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The use of computers in music education in South West Africa

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8.2 TEST VALIDITY

This represents the extent to which a test measures what it purports to measure. The validity of a measuring instrument has been defined as "the extent to which differences in scores on it reflect true differences among individuals on the characteristic that we seek to measure, rather than constant or random errors" (Selltiz et al. 1976, pp. 168-169). This was established using the procedure termed 'concurrent validity'. Performance on the CAMETS tests was compared with performance on another well-reputed test: the UNISA Music Certificate Examination. This procedure was carried out on a limited scale with five students not in the sample of students who participated in the CAMETS project. It is noted that these five students were selected from the student population of the Windhoek Conservatoire, that they were aged between eleven and fifteen years, that they were at different levels of music achievement (grades 4-8) and that they had all recently completed a UNISA examination. Each student in this sample validation group was given the CAMETS test at his/her present grade level. These scores were then compared with the most recent UNISA examination results of each of the five students, at the same grade level.

It is noted that the appropriate section of the UNISA examination (Practical Musicianship) represents between ten and fourteen per cent of the total score of the UNISA examination. This section is marked out of fifteen, eighteen or twenty-one points, out of a total of 150. The pass-mark set for this section is sixty-seven per cent. It is also noted that interval recognition and rhythm tests (clapping, beating time, naming note-values, etc.,) forms only a small portion of the UNISA tests in Practical Musicianship. Although each specific section of the Music Certificate examination is followed by brief 'remarks' of the examiner, an indication of the candidate's ability in specific areas of ear training is not always referred to in detail. However, for the purposes of this concurrent-validation procedure, it was assumed that the total score awarded for Practical Musicianship to a student would accurately reflect that student's all-round aural-perception ability. This mark was therefore assumed to also

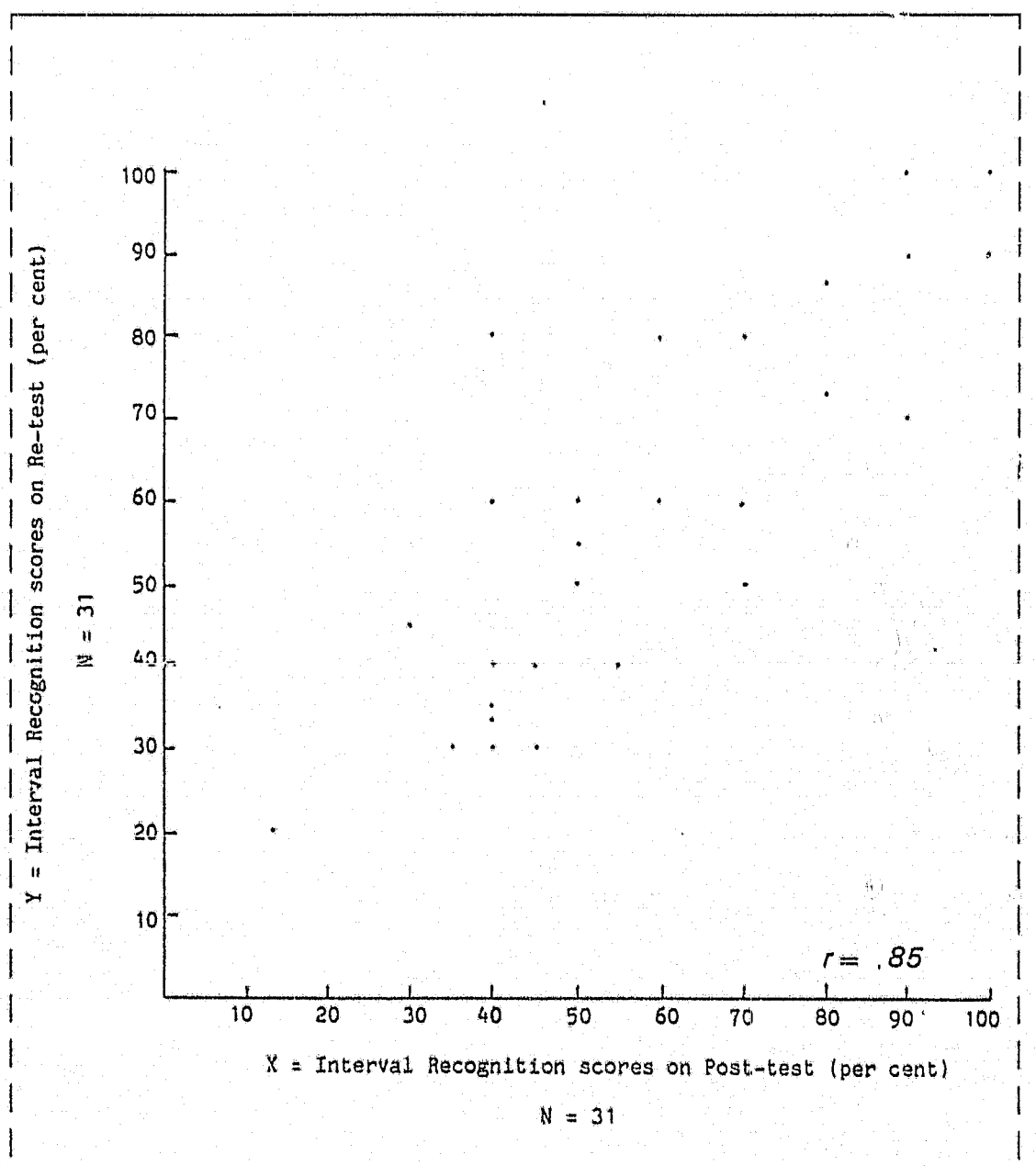


Figure 10. Scatter diagram - test-retest reliability (Intervals).

reflect specific abilities in interval and rhythm aural perception, at least to some extent.

The marks achieved by students are given in Table 11 and are expressed as percentages:

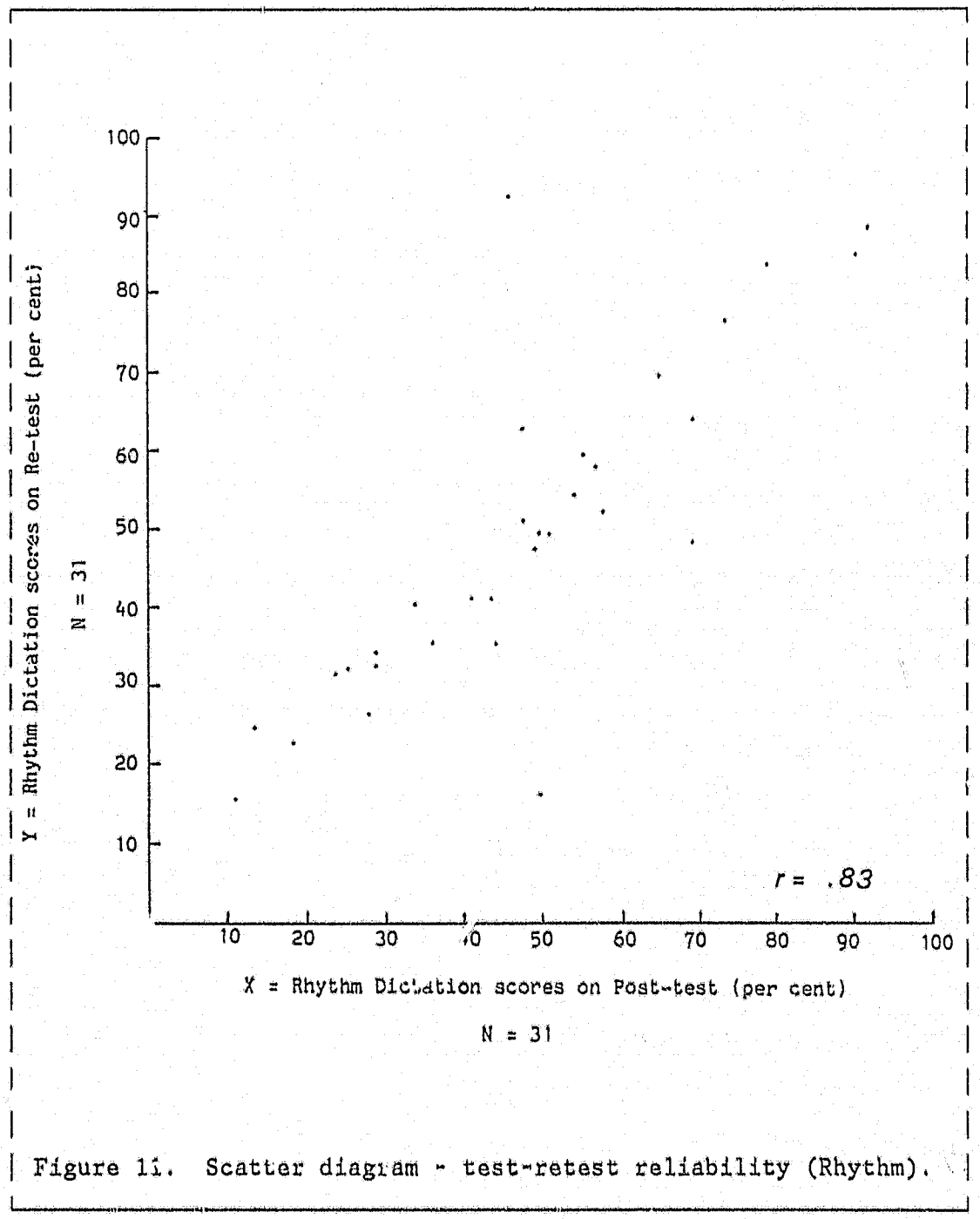


Figure 11. Scatter diagram - test-retest reliability (Rhythm).

It is noted that, in calculating the score on CAMETS tests, both sections - intervals and rhythms - were marked separately, and the average was taken. From this data it is evident that a very high degree of correlation was obtained from the concurrent validity procedure. It is therefore concluded that the CAMETS tests measured what they purported to measure, namely, that the test scores obtained were an accurate reflection of student skill proficiency in the specified

Table 11. Results of concurrent validity pilot study

Student	Age	Grade	CAMETS	UNISA
A	12	4	57	60
B	13	5	83	83
C	14	6	93	87
D	13	7	84	89
E	15	8	70	71

r = 0.96

aural tasks. However, the limited scale on which this validation procedure was conducted must be acknowledged.

8.3 VALIDATION

8.3.1 VALIDATION : MUSIC AUTHORITIES IN RSA

This procedure was carried out by the researcher, by submitting the CAMETS tests and syllabus to music authorities at six universities in RSA as well as to an authority not connected to a university. These judges were asked to review the comprehensive documentation of both syllabus and tests, and to answer a questionnaire constructed by the researcher. It was hoped that this questionnaire would elicit a response from judges, in determining whether or not the CAMETS tests measure the kind of behaviour that the investigator had assumed them to be measuring and whether the tests were observed as providing an adequate sample of that kind of behaviour. Thus, face validity was assessed by the evaluators studying the concept to be measured and

determining, in his or her best judgement, whether the test instrument arrived at the concept adequately. It is noted that, of the fourteen questionnaires sent to music authorities, only seven responses were received. Since this validation procedure was probably the most crucial to the present study, in determining the relevance and validity of the CAMETS syllabus and tests, the observations made by authorities are reported in detail.

In the aforementioned questionnaire (see Appendix G) the judges were asked to consider the following statement: 'The CAMETS grade tests are, on face evaluation, fair in that they closely approximate the CAMETS syllabus in content.' Six of the seven judges agreed with this statement, one observing that in the Grade 1 test, the interval asked extended beyond the pitch range stated in the syllabus.

All agreed with the following statement: 'On face evaluation, the CAMETS grade tests examine what they claim to examine i.e., the questions asked adequately test the student's knowledge at a particular grade level according to the CAMETS syllabus'. One judge observed that: "without the 'singing' component, more extensive tests are required, especially for the later grades". Another observed that: "it will probably be confusing to students not used to the symbols m3, P4, etc. First, second, third degree or note of the scale might be more understandable to them".

In response to the statement that the number of intervals asked in the CAMETS test is adequate, the majority (6) concurred. One authority observed that, as noted in the previous statement, there was a need for more extensive testing, since the 'singing' component had been removed. It was recommended that perhaps students could be required to recognise a series of intervals. Three or four notes played in succession could be asked and students could then identify these either in relation to the first note played, or in relation to each preceding note. The same judge was again the only one not concurring with the statement that the number of rhythms asked in CAMETS tests was adequate. This authority observed that: "Once again, once the physical component of clapping is eliminated, this needs extension".

It was recommended that the Kodaly method of naming note-values be incorporated in the tests.

Five authorities thought the length of rhythms (two bars) was sufficient, although most recommended that the length could be extended, particularly in the higher grades. One observer, stating that the rhythms were too short, noted that "memory in music is also an essential ear training skill". All agreed that the time limits specified in tests appear to be feasible, although one observed that these should be flexible, depending on the particular test situation.

Although most authorities (5) concurred that the recommended scheme of marking was feasible, most acknowledged that this was a problem. One felt that rhythms could perhaps be 'weighted' according to the number of notes required in the answer, with longer rhythms being allotted more marks than shorter rhythms. Another suggested that students who identified the distance of the interval but not its quality (e.g., M6 for m6) should be awarded part marks. It is noted that the statement 'these marking suggestions may be changed at the discretion of the examiner' was made by the researcher in the recommended scheme of marking. One observer noted that this statement should have been placed at the beginning of the section 'scheme of marking'.

Three judges stated that a pass-mark of fifty per cent in each section of the test (intervals and rhythms) was feasible. Three noted that they would have preferred a higher pass mark (60%, 67% and 65%). One thought the pass-mark was irrelevant. It is noted that in the CAMETS project, a comparison of CAI and conventional instruction was made and student achievement was assessed at a predetermined achievement level. Here, the pass-mark was set at eighty per cent for intervals and sixty per cent for rhythms.

Six of the seven authorities agreed with the following statement: 'The level of difficulty of intervals specified in the CAMETS syllabus appears to be logically and gradually increased for each successive grade.' One observed that the UNISA syllabus should not necessarily serve as a logical model. However, it is pointed out that the UNISA

syllabus was accepted as the model and it was not the researcher's aim to determine the validity of the UNISA syllabus. Many of the judges took the trouble to consider both sections of the test in detail, making valid suggestions for which the researcher is grateful.

Five of the seven authorities agreed with the statement that 'the level of difficulty of rhythms specified in the CAMETS syllabus appears to be logically and gradually increased for each successive grade.' It was noted that some of the rhythms, particularly in higher grades, were considered 'unrealistic' and perhaps too difficult. The lack of arpeggios was noted by two judges. One suggested that triplets could be introduced before dotted rhythms and observed that Grade 7 appeared more straightforward than Grade 6.

It was then asked whether or not music authorities agreed that 'the level of difficulty of intervals specified in the CAMETS grade tests appears to be logically and gradually increased for each successive grade, and whether or not the level of difficulty of rhythms specified in the CAMETS grade tests appears to be logically and gradually increased for each successive grade.' Although a repetition of the two previous questions, these two questions specifically referred to the CAMETS tests, whereas the previous questions referred to the CAMETS syllabus. Although most judges (5) agreed with these statements regarding the CAMETS tests, it appeared (to the researcher) that most had equated the tests and syllabus, since there were no comments regarding the last two statements.

The following statement was put to the music authorities: 'On face evaluation, results (i.e., student scores) obtained from CAMETS grade tests would seem to be meaningful in that they would provide a valid index of student achievement, that they would test a student's ability to recognise intervals and dictate rhythms fairly accurately, and that the scores are likely to provide a basis of comparison of student ability within a group of students taking the same test.' Five of the seven judges agreed with this statement, one disagreed and one abstained. One observed that it was unfortunate that no provision for training in time signature recognition had been made. Another observed that "it will not test any general musical talent, only a

technical ability". This may be taken to mean that the test was indeed a test of a particular skill. Since the CAMETS tests were not constructed to measure musical aptitude, this comment is interpreted positively. A test of musical aptitude would not have served as a measure of achievement in the particular context of the CAMETS project. It is noted that the authority who neither agreed nor disagreed with the above questionnaire statement expanded her view: "I have reservations about this as I feel so strongly about the necessity for the ear, eye and voice to work together. In the absence of the physical (voice) involvement I think a critical sense of interval and rhythm experience is missing, particularly for children".

The following statement was put to authorities: 'On face evaluation, the CAMETS syllabus and grade tests in interval recognition and rhythm dictation appear to have relevance to students studying music ear training at the level of graded music examinations, and seem to be as valid as the corresponding sections of the UNISA syllabus and tests in Practical Musicianship.' Judges were asked to consider this statement in the light of the argument supporting it, which was presented (by the researcher) in the covering letter accompanying the questionnaire, as follows:

'I wish to argue that the CAMETS program has as much relevance as UNISA in music education. The UNISA Practical Musicianship examination is by nature different from the CAMETS program. It emphasises, albeit implicitly, that aural training is a physical activity. By requiring a student to sing an interval, the UNISA examination is testing a candidates ability to sing and pitch correctly as well as to identify the degree of the scale. The physical activity of clapping a rhythm is emphasised by UNISA (Grades 1 to 4). It could be argued that the activity of clapping a rhythm is, to some extent, related to the activity of notating a rhythm. A student who can notate a rhythm will be able to clap that rhythm in all probability. Yet a student who claps a rhythm may not necessarily be able to notate it. To clap a rhythm, the student may merely be imitating what he/she has heard. Rhythmic dictation is cognitive, clapping imitative. Dictation presupposes a knowledge and understanding of time signatures and music notation whereas clapping does not. It is not my

intention to criticise the UNISA approach but merely to point out the differences.

The line of re ag I take to justify CAMETS is that, if a student can listen to a musical example and write it down, then surely the student has heard it properly. Dictation is seen as the primary means of measuring student progress in aural skills. I therefore submit that the CAMETS approach is relevant in music ear training, that it is relevant to students studying music at this graded level and that it is founded on an acceptable approach (UNISA)'.

It is noted that five of the seven educators concurred with this statement. One abstained and offered no comment. The other abstention was supported as follows: "Your study is valid but in my opinion not comprehensive enough. What about the whole area of sight-singing? This is something I begin from day 1 with a student and it pays great dividends". This was elaborated later: "I feel the CAMETS programme is valid under certain circumstances and with certain provisos. It shouldn't replace the traditional comprehensive music ear training instruction, but should be used alongside the physical activity counterpart. In terms of music education per se, I cannot unfortunately agree that it has as much relevance. As a complementary means of testing it is valid, but is limited by its own technology which excludes e human physical factor".

The additional remarks made by other authorities are given:

"The syllabus seems to be well-designed and compiled logically. Perhaps care should be taken that the UNISA syllabus is not taken as the sole criterion. The principal purpose of aural training is to develop practical-aural recognitive abilities and not to pass a pre-set test. This is not to criticise the CAMETS system, as long as the tests are not used as an end in itself. The aspects shown in this questionnaire would seem to go a long way to training musicians in the aspects of interval and rhythm, which really are the bases of any aural program".

"The rhythms used in the CAMETS tests have not been conceived musically. It is recommended that tests should be constructed on a 'rising' scale i.e., one that gradually increases in difficulty. Therefore, students should not only be examined at one grade level. I don't agree that the tonic should serve as an exclusive starting point in interval recognition. Although the CAMETS tests provide a guide-line of student aural ability, the best assessment of aural training is sight-singing".

Specific recommendations for improvement of the CAMETS syllabus and tests were made:

"Please note the anomaly that m2 (an easy interval) only appears at Grade 7-8 level! It has appeared in Grade 5 already 'below', albeit called M7". It was suggested that the minor second ascending be included in Grade 4. One authority observed that the following rhythm questions in CAMETS tests were too difficult: Grade 3 - no. 2; Grade 4 - no. 3; Grade 5 - nos. 1 and 3. Another observed that excessive use of rests and tied notes was made in Grades 6-8, and that no triplets were used in rhythm questions of the Grade 6 test.

The researcher therefore concluded that, in essence, the music authorities responded positively towards the CAMETS tests and syllabus, and regarded the tests as an adequate means of measuring skill proficiency in the specific aural tasks. The many reservations expressed by authorities have been noted and the limitations of the tests and syllabus are acknowledged. Since the majority of respondents to the validation questionnaire concurred with the statements put to them, the researcher wishes to argue that the CAMETS tests and syllabus are a valid means of testing student proficiency in certain aural skills. Therefore, it is argued that the instrumentation used in the experimental study did measure the kind of behaviour that the investigator assumed it to be measuring, and that an increase in skill proficiency in specific aural tasks could be determined from a comparison of pre- and post-test scores.

Observations made by group-class instructors and students in the sample concurrent validation study (presented below) are supportive

of this contention made by the researcher, that CAMETS is likely to test what it sets out to test and that the tests provide an adequate index of ability in the specific skills being measured.

8.3.2 VALIDATION : GROUP-CLASS INSTRUCTORS

This formed part of the interviews conducted by the researcher with both group-class instructors. The following observations regarding the CAMETS Interval Recognition syllabus are noted.

One instructor observed that it would have been better to introduce the intervals of the harmonic minor scale in its ascending form at first, that is, at a grade 6 level. This grade would also include the intervals of the ascending and descending major scale. The other instructor felt that, since only two new intervals were actually introduced in the harmonic minor scale (the third and sixth degrees), its inclusion in both ascending and descending forms at a grade 6 level was feasible. Both observed that the intervals introduced at a grade 7 level (minor second, tritone and minor seventh) were easy for students and immediately recognisable, since these intervals did not form part of the major and harmonic minor scales.

Regarding the CAMETS rhythm dictation syllabus, both instructors observed that the work load was not evenly spread throughout the eight grade levels. Both felt that too many new rhythmic patterns were introduced in Grade 3 and these new patterns should have been spread over Grades 3 and 4. Both instructors noted that students continually confused triplets in simple time signatures with compound time signature note-values, although 6/8 time had been introduced in Grade 3 and triplets, only in 2/4, in Grade 4. One instructor suggested that rests should be introduced from a grade 1 level, and not only in Grade 5 as prescribed in the CAMETS syllabus. Both instructors observed that it was unrealistic to expect that the rhythm syllabus could be completed in a six-month period.

Both instructors felt that the CAMETS tests were generally acceptable, although they recommended that rhythm questions should have been longer than two bars and more rhythms should have been asked. One instructor observed that, since rhythm dictation is largely a test of memory as well as notational ability, the tests in interval recognition could have been extended. It was suggested that a series of intervals should have been presented (c.f. the recommendation made by music authority in Ch. 8.3.1.) so that memory would also play a part in this section of the test. Finally, it is noted that both instructors agreed with the statements presented in the questionnaire (see Appendix G, specifically with statement nos 1, 2, 3, 6, 7, 8, 10, 11, 12, 13, 15, and 17).

8.3.3 VALIDATION : STUDENTS IN SAMPLE CONCURRENT STUDY

Interviews were conducted by the researcher with the five students selected for the concurrent validation procedure previously described. These interviews were conducted informally with the students, following the administration of the CAMETS tests. It is noted that three of the students were interviewed separately and the remaining two were interviewed together. A tape-recorder was used to record their responses. The purpose of these interviews was to ascertain the viewpoint of students who had taken the CAMETS tests. All five students stated that they understood the instructions given on how to answer both sections of the tests. All felt that sufficient intervals were asked to assess their ability. All felt that answering intervals which started on different notes did not "move around" excessively. This was asked in response to an observation by a music authority that the second series of intervals (in each CAMETS test) should move more gradually, that is, the starting note of each interval should be placed close in pitch register for successive intervals on different 'tonics'.

All students observed that the intervals asked in CAMETS tests corresponded with intervals asked in concurrent UNISA examinations. One

observed that the test was "less intense" than the UNISA examination because "you are not under pressure to give the answer straight away. You can think about the answer and even change your mind". Another student observed that the CAMETS test in Interval Recognition was less unfair than UNISA's examination, because it specifically tested recognition ability: "You have to sing it in the UNISA exam. I don't see why you should sing it, unless you're doing a singing exam. What happens if you just haven't got a voice? It's unfair". Three of the five students observed that they had not previously learned rhythm dictation and this part of the CAMETS test was new to them. One student noted that, although new to her, "if you write it down, it's easier than if you have to say the note-values" (as in the UNISA examination from a grade 5 level). Another observed that "if you write it down, you have time to work it out. With UNISA you've got to answer immediately". Two of the five students felt that the CAMETS rhythm tests would have been better "if you had to work out the time signature". Nevertheless, all agreed that this section would give some indication of rhythm-perception ability, as well as a reflection of their understanding of note-values, time signature and music theory knowledge.

9.0 INTERPRETATION OF RESULTS OF THE COMPARATIVE STUDY

9.1 CONCLUSIONS

The term 'conclusion' is used to denote the final result and outcome of statistical procedures conducted with data generated by the empirical design. Inferences drawn from these conclusions are presented later in this chapter.

The results of this study showed that there was no difference in improvement of aural-perception skills in interval recognition and rhythm dictation between students exposed to alternative forms of instruction- CAI and the conventional instruction- at the .05 level of confidence. Furthermore, this study found that there was no difference in achievement between the two groups when compared at different grade levels ($p = .05$). In addition, it was determined that certain independent variables, namely, sex, age and presence/absence of music theory classes did not influence the extent of improvement of the specific aural- perception skills of students exposed to CAI ($p = .05$). Finally, no differences in degree of proficiency in the specific aural skills was found in a comparison of the groups, when achievement was determined in terms of pre-set competency levels ($p = .05$).

However, there were differences between the groups in the degree of proficiency obtained in the specific aural-perception skills under consideration in this study. While not statistically significant, it was apparent that the group receiving CAI in interval recognition achieved a far greater degree of proficiency than the group receiving the conventional instruction. Results of both the Sign and Wilcoxon Matched-Pairs Signed-Ranks tests indicate that this difference was significant at the .10 level of confidence. In addition, results of these statistical tests indicate that students receiving the conventional instruction in rhythm dictation fared better than their counterparts who received CAI, in the degree of proficiency attained

in this specific skill, although this increased degree of proficiency could not be shown at the specified level of significance.

From the results of the post-hoc analysis it was concluded that there was no difference in the degree of proficiency obtained, between students receiving the alternate forms of instruction, in their ability to notate rhythms correctly when proficiency in this skill was determined in terms of pre-set competency levels (p=.05). However, while not statistically significant, it was evident that the teacher-taught group showed a far greater proficiency in this skill than their counterparts receiving CAI. Results of the X^2 Test for Two Independent Groups indicate that this difference was significant at the .10 level of confidence.

9.2 DISCUSSION

This discussion focuses on three issues. Firstly, a discussion of the conditions under which statistically significant results may have been attained is presented. An explanation of the results of the comparative study is proposed. Secondly, a discussion of the implications of the raw scores obtained by students on the pre- and post-tests is considered. It is argued that these scores indicate a definite improvement in student aural proficiency. Finally, a discussion of the results is presented in the light of some of the qualitative information obtained through questionnaires and observation.

It should be pointed out that probability statements obtained from the nonparametric tests used in this study indicate the exact probabilities of their occurrence. Probability has been defined as an expression of "the frequency of occurrence of a given event, relative to the frequency of the nonoccurrence of that event, in any series which could produce either occurrence or nonoccurrence" (Goode and Hatt 1952, p. 211). It is obvious that the size of the sample has a crucial bearing on the probability of a certain outcome, since a

chance unexpected observation is less likely to affect the outcome of a statistical procedure when the sample size is large than when it is small. In the present study, the size of groups being compared was limited to a maximum of twenty-two students (n1 = 21; n2 = 22). It is therefore evident that the score of any individual could make a difference at the critical level of confidence.

This observation is offered as a means of explanation of some of the findings. One possible explanation of results obtained in this study is given as an example. In the comparison of matched pairs in testing Hypothesis 1 using the Wilcoxon Matched-Pairs Signed-Ranks test to determine differences in student proficiency of interval recognition, it was previously noted that the CAI group far out-performed the conventional group. The observed probability was p = .09.

From comparison of pre- and post-test scores it is noted that three students scored much lower marks (viz., more than fifteen per cent) on the post-test than on the pre-test. This would indicate that they actually deteriorated in aural proficiency over the six-month treatment period in ability to recognise intervals. If the test results are assumed to be reliable, it would seem that CAI was detrimental to these students (nos. 6, 26 and 41). It is noted that one of these students (no. 6) discontinued his practical music lessons at the Conservatoire midway through the research project. His piano teacher stated that he was no longer interested in learning the instrument, but, at the insistence of this researcher, this student continued to participate in the CAMETS project. It may be argued that this particular student was no longer motivated in his music studies and his post-test score is an indication of this. Similarly, Student no. 11 fared far better in the re-test conducted as part of the CAMETS tests reliability check, scoring eighty per cent in the interval recognition section of the test (as opposed to 40% in the post- test). This particular student indicated that she had been ill at the time of the post-test. She felt, however, that she was obliged to attend the post-test examination, as she assumed it was compulsory to attend on that day.

Obviously, it may be possible to present specific circumstances for other students in the study in an attempt to justify the results. However, reference to students in this instance is offered as a possible explanation. It is noted that, had the post-test results been different in even one of these instances, this particular statistical test (Wilcoxon) would have supported Hypothesis 1 at the .05 level of confidence.

The results obtained from statistical analysis of data represent only part of the findings in this study. From a perusal of the CAMETS pre- and post-test results it is immediately evident that there was a definite improvement in scores over the six-month period, in the majority of cases (q.v. Appendix L). A comparison of mean scores provides a rough indication of this. One may assume that, irrespective of the method used to teach students the specific aural-perception skills, whether CAI or conventional instruction was used, the majority of students in this study showed an increase of proficiency in these skills. It would only have been possible to determine the significance of increased proficiency if a third control group had been used in the study, one which received no form of treatment (CAI or conventional instruction). Scores of a third control group would have provided a basis for comparison of gain scores of students in the CAMETS study. It is not possible to test for this significance of increased proficiency by using each subject in the study as his/her own control. Although the pre-test scores are an indication of students' initial proficiency, one cannot assume that students would have remained at that level, had no treatment been administered. It is likely that extraneous variables such as history and maturation may have influenced the achievement levels of students over a six-month period. Yet, it is highly unlikely that increases in proficiency (as measured on the CAMETS tests) of students participating in this study were a result of these extraneous variables and not as a direct result of treatments.

If it is accepted that students did improve in aural proficiency over the treatment period, irrespective of the kind of treatment received, it is reasonable to conclude that each form of treatment was at least as effective as the other, since the null hypothesis could not be

rejected in all instances. In terms of the aims of this study, it is therefore possible to argue that the computer provided a feasible alternative to traditional methodology in certain areas of music aural training. One could immediately gauge that a response from music educators to this view would be less than salutary, since no teacher wishes to think that he/she could be replaced by a machine. Yet the data obtained from this study cannot be ignored. The fact that students exposed to CAI performed at least as well as their teacher-taught counterparts must be acknowledged. However, considerations of the desirability of a situation where CAI is used as an alternative to traditional instruction are of crucial importance to both educators and decision-makers. These considerations will be discussed later. It is accepted that the statistical procedures employed in this study provide only a superficial indication of the learning experience and process that was taking place. The experimental study provided a framework for evaluation of the efficacy of CAI. Descriptive data obtained from questionnaires, interviews and observation has been presented in an attempt to further inform the results obtained from statistical analysis. Although not comprehensive, this information was intended to describe more fully the learning milieu and perceptions of students involved in the learning experience. Information obtained from these procedures is summarised below.

Although the experience of working with a computer was a novel one for most of the students, it was evident that they were not overwhelmed by this means of instruction. Most were able to operate the computer satisfactorily and to find their way around the computer programs. Yet mechanical problems, particularly evident in the rhythm dictation programs, did cause a certain frustration to many students. The majority of students felt that CAI was an enriching learning experience and that they had benefited from the project. Many expressed an interest in continuing with CAI in aural training.

Many music lecturers who responded to the questionnaire observed that the GUIDO system and CAMETS programmes had a relevant place in music ear training, that the system could be used to advantage at the Windhoek Conservatoire, that they would encourage their students to

use the system as an adjunct to conventional instruction, and that the GUIDO system could be beneficial in improving their own aural skills. From observations made by the researcher, it was apparent that students required continual assistance with the CAI system and that some form of supervision was essential. It is interesting to note that, although the novelty of CAI appeared to wear off, particularly as the level of difficulty of programs increased, most students remarked that they wished to continue with the CAI course.

9.3 POST HOC ANALYSIS

9.3.1 STUDENT PROFICIENCY IN NOTATING RHYTHMS CORRECTLY

Probably the most illuminating aspect of this project was the observation of the computer's inability to <u>teach</u> the specific aural skills. This was evident in the rhythm dictation program. It has been previously observed that, in the CAMETS rhythm program, the researcher made every effort to ensure that rhythms presented to students for dictation in the lessons would adhere to the 'rules' regarding correct note-groupings. From the post hoc analysis of the CAMETS rhythm test-answers given by students, it was apparent that the group-class instructors were far more successful in teaching correct note-groupings than the computer (q.v. Ch. 6.7). This observation is fully developed and interpreted later in the chapter.

9.3.2 STUDENTS' UNDERSTANDING OF THE CAI INTERVAL PROGRAM

Information obtained from the student questionnaire would appear to indicate a lack of understanding on the part of students working with the CAI program in interval recognition. This was apparent from the responses of students to the following question:

> If the lesson was
>
> did you think that: (tick one)
>
> a) this was stupid because it is easy to tell the difference between these two intervals ___
>
> b) there was a reason for this lesson and this reason is (fill in your answer) ___
>
> .....

The answer was seemingly self-evident to this researcher, namely, that the 'new' interval of a major seventh was being introduced in isolation, so that students could become accustomed to the sound of this interval. Similar units had been presented whenever an additional interval was being presented. However, exactly half of the students responded to the first option (a) in this question, indicating that they did not perceive the intended purpose of the lesson. Furthermore, approximately half of the students who gave this answer were between the ages of eleven and twelve, while the remainder were aged between thirteen and fifteen years. Therefore it would appear that, since half of the students in this sample did not perceive the

intended purpose of these lessons, this aspect of the CAMETS program was not clearly understood.

These observations of the computer's inability to teach students to notate rhythms correctly, and lack of understanding shown by students working with the interval recognition program, are obviously made with reference to the students who participated in this study. It is possible that older students, for example, students studying aural training at a tertiary level, would have perceived the program's intentions. Yet, in the light of claims made by developers of the GUIDO system as a 'learning system', and one that "offers instruction in ear training" (Arenson and Hofstetter 1983, p. 46), it would appear that the computer system does have certain limitations in teaching younger music studerts. It is perhaps unfair to view the GUIDO system as providing self- sufficient instruction in aural-perception skills, since it was conceived as a means of providing practice in these skills. The fact that it did serve as a feasible alternative to traditional instruction in this study indicates that the GUIDO system was self-sufficient as a form of teaching. However, the researcher wishes to argue that its optimal employment would be in conjunction with traditional instructional methods. It is the second word of the concept 'computer-assisted instruction' which is being emphasised as a rationale for this argument.

It is therefore proposed that the intent of both CAMETS programs could have been more clearly communicated to students if concurrent teacher-taught instruction was given to students receiving CAI. It is likely that, had students been told to observe the grouping of notes in answers appearing on the screen, and had the importance of correct note-groupings been constantly emphasised by a teacher, the students receiving CAI would have shown a far greater proficiency in notational skills than that observed from the post hoc analysis. Similarly, a teacher could have pointed out the purpose of lessons in which 'new' intervals were being introduced in isolation, and so increase students' understanding of the CAI program.

intended purpose of these lessons, this aspect of the CAMETS program was not clearly understood.

These observations of the computer's inability to teach students to notate rhythms correctly, and lack of understanding shown by students working with the interval recognition program, are obviously made with reference to the students who participated in this study. It is possible that older students, for example, students studying aural training at a tertiary level, would have perceived the program's intentions. Yet, in the light of claims made by developers of the GUIDO system as a 'learning system', and one that "offers instruction in ear training" (Arenson and Hofstetter 1983, p. 46), it would appear that the computer system does have certain limitations in teaching younger music students. It is perhaps unfair to view the GUIDO system as providing self- sufficient instruction in aural-perception skills, since it was conceived as a means of providing practice in these skills. The fact that it did serve as a feasible alternative to traditional instruction in this study indicates that the GUIDO system was self-sufficient as a form of teaching. However, the researcher wishes to argue that its optimal employment would be in conjunction with traditional instructional methods. It is the second word of the concept 'computer-ass'··ed instruction' which is being emphasised as a rationale for this argument.

It is therefore proposed that the intent of both CAMETS programs could have been more clearly communicated to students if concurrent teacher-taught instruction was given to students receiving CAI. It is likely that, had students been told to observe the grouping of notes in answers appearing on the screen, and had the importance of correct note-groupings been constantly emphasised by a teacher, the students receiving CAI would have shown a far greater proficiency in notational skills than that observed from the post hoc analysis. Similarly, a teacher could have pointed out the purpose of lessons in which 'new' intervals were being introduced in isolation, and so increase students' understanding of the CAI program.

9.4 INTERPRETATION

In the present study, although differences were hypothesised, none were found in the comparison of student achievement scores as measures of proficiency in selected aural-perception skills. It was expected that students receiving CAI would achieve better results than students receiving traditional instruction. It was expected that there would be differences between males and females, older and younger students and students who received concurrent music theory classes and those who did not, in the degree of proficiency of the specific aural skills amongst those students who received CAI. It was expected that students receiving CAI were more likely to attain a predetermined level of achievement and level of competency than their counterparts receiving conventional instruction. It is therefore appropriate to consider why results did not turn out as hypothesised or expected. This discussion addresses itself to this question as well as others: What circumstances accounted for the unexpected outcome? What might have been happening within the methodology to account for the findings? What were some of the shortcomings of the study? What were some of the limitations?

Results of the study indicate that students receiving CAI did acquire a certain proficiency in aural discrimination tasks and did show an improvement in ability over the six-month period in the selected tasks. It must be acknowledged that learning had occurred in this individualised environment of CAI and that an increase in proficiency in certain aural-perception skills was shown by students using the resources of CAI, in the absence of conventional instruction. What was evident in the finding was that the degree of aural proficiency attained through CAI was not as great as that expected. A partial explanation of this is offered. It was observed that students receiving CAI in interval recognition fared better than those working with the CAMETS Rhythm Dictation program, when compared with the control groups receiving group-class instruction in these aural skills. A likely explanation of this is that the CAI program in interval recognition was a better program than the CAI rhythm dictation program, primarily because of its simplicity. The interval program

was less subject to mechanical problems than the rhythm program. Recommendations for program improvement are considered later.

It was observed by the researcher that students receiving CAI in interval recognition were getting far more practice in this skill than their group-class counterparts. During the half-hour session with the computer, the average student completed between ten and twenty units. Each unit required the student to recognise between four and fourteen intervals. From observation of group classes, it was evident that instructors were only able to ask approximately twenty or thirty intervals. Yet, in spite of this increased practice, students receiving CAI did not perform better than their counterparts at the hypothesised level of significance.

It may have been that students receiving CAI experienced more difficulty in recognising intervals when these were presented in the CAMETS tests at the piano, since the intervals presented for identification in computer lessons were 'played' on a synthesiser. Although pitch is the fundamental factor in interval recognition, the timbre or tone-colour does have some bearing on the perception of an interval. Students receiving group-class tuition in interval recognition were taught, not only to hear an interval, but to hear what it sounds like when played on the piano. However, the researcher wishes to argue that the reason why the computer program did not achieve its objectives (since there was a difference between expected achievement and observed achievement) has to do with the lack of continued teacher-taught instruction. It has been previously noted that all students participating in this study received the theoretical knowledge underpinning aural training in these specific skills, during the first two lessons of group-class instruction. Yet it is argued that, for students receiving CAI, this was not sufficient and it is more likely that expected achievement levels would have been attained if students had received subsequent instruction from a teacher, as they progressed through the program.

It is easier to offer an explanation for the observed differences between groups receiving alternative forms of instruction in rhythm dictation. The numerous observations by music authorities, educators

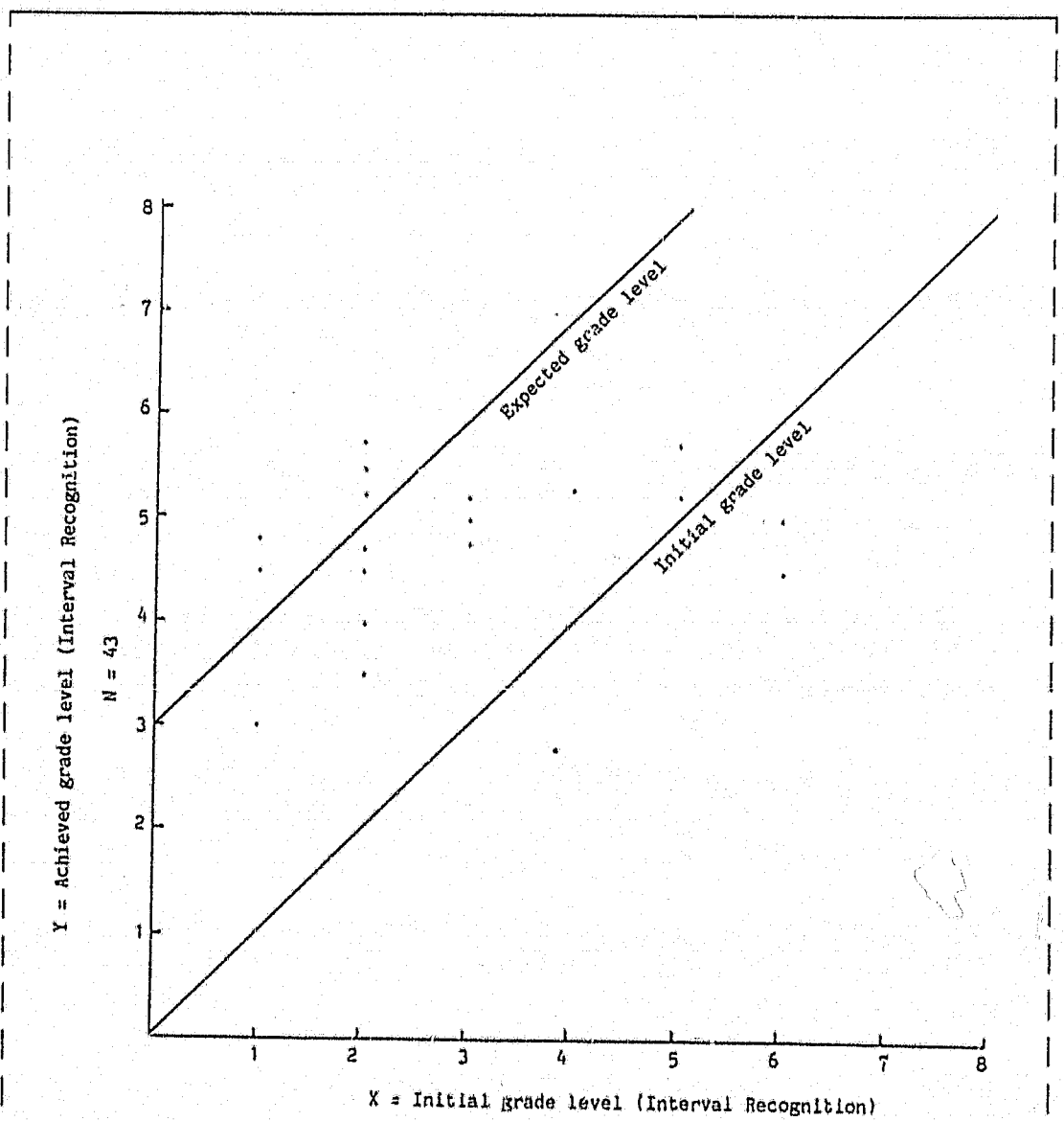


Figure 12. Interval Recognition (CAI) - expected/observed levels.

in SWA and group-class instructors serve to indicate the extent of limitations of the GUIDO system and CAMETS program in Rhythm Dictation. These are summarised later. In retrospect, it seems obvious that the goals set in rhythm dictation skills were far too ambitious. The syllabus was deemed unfeasible in terms of the six-month study period, precisely because the permutations of different rhythm patterns and different time signatures are extensive than that

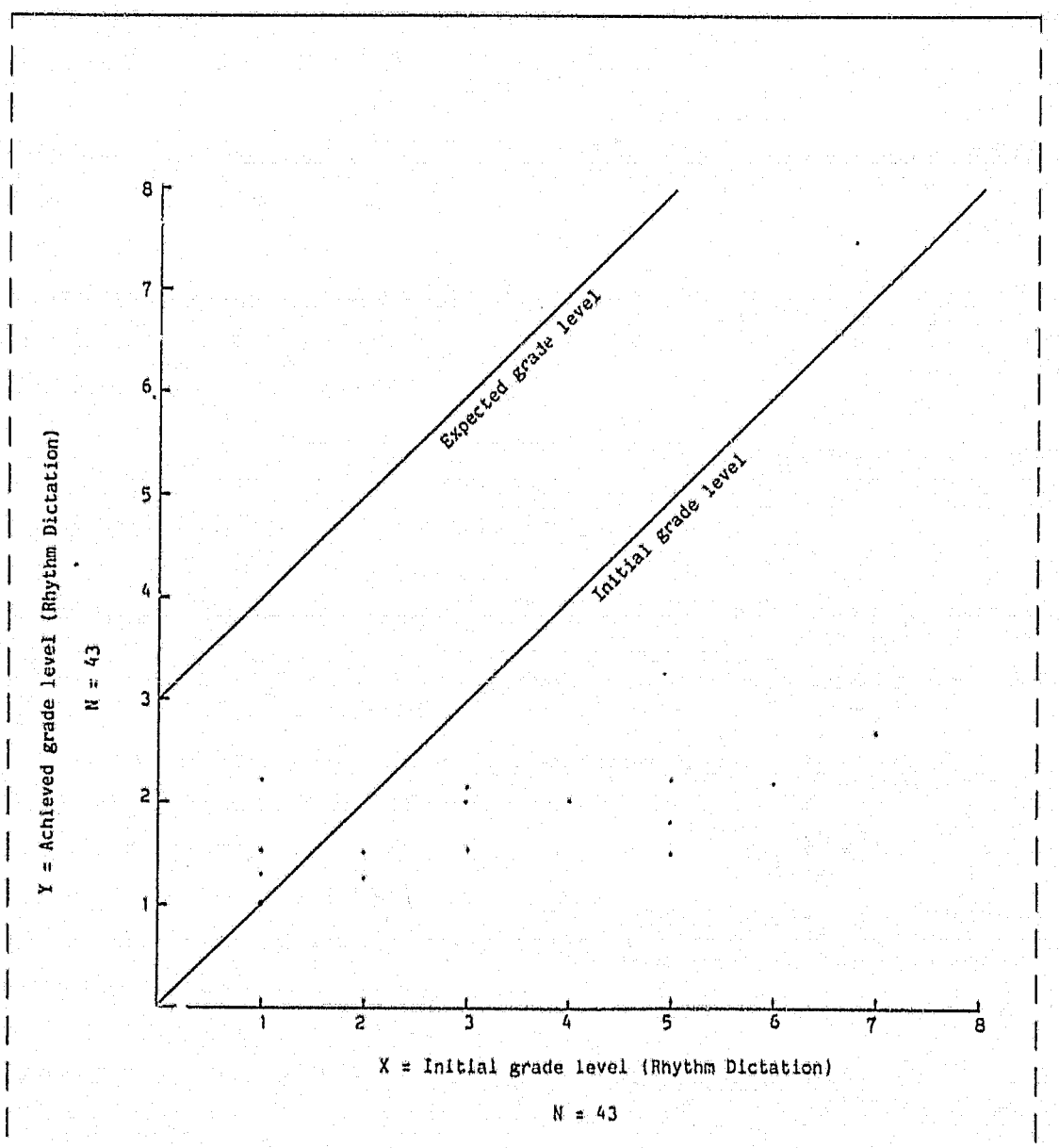


Figure 13. Rhythm Dictation (CAI) - expected/observed levels.

in interval recognition, which is limited by the number of chromatic notes available. This is clear from a comparison of the graphs in Figure 12 and Figure 13 on page 169, which indicate exactly how far students, receiving CAI, progressed in the two programs. It has been noted that progress made by the group-class instructors was approximately the same. Both instructors managed to complete the interval syllabus in the study period, but were only able to reach a grade 3 to 4 level in rhythm dictation.

It is therefore suggested that the lack of differences between groups receiving alternative forms of instruction in rhythm dictation may be explained in terms of the 'unrealistic' syllabus, the extensive problems experienced by students using the CAI program and the extensive limitations of the GUIDO system. It is also pointed out that rhythm dictation was a skill new to most students in the sample, since it is not part of practical music examinations at a grade level in SWA, whereas most students are familiar with interval recognition, which is part of practical examinations. These observations may account for some of the results obtained in this comparative study.

The intervening variable was referred to in the introductory section (Ch. 1) as a conceptual variable that is often difficult to identify and define. In order to isolate this factor, which cannot be seen or measured, one may ask: "What is it about the two modes of presentation (CAI and conventional instruction) that should lead one to be more effective than the other?" It was postulated that the answer may lie in the amount of attention demanded from the student and the amount of information presented in the different forms of instruction. Two basic principles of teaching are that each learner must do his own learning and that learner-motivation is a vital ingredient in any learning situation (Gore 1969, p. 64). For motivation to be sustained, the student's interest must be captured and held. It is obvious that, since this was the first time that most students participating in this study had used a computer, it would have a natural attraction. Students found this experience interesting and, despite the wearing off of the novelty, this interest was maintained. It may be argued that attention of students was greater in the computer-learning experience than in the classroom situation, since physical presence in the class does not necessarily imply attention. The fact that students received more information during computer sessions (number of exercises presented) has already been noted. Yet, the researcher wishes to expand on the notion of 'amount of attention'. Attention is implied when a student is actively engaged in the learning process. Since the computer demands active participation from the student, one may consider that the degree of attention and concentration was far higher in this form of instruction. In a classroom situation, it is the teacher who is the active participant,

while students remain passive unless called upon to give an answer, for example. Yet, in spite of this, with all these factors favouring CAI, no statistically significant difference in achievement was observed in the comparison of student scores, between CAI and conventional instruction.

Since the CAI group in interval recognition fared better than the teacher-taught group, it is not necessary to consider the efficacy of CAI in this context. Yet, a possible explanation of the lack of difference between the groups receiving alternate forms of instruction in rhythm dictation is suggested. In this researcher's view, the answer lies in the very notion of 'active/passive participation'. It is acknowledged that the student working with the computer is continually interacting with the machine. In order to give an answer to a rhythm exercise, he/she touches boxes on the screen specifying the different note- values. This may be seen as active participation. Yet, as the student touches the correct box, the note appears on the screen automatically. If the rhythm pattern heard contained two quavers, for example, the student would touch the box marked '♪' on the screen once. This note would appear on the screen. On pressing the box again, a second quaver would appear and would be automatically joined to the first quaver. Similarly, if a group of four semiquavers was required, each would appear as follows, as the appropriate box is touched repeatedly: first '𝅘𝅥𝅯', then '♬', then '𝅘𝅥𝅯𝅘𝅥𝅯', and finally '𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯'. If a student reaches the end of a measure in giving an answer, the bar-line appears automatically. When an answer is correctly completed, a double bar-line appears. This rather laborious description of the processes involved in answering a rhythm lesson is essential to the argument. Rhythm dictation has become a passive activity. The actual process of writing down rhythms, of joining groups of notes, of inserting bar-lines, has been left to the computer. The student may be actively engaged with the computer, but it is the machine that is actively engaged in the process of notation. It may be argued that, since the student is observing the note-groupings, bar-lines, etc., as they are entered on the screen, he/she is surely taking cognizance of the precise manner in which rhythms are notated. Yet this information was apparently not being absorbed by students in this study. The act of notating a rhythm is an active

process, and essential to this process is the practical experience of applying pencil to music paper. The computer activity is analogous to presenting a film on how to fly an aircraft. No amount of viewing can replace the practical hands-on experience.

This lengthy argument has been presented in defence of the results of the study and it may serve as a partial explanation of the data. In addition, it is worth noting that both group-class instructors were highly motivated and competent teachers. This was considered a strength in the comparative research design, since the validity of the study would be diminished if the teacher- taught groups had received instruction of a low standard.

One of the limitations of the present study was the length of the treatment period. Although a research design consideration, it is presented here to assist with the interpretation of findings with regard to the researcher's expectation of the degree of student proficiency by the end of the treatment period.

Although a treatment period of six-months was considered adequate, especially in the light of the length of treatment periods of comparative studies of other investigators (c.f. Ch. 2.3.5.), a longer treatment-period would have been preferable. It is possible that a greater difference between groups being compared (CAI and teacher-taught) would have been observed, had the treatment been extended to nine months, or three school-quarters. This observation is made with hindsight, in view of the perceived difficulty and extent of the CAMETS syllabus in rhythm dictation. Also, it is noted that the six-month study period was actually reduced by school holidays occurring in June and September (for almost one month). However, the length of treatment was dictated by circumstances. Initially, the GUIDO system would not operate satisfactorily and this problem was only corrected during the first quarter of 1985. Further, impending school examinations at the end of the school year (November 1985) had to be considered in planning the research. Many of the students in the sample were only prepared to participate in the CAMETS project if it did not extend more than a few weeks beyond the third school-quarter. Other shortcomings regarding the methodology and

design procedures of the present study are elaborated in the final chapter (10.3).

In concluding the interpretation of findings, it is noted that the results of this study are consistent with those of earlier investigators (Deal 1985, Cooper 1975, Watanabe 1981), in that no significant difference was found between groups exposed to CAI and alternative instructional methods in music education. It is noted that the only study which, to this author's knowledge, relates directly to the present study, found that CAI was more effective than conventional methods of ear training ($p = .05$). This study, conducted by Vaughn (1978), was consistent with findings of other researchers in comparative studies between CAI and alternate methods of instruction in various applications of computers to music education (Hofstetter 1975, Canelos et al 1980, Garton 1981).

10.0 RECOMMENDATIONS

10.1 RECOMMENDATIONS FOR PROGRAM IMPROVEMENT

From observations made by music authorities, educators, lecturers who administered the group-class instruction, students who participated in the project, as well as observations made by the researcher, it was evident that a number of aspects regarding the GUIDO system, the CAMETS programs and the CAMETS syllabus and tests were perceived as limitations during the course of this study. These limitations are summarised below and recommendations for program improvement are suggested.

10.1.1 THE MICRO GUIDO EAR TRAINING SYSTEM

It is noted that recommendations for improvement of this system are specifically made in connection with the Interval Dictation program and the Rhythm Dictation program. These recommendations are directed towards program developers of the system, in the interests of improving an aspect of music education.

1. The GUIDO Interval Dictation program

   The GUIDO system has been designed so that intervals may be presented to students working with the lessons on a number of different 'instruments', including clarinet, harpsichord, pipe organ, reed organ and bells. The wave-forms of these instruments are well suited to a programmable synthesiser and it is probably for this reason that they have been included in the GUIDO system as 'standard' sounds. It is obviously to a music student's advantage to be able to recognise intervals played on a variety of instruments in any comprehensive ear training course, especially

at a more advanced (tertiary) level of instruction. Yet music ear tests are always presented on a piano at the primary and secondary grade levels of music examinations in SWA and RSA. It is pointed out that the sophisticated Orchestration program included in the GUIDO system permits instructors and students to 'create' their own instruments for use in the ear training drill lessons. Using this facility, this researcher was able to create a sound that closely approximated the sound of a piano. However, the loading procedure (loading a wave-form for use in the lessons) was time-consuming. It takes approximately five minutes only to load a wave-form. Yet, this procedure would have to be repeated every time a student wished to use the interval program and every time a problem was experienced with the sound accompanying the lesson drills. It was therefore not feasible to use this facility during the CAMETS project. It is recommended that a 'piano' sound be included as a standard feature of the GUIDO system.

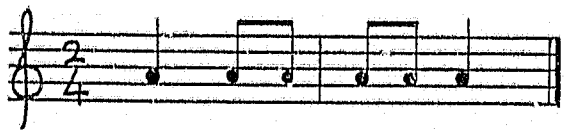
It is noted that, in a recent study conducted to assess student attitude towards a CAI melodic dictation program, Pembrook (1986) observed that students found the synthesised tone, which approximated a square wave, to be an annoying one. He recommends that great care should be taken when choosing the timbre of instruments used in CAI, since careless selection of the presence and amount of overtones present may distort the fundamental pitch of certain notes in certain ranges (p. 131).

Although some educators did not agree that intervals should always be considered in terms of the tonic of a scale, the incorporation of solfeggio symbols in the interval program would be an added advantage. Also, UNISA, as well as other music examining bodies in SWA and RSA, require students to identify descending intervals in terms of the first (higher) note played, that is, the interval is named according to the degree of the scale heard below the tonic. It is argued that this tonal approach in identifying descending intervals creates a sense of key-awareness. Its inclusion in the GUIDO system (which adopts an intervallic approach) would result in a more comprehensive program in interval recognition. Furthermore, the interval of a minor second

descending, according to the intervallic method of naming an interval, would easily be recognised by students if solfeggio symbols were used (doh' to ti). Since this tendency tone (the leading note) is fundamental to the harmonic tonal system, its importance could be emphasised if a tonal approach was included. It is also suggested that the program be expanded to allow two or three intervals to be asked, so that students may acquire proficiency in recognising intervals in a limited melodic context.

2. The GUIDO Rhythm Dictation program

Probably the most fundamental flaw of this program is the fact that rhythms are sounded without accents. Therefore there is no sense of pulse or beat, and the student's task of notating a rhythm becomes a mechanical one, one of mathematically determining note-values to fit the given time signature. A series of electronic beeps is not a rhythm, and the entire purpose of rhythm dictation would appear to be defeated. As Meyer (1970, p. 103) has observed: "The perception of rhythms involves a mental grouping of one or more unaccented beats in relation to an accented beat". It should be possible to design a rhythm dictation program where the first beat of a bar is more strongly accented, and remaining beats receive slightly more emphasis than others in a rhythm. Obviously, in music, rhythm does not dogmatically follow these rules. Often, when playing a rhythm, a musician will determine where accents should be placed according to his aural conception of a musical phrase and his degree of musicality. However, if accents of different strength were sounded, it would be possible for the system to be designed so that the student must identify the time signature as well. The Kodaly system of naming note-values (e.g., 2/4 taa tate tate taa for:



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could be incorporated, and would be especially beneficial for students in the early stages of music study.

Music authorities and teachers who responded to questionnaires during the course of this study generally agreed that, although rhythms presented in the GUIDO lesson were on one note (that is, a single note is repeated in a certain rhythm), an integration of pitch and rhythm is ultimately desirable. It was agreed that the separation into components of parameters of music, such as pitch and rhythm, may serve during initial stages of aural development. Deutsch (1972) has observed that incoming musical stimuli evoke various ways of processing. Certain sounds capture more attention at one level of processing and less attention at another. Organisation of music consists of multiple interacting hierarchies (Deutsch 1977).

It is interesting to note that, in a recent study conducted by Sink (1984, pp. 177-193) which investigated the psychological dimensions underlying auditory processing of monotonic and melodic-rhythmic patterns, it was observed that monotony did not influence the majority of subjects' rhythm processing. This study attempted to categorise various 'organisers' of rhythmic processing and it was found that tempo alteration, duration and pitch were the underlying dimensions of rhythmic processing. Since monotone rhythms removed melodic information from rhythmic patterns, it was observed that more difficulty was experienced by students in the processing of monotonic rhythms. Similarly, both Gabrielsson (1973, pp. 138-160) and Moog (1979, pp. 73-78) reported that melodic information interfered with auditory processing of rhythmic structures to some extent, that subjects found it difficult to concentrate on rhythmic information amidst melodic information. However, Petzold (1966) found that presentation of rhythmic information in a melodic-rhythmic context or a monotonic context did not significantly affect children's abilities to perform rhythmic patterns, whereas Boisen (1981, pp. 165-172) found that accuracy in aural perception of rhythm is significantly influenced by melodic context.

In the light of these conflicting observations, the researcher suggests that rhythms which are presented on one note in the GUIDO lessons are acceptable. One must see the intended objective of

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In the light of these conflicting observations, the researcher suggests that rhythms which are presented on one note in the GUIDO lessons are acceptable. One must see the intended objective of

the GUIDO system in perspective, namely, to provide a means of practicing aural skills. Even if parameters of music are compartmentalised, the student can practice these skills separately, using the rhythm dictation program in conjunction with the GUIDO program in Melodic Dictation. Furthermore, the problems associated with designing a computer program to present rhythms in a melodic context must be taken into account.

The GUIDO system has been criticised by music authorities and educators in SWA and RSA because it does not emphasise the physical activities which form an integral part of aural training. Students need not sing an interval, clap a rhythm or beat time when answering drill exercises. One music authority observed that the GUIDO system is valid as a complementary means of aural training "but it is limited by its own technology which excludes the human physical factor". Steele and Wills (1981) have observed that a touch panel (the screen on the GUIDO system, for example) does not suffice as an appropriate "man-machine interface", since this "requires the student to relate musical knowledge through a non-musical device" (p.199). It is noted that the developers of the GUIDO system have recently expanded its capabilities by providing a compatible pitch detector and a music keyboard (Arenson and Hofstetter 1983, p. 51). The pitch detector is designed to analyse the human voice in sight singing and ear training exercises. This device can be adjusted to require different degrees of pitch accuracy for varied levels of difficulty. A student responding to an exercise is told whether or not the pitch sung was correct, sharp or flat. An incorrect note sung is displayed and the staff and pointers inform the student whether the pitch was too high or too low. Similarly, it may be possible to interface the music keyboard with the GUIDO system so that a student may tap a rhythm exercise on one note.

Therefore, an effort is being made to overcome these limitations and to provide more emphasis on human interaction with the machine. Also, these peripheral devices provide another means of measuring aural ability, since it is not necessary for students to 'notate' exercises by touching appropriate boxes on the

screen. This expansion of the system provides a more direct interaction between student and computer than that provided by the system used in this research.

10.1.2 THE CAMETS PROGRAMS

Music educators have devised methods of teaching interval recognition by focusing on individual intervals. Many sight singing and dictation textbooks have been written which present sets of drill exercises which are organised around single intervals or consist only of intervals removed from any context (Fish and Lloyd 1968, McGaughey 1966). Shatzkin (1984, p. 5) has observed that "this approach is presumably based on the expectation that ability to recognise and sing single out-of- context intervals will generalise to recognition and singing of whole phrases of melody". Berkowitz et al (1976) have approached the subject directly, directing their efforts to training students to sing melodies at sight. At first, stepwise melodies are introduced, then notes of the tonic chord and gradually more intervals are included within a melodic context. Shatzkin (1984) has investigated students' perception of intervals when placed in a certain context, namely, with 'distractor' tones on either side of an interval.

The GUIDO program in Interval Dictation was developed by Prof. F.T. Hofstetter and was based on Benward's Workbook in Ear Training (1969) (Hofstetter 1979a). As noted previously, this program was considered unsuitable for ear training instruction at a grade level and the reconfigured CAMETS program was used in this study. It was also noted that the sequence of instructional units was derived from recommendations by Ulster (1956). It must be stated that the CAMETS program in Interval Recognition presents only one method of arranging intervals in a sequential order. Both group-class instructors observed that they introduced the first five notes of a major scale in order (doh, re, mi, fah, soh), and this may be an equally feasible alternative.

Part of the value of transforming a course in interval recognition or rhythm dictation into a computer program stems from the fact that the computer imposes a discipline on the program developer which is not imposed on a textbook author or teacher. This is because the precise hierarchical nature of the subject matter must be defined. The exact order in which intervals or rhythms should be taught, although based on a system, is often the result of subjective intuition and, because of the lack of relevant models, the researcher's program is open to criticism. Allvin (1971) has observed that, "in music education, preparation for computer- assisted instruction is forcing educators to re-evaluate teaching theory ..." (p.131), since questions arise about the correct format and organisation of instructional material. He concludes that research in CAI may help "to define optimum sequential ordering of instructional material within concept-modules" (p.136).

From observations made by students participating in the study, it is suggested that 'practice' lessons need not be so extensively used, especially in the rhythm lessons. Also, competency levels should be made lower, to reduce student frustration when working with the system, especially in the rhythm dictation program.

It is noted that the CAMETS programs are linear programs. A student has to complete each lesson at the imposed level of competency before proceeding to the next lesson. The GUIDO system does not permit branching routines where an incorrect response obliges a student to follow a corrective sub-program leading back to the point where the error occurred. Similarly, a branching program would permit a student who is easily coping with the material to proceed with lessons of a more appropriate standard. All students participating in the CAMETS project were obliged to start at unit no. 1 and proceed in linear fashion through the program, irrespective of their proficiency levels in the skills presented in the programs. However, the GUIDO system does permit the instructor to design different selections from, or sequences of, the units. Using this facility, it would have been advantageous to develop different sequential arrangements of lessons for weaker, average and advanced students.

10.1.3 THE CAMETS SYLLABUS AND TESTS

Numerous recommendations for improvement to the CAMETS syllabus and tests have been made by music educators consulted during the course of this research. These have been presented previously and are not repeated. In addition, the researcher wishes to make two further observations. Firstly, it is noted that the test questions in both sections, intervals and rhythms, were developed directly from the CAMETS programs, specifically from the final 'Test Questions' constructed at the end of each CAMETS program (q.v. Appendices B and C). It is noted that these questions were not used as part of the CAMETS programme and were specifically developed for the formulation of the CAMETS tests, i.e., as research tools. Since the computer constructs intervals and rhythms at random within the prescribed parameters, the randomness of the sequence of intervals in the tests and rhythmic patterns used was ensured.

However, in retrospect, it would seem that this randomness created an additional problem, specifically with regard to the rhythm dictation sections of the CAMETS tests. Sink (1984, p. 177) has observed that "rhythmic structures in music are complex, consisting of multiple dimensions that repeat and vary within the boundaries of musical form". The researcher wishes to emphasise the phrase 'that repeat and vary' in the above quotation. Since the computer is selecting different rhythmic patterns at random in constructing rhythm test questions, it is evident that the more patterns specified for inclusion in a rhythm, the greater the probability that few rhythm patterns will be repeated. However, it is possible to give certain note patterns various weightings. Therefore, if this facility of the GUIDO system is used, an instructor can, by increasing these weightings, ensure that the computer constructs rhythms that have repeated note patterns. Therefore it is suggested that the CAMETS rhythm test questions could be improved by judicious use of repetition of certain patterns. This may result in rhythms which are more musically conceived than the present test questions. Also, repeated note patterns could be more easily included if four-bar phrases are incorporated in the tests, as was suggested by music educators.

The second observation is that the CAMETS Interval Recognition syllabus was based on the UNISA syllabus. The UNISA music syllabus and examinations are highly regarded and generally considered to encourage and maintain a high standard in music education in both SWA and RSA. Yet it should be acknowledged that the UNISA syllabus in Practical Musicianship for grade examinations is not perfect, since it is not comprehensive and constitutes a very small part of the practical examination. It is suggested that this aspect of the UNISA syllabus be scrutinised by music authorities and educators in determining whether or not enough emphasis is being placed at present on an essential aspect of music education, namely, ear training. This suggestion will be elaborated in the final recommendations made to decision-makers.

10.2 RECOMMENDATIONS TO DECISION-MAKERS

This section addresses decision-makers within the sphere of music education in SWA and RSA. It is intended to permit administrators, educational planners and teachers to make value judgements about the worth of the GUIDO system, which was specifically adapted to suit requirements of students at a primary and secondary level of music education in this study, and the benefits that may accrue to music students from applications of computers to music education. In order to provide a basis for evaluation in determining the relative merits of this educational alternative, certain factors must be considered. These are whether or not the CAI program achieved its own objectives, whether or not these objectives are concordant with the broader educational objectives currently evident in SWA and RSA, and costs of this educational alternative.

From the present comparative study it is evident that the CAI system achieved its stated objectives to a certain degree, namely, to increase proficiency in certain aural-perception skills among the participating students. Although it was observed that there was no statistically significant difference between groups receiving CAI and

traditional instruction, it was evident that the group receiving CAI in interval recognition acquired a greater degree of proficiency in this skill than the teacher- taught group. Furthermore, the teacher-taught group receiving instruction in rhythm dictation fared slightly better than the CAI group, and a difference in degree of proficiency in notating rhythms correctly was observed at the .10 level of confidence (in favour of the teacher-taught group). However, neither group attained the degree of proficiency that was expected in these aural-perception skills, and explanations for this have been previously suggested.

It should be pointed out that this researcher was able to adapt the GUIDO system to suit requirements of music education syllabi at the grade level of study without any specialised knowledge of computers. Concordance between the objectives of the CAI system and music syllabi (in SWA and RSA) was achieved to a greater degree in interval recognition than in rhythm dictation. This was primarily because the way in which students responded to questions on the computer was similar to the response format in an oral music examination. Rhythm dictation is a specific skill in notating a rhythm and the act of notation does not form part of the oral music examination in aural training.

Although it is argued that the CAI system used in this study did achieve its stated objectives to some extent, it would appear that there is a lack of concordance between these stated objectives and the broader objectives of music education in SWA and RSA. This observation is made in the light of the fact that aural training constitutes a relatively small part of practical music syllabi presently in use, at a grade level of music study. Ear training counts for approximately ten to fifteen per cent of the total mark awarded in the practical music examination of the Windhoek Conservatoire, UNISA and the Trinity College of Music, London. In this researcher's view, there is a lack of emphasis being placed on aural training at present, at this level of study. Many students and teachers, in preparation for grade exams, consider ear training to be unimportant, since it is possible to pass the examination even if one fails the section on aural training. Yet, Schmidt (1984, p. 159), in referring to observations made by Sidnell (1973), has noted that "it is a fundamental

assumption among most music educators that developing competency in the area of aural skills is the cornerstone of music learning ..." It would appear that music administrators and planners need to reassess the current state of music education in SWA and RSA, with specific reference to the perceived importance of aural training, and whether or not the needs of music students are being adequately met in terms of present accepted syllabi. It is suggested that a partial solution would be to change requirements of music examinations, so that a certificate is only awarded when all sub-sections (including aural training) are passed in terms of pre-specified criteria, and to increase the weighting of marks allocated to aural tests in the examination.

In assessing the worth of an alternative program in education, it is necessary to consider the costs involved. Educators have pointed out that continued advances in microtechnology have resulted in decreasing costs of computers and computer programs (Hofstetter 1983a). Hofstetter (1979b) has observed that if the GUIDO system is used in conjunction with the PLATO mainframe system, a large-scale Cyber computer, the cost of CAI is substantially reduced, and the cost projections of $.24 per hour of instruction are envisaged in the future. Yet, this does not seem to be a feasible alternative in SWA, if the initial capital outlay is considered. However, it is noted that the GUIDO system used in this study was run on a microcomputer and the cost of this equipment is within the reach of universities or colleges.

It was previously noted that the Micro GUIDO Ear Training System was purchased by the researcher at a cost of R8 850. In the present financial climate, the cost of the system would be higher. This amount included the initial software licence for the GUIDO system, which must be renewed every two years at a cost of approximately R2 250. Besides the initial outlay, it is necessary to consider maintenance costs. It is noted that, at present, no maintenance of the GUIDO system is offered in SWA. Control Data (Pty) Ltd. in RSA can provide routine maintenance for the monitor and terminal, but the GUIDO Sound Synthesiser must be sent to the Office of Computer-Based Instruction, University of Delaware, if service is required. It must be noted that

the lack of maintenance did prove problematic during the course of this research. Although Control Data and the Office of Computer-Based Instruction provided assistance whenever possible, the problem was one of isolation and communication. This is evident from the fact that it took twenty-one months from the date of purchase until the point where the system was operating satisfactorily, for the purposes of the research project. The researcher wishes to acknowledge the constant assistance and advice received from Prof. F.T. Hofstetter, developer of the GUIDO system.

In reviewing cost information, it is necessary to address the question of how well the CAI system succeeded, given its expense. This judgement must be made in terms of the costs of alternative ways of meeting the educational need the program was intended to address. It must be noted that alternative methods in ear training instruction <u>are</u> currently available. Many courses of programmed instruction in ear training have been developed, in which the essential sound-source is provided by means of long- playing recordings and tape. These include courses written by Sherman and Knight (1972), Carlsen (1965) and Kraft (1967). Still other ear training courses are available which do not make use of a sound-source (Horacek and Lefkoff 1970, Kreter 1976, Wittlich and Humphries 1974). These alternatives are available at a fraction of the cost of the GUIDO system.

Yet it is argued that the costs of the Micro GUIDO Ear Training System are worthwhile because the system provides a comprehensive course of instruction in ear training and because the instruction material can be adapted to suit the requirements of aural training at <u>any</u> level of study, from a beginner through to an advanced, tertiary level of music study. In the context of music education at a primary and secondary level, the researcher has shown that it is possible to adapt the course material to suit requirements of syllabi used in SWA and RSA. Other advantages of the GUIDO system over alternate instructional methods are given below.

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[37] In 'learner-paced' or 'self-paced' learning, the student proceeds

CAI can be seen as an extension of programmed instruction, a technologically innovative method of presenting programmed instructional material. Both offer individualised instruction. Both are 'learned-paced'[37]. Both forms may present material in linear or branching sequences and both provide feedback (to different degrees) of student responses. Further, both forms may offer mastery or criterion learning by ensuring, through testing, that course material is mastered sequentially. Finally, both forms demand active participation from students and provide a record of student responses to a greater or lesser degree. If this argument is accepted, it is appropriate to consider research in music education which compares these two forms of instruction. Jumpeter's (1985) results indicate that the Personalised System of Instruction was neither more nor less effective than the lecture demonstration method in a specific area of a college music appreciation course, whereas Cary's (1981) results indicate that individualised music instruction was more effective than the traditional approach. Student achievement scores were significantly higher at the .01 level for the individualised group of fifth grade students.

From the above considerations regarding CAI and PI it would appear that both forms of instruction are similar in many respects. Yet the researcher wishes to argue that through CAI the potential of PI is more fully realised. Not only is CAI an extension of PI, it also expands the concept of PI. In this writer's opinion, the GUIDO system, although more expensive, is infinitely superior to alternative PI courses currently available because it offers distinct advantages over these ear training methods.

Hofstetter (1975) has pointed out that the GUIDO system offers four advantages over ear training tape laboratories which are in widespread use in the USA. Those are that aural exercises are presented randomly, whereas taped instruction has a predetermined and fixed order; that the time allotted for student responses to dictation ex-

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through the course material at his or her own speed commensurate with his or her ability.

ercises is flexible on the computer, whereas in taped instruction it is fixed; the speed at which dictation exercises are played on the GUIDO system is flexible and can be controlled by the student, whereas in taped instruction it is fixed; and the GUIDO system permits a manageable way of saving, analysing and interacting with student answers, whereas the tape laboratory does not. These observations are equally relevant as distinct advantages over the PI courses previously mentioned. In addition, the GUIDO system provides immediate feedback to the student. A correct response is immediately reinforced and incorrect responses are identified. Also, the student may choose to hear the exercise played again. This is not possible when a student is working with conventional programmed instructional materials, since he/she must first answer in a workbook, and then look up the answer. This is usually carried out at the end of an instructional sequence, by which time the student has more than likely forgotten what he/she has heard, and the sound associated with a correct response is not internalised. Therefore, when conventional PI methods are used, error analysis becomes a negative factor in the guidance of each instructional sequence.

Other benefits of CAI in music education are well documented (Allvin 1971, Hofstetter 1979b, Kuhn 1974). These may be summarised as follows: CAI provides individualised, learner-paced instruction. It is especially suited to ear training where drill- and-practice is the only method of achieving proficiency. With sophisticated programs (such as the GUIDO system), the sounds heard are displayed in musical notation. This provides visual reinforcement of the aural sensation. CAI provides a means of conducting research in the aural-perception processes and helps identify confusion tendencies and their causes. The level of instruction may be adjusted to suit individual students.

The advantages of CAI over traditional group-class instruction or the individual method of teacher/learner instruction is that the teacher can make better use of time by assisting students with problem areas (which are diagnosed by the computer) and leaving the soul-destroying task of constant repetition to the machine. In addition, the GUIDO system has endless patience and student anxiety is minimised, since

there is no fear of ridicule from either peers or teachers if an incorrect response is given.

It is recommended that the GUIDO system be used in conjunction with traditional instruction and that music teachers make use of this system to give students a means of practicing aural skills taught in the classroom. It is recommended that the GUIDO system be incorporated as part of the ear training instruction currently presented at the Windhoek Conservatoire. This may be achieved by using the CAMETS programs to supplement group-class lessons. The lecturer may explain material in the class and request students to complete a specified section of the CAMETS program before the next class is conducted. Half-hour CAI sessions could be allocated for this purpose during afternoons so that each student in the class receives CAI.

It has been observed that some form of supervision was considered essential during the course of the present research project. Therefore it is recommended that supervision of CAI periods be provided, particularly for younger students. A teacher should be on hand to assist students in overcoming mechanical problems when working with the computer. In addition, a supervisor may assist students by providing additional explanation of the CAI course material. It is pointed out that no form of training is necessary for an instructor to use the computer system. Also, proficiency in computer programming is not a pre-requisite if the instructor wishes to adapt or reconfigure the existing GUIDO programs. Therefore suitable programs in melodic and harmonic dictation, as well as in chord recognition, may be developed to suit requirements of music syllabi at a primary and secondary level of education. Finally, administrators should also take into account the fact that space is needed to house the computer equipment and that a separate room would be ideal.

The researcher wishes to argue that it would be equally beneficial to schools in SWA to implement the GUIDO system as part of the conventional method of instruction, and that this implementation be achieved in a similar manner to that recommended for its implementation at the Windhoek Conservatoire. It is therefore argued that it is possible to incorporate the GUIDO system as part of present music

syllabi and school timetables and that the use of the GUIDO system would be credible in school practices in SWA.

It must be pointed out that only two aspects of the GUIDO system (interval recognition and rhythm dictation) were used during the course of this research. In addition, the system offers programs in melodic dictation, chordal recognition, harmonic dictation and orchestration. Of these, all except the last can be used in preparation for practical musicianship examinations, as the syllabi exist at present in SWA and RSA. Furthermore, it is this writer's opinion that the GUIDO system is by far the most extensive, well developed and most comprehensive ear training instructional system available today. Criticism levied at CAI as being merely expensive page-turners is unfounded. The constant interaction and active participation of students with a computer system provides a rich, stimulating learning experience. With the new technological innovations currently being developed, the physical aspects of aural training will be emphasised.

10.3 RECOMMENDATIONS FOR FURTHER STUDY

The research design of the present comparative study was based on accepted procedures in educational research. Yet, it is important to realise that there are many educationalists who have criticised these procedures, which are seen as illegitimate extensions of the agricultural-botanist tradition of research (Hamilton 1976). Critics maintain that social and educational research are best studied by methods akin to those of the social anthropologist. Alternative approaches have been developed, such as descriptive evaluation (Stake 1967), "illuminative" evaluation (Parlett and Hamilton 1972) and "goal-free" evaluation (Scriven 1967).

Research concerning the efficacy of CAI conducted by idiographic methods (Stake, Parlett and Hamilton) is likely to emphasise the learning milieu, that is, the interaction of cultural, social, institutional and psychological variables. Such research may lead to

a greater degree of understanding of these variables than that achieved in the present study by empirical methods. The researcher may focus on the unique pattern of circumstances, pressures, customs, opinions and work styles which suffuse the learning experience.

Yet within the present paradigm adopted in this research and the confines of this research tradition, the researcher was able to generate data for statistical analysis by means of the empirical design. An attempt was made to establish a degree of internal validity in the comparative study. Obviously, perfection does not exist in educational research, precisely because of its nature, in that individual differences among the students in the groups being compared must influence the degree of comparability between groups. In spite of this, the researcher wishes to argue that credibility of the results within the confines of the study was attained, and that soundness of design methodology and adequacy of measurement procedures was achieved. However, external validity of the study can only be reaffirmed when the study is replicated with different sample groups. Yet Bailey (1982) has observed that very few studies actually are replicated, as often a later researcher may find what he/she considers a deficiency in the study and would rather improve on it than replicate it (p. 11). Research is an on-going process, and even if modifications are made, each tentative finding represents an incremental step in the acquisition of knowledge and understanding.

Some of the shortcomings of the present study are given below. It is recommended that these changes be incorporated if a similar study is undertaken. It would have been preferable to add a third control group, which received neither form of instruction, against which improvement in aural proficiency could be measured. A researcher may then provide an 'irrelevant' experience for this group, such as a word-processing course on the computer, to ensure constancy and control of Hawthorne effect. Obvious recommendations would include using larger samples, using samples of a wider age group, extending the treatment period to nine months or one year, and using some form of standardised measuring apparatus, if available. If a test is found where measurement is achieved in the sense of an interval scale, stronger statistical inferences would be possible and parametric

tests could be used. External validity would then be extended, since it would be possible to generalise a set of results beyond the confines of the given study. However, if the CAMETS tests are used, it is suggested that the recommendations for improvement be incorporated. Further recommendations regarding the CAMETS programs and syllabus may also be included. Another recommendation would be to administer CAMETS tests on the same musical instrument on which they were taught. For those students who receive CAI, the test questions should be played on a synthesiser. Similarly, for those students who receive group-class instruction, the CAMETS test questions should be presented on a piano.

Finally, it would be beneficial if students receiving CAI could be given occasional, concurrent instruction from a teacher in explanation and assistance with the music component of the course, the theoretical underpinning necessary for understanding of the CAI drill exercises.

Later researchers may repeat the present study in its essentials with some modification. For example, frequency of drill sessions for both groups could be made a moderator variable in an attempt to substantiate other findings regarding lesson frequency. Humphries (1978) has shown that three weekly drill sessions of twenty-five minutes was most effective in increasing student proficiency. CAI could be examined to determine its efficacy in teaching students with low and high initial achievement scores (Von Feldt 1971, Niemiec 1984).

One further aspect of the current design procedure must be addressed. Cronbach (1966) has observed that the type of teaching is often overlooked in research design and experiments are often loaded against the nondiscovery group. He continues: "it is clearly impossible to give desirable instruction for each group while keeping all variables constant save one" (p. 64). Educationalists may consider the present research to be fundamentally flawed because the type of teaching, and hence lesson content, were different for each group.

It is acknowledged that the instructional approach or strategy can significantly influence learning by imposing an information process-

ing strategy on the learner. The instructional strategy was different for each group in the comparative study. Although both teacher and computer program followed the same syllabus, the method of presentation is different by nature. It would be ludicrous to expect a teacher to structure lessons in the same way as the computer and to present units in the same order. Similarly, a computer program cannot emulate a teacher, since it cannot respond intuitively to the perceived needs of students. Obviously, a lot of effort went into the preparation of the CAMETS programs to ensure the hierarchical presentation of subject matter. Yet it would be unfair to argue that the group classes received mediocre instruction or that this was presented in a casual, run-of-the-mill fashion by the instructors. A particular instructions' technology serves to deliver the material in the way that it can, and, by the same token, a teacher will teach in the way that he/she can. But according to Cronbach's line of reasoning, there would only be a basis for inter-group comparison if instructional strategies, content of instruction and sequence of presenting material were identical in every respect "save one", namely that one was delivered by a teachor and the other by the computer. One cannot imagine educational research studies being conducted where video-taped instruction material of a teacher presenting material is compared with a 'live' teacher, to determine which is the better form of instruction. Therefore, this line of reasoning is flawed and should be rejected. Furthermore, many precedents exist where alternative forms of instruction are compared and the nature of the material, lesson content and sequence of presentation are different in certain respects (Jumpeter 1985, Cary 1981, Watanabe 1981, Platte 1981, Sanders 1980, Robinson 1984, Shannon 1982, Vaughn 1978, Lee 1975, Cooper 1975, Canelos et al 1980 and Deal 1985).

In conclusion, the writer wishes to argue that some form of subjective judgement is necessary in the evaluation of an educational alternative. It has been argued that the GUIDO system offers numerous benefits for ear training study and its implementation in school practices has been strongly recommended. These recommendations are made with the knowledge that they are the reactions of an inquiring mind to the findings that have been presented. The GUIDO system and CAMETS programs should not be seen as a panacea for music aural

training. However, this system could be used by music educators as a tool to assist them in providing a viable means of developing proficiency in aural training. Computers will continue to become increa. ingly pervasive in our society. It is hoped that music educators may observe the value of CAI in assisting them in this educational process.

APPENDIX A. INSTRUCTIONS GIVEN TO STUDENTS

THE MICRO GUIDO EAR-TRAINING SYSTEM

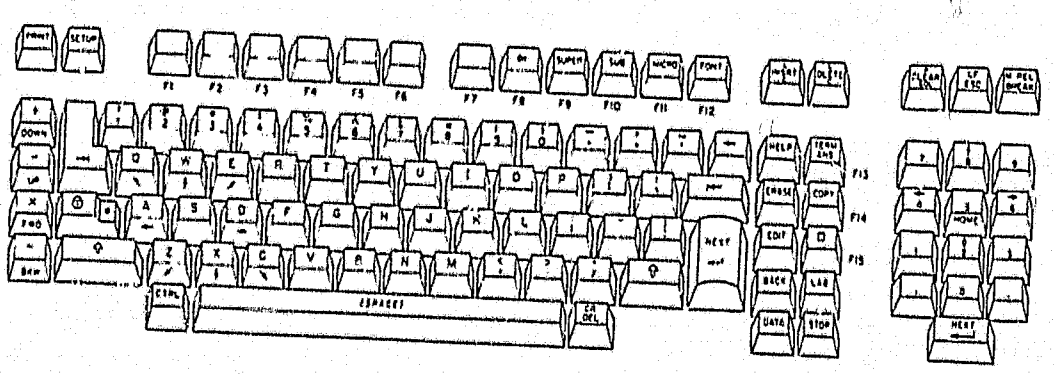
Guido D'Arezzo is the eleventh century monk who invented the staff and the solfeggio syllables do, re, mi, fah, sol and la. Since he was the first real music educator, the system has been named after him, using his first name as an acronym for Graded Units for Interactive Dictation Operations. Each GUIDO program is divided into units of instruction that is graded according to their levels of difficulty. The programs are highly interactive, with the student participating in a constant dialogue with the GUIDO system. Each GUIDO unit consists of a set of drill-and-practice dictation exercises. Dictation is the primary means of measuring student progress in aural skills; if a student can listen to a musical example and write it down, then surely the student has heard it properly.

A. COMPONENTS

The GUIDO system consists of:

a) the monitor or screen: it is very important that you read and follow the directions given to you on this screen;
b) the disk drive which reads the program from a floppy disk;
c) the sound synthesizer which allows you to hear the program (a set of earphones is plugged into the synthesizer);
d) the keyboard terminal which is connected to the monitor and has a keyset.

B. THE KEYSET



The main method of communication between you and the computer system is your keyset. You don't need to know how to type in order to use the system. A very basic knowledge of the keyset is all that is needed to successfully complete the lessons.

C. THE USE OF THE 'FUNCTION'KEYS TO MOVE YOU THROUGH A LESSON

On the right hand side (of the keyset) are the (function keys). Notice that these have words printed on them. Those are the names of the keys. When you are referred to one of those keys in a lesson, the name of the key is spelled out in capital letters: NEXT, LAB, HELP, and so on.

1. NEXT

As you can see, one of the keys is much larger than the others. That key is the most important key on your keyset. The main purpose of this NEXT key is to move you from one display (page on the screen) to another. If there is any one thing you should remember about this system, it is that if you do not know what to do ...

Press NEXT when in doubt!

In general, pressing next will move you forward in your lesson.

2. BACK

In the same way that the NEXT key takes you to the next display, the BACK key usually brings you back to something you have already seen. Don't forget, if you are not too sure about a concept, press BACK to review.

3. HELP

The HELP key is usually used to give the student additional information. The HELP key is active when you see the message: "HELP is available" on the screen.

4. SHIFT

In the same way that you would use the SHIFT key on a typewriter to type capital letters, you use the SHIFT key to produce "capitalized" function keys. The "capitalized" keys are called "shifted keys" and are referred to by placing the word "SHIFT" in front of the name of the key. Thus, a shifted NEXT key would be referred to as the SHIFT-NEXT key and shifted BACK key as the SHIFT-BACK key.

To use a shifted function key, the best method is to first hold down the SHIFT key (either one will do) and then press the function key while continuing to hold down the SHIFT key.

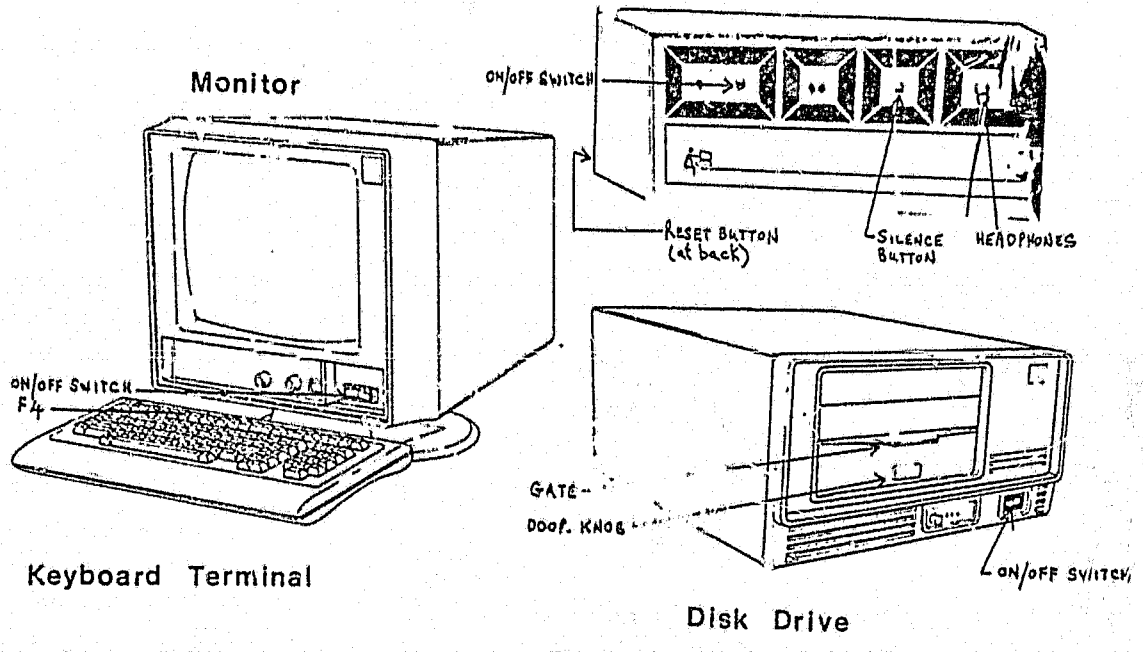
5. SHIFT-STOP

Pressing this key will halt the activity you are in and return you to the index. Just remember this: if you get stuck in a lesson, or if you want to stop a lesson for any reason, press SHIFT-STOP.

D. TOUCH PANEL

The screen is divided into 256 squares (although you cannot see them). Each square is the smallest detail that the terminal can detect. It is important that you sit directly in front of the screen when using the touch panel. If you are sitting off to the side, the curvature of the screen may fool you into touching a spot on the screen that you did not intend to touch.

E. SWITCHING THE SYSTEM ON



1. Switch on disk drive.
2. Switch on monitor.
3. Switch on synthesizer.
4. Press door knob on disk drive to open gate.
5. Carefully remove floppy disk from it's envelope. Note "this side up" and arrow (↑) and insert disk into disk drive, pushing it gently but firmly all the way in. Do not touch exposed area on disk.
6. Close gate of disk drive.
7. Press F4 (this key is to be found along the top row of your keyset, 6th from the left and is marked F4 on the black base below the key).

The screen displays the message: "Loading terminal memory from disk" and a few seconds later a "menu" appears. This is like the contents (chapter titles) of a book.
Note that number 1 is 'Interval Dictation Drill' and number 5 is 'Rhythmic Dictation Drill'. If you are working with the interval lessons, press 1 on the keyset. Alternatively, if you are working the rhythm lessons, press 5 on the keyset.

A title page appears with 'Please wait' in a box. This message soon changes to 'Press NEXT'.

Press NEXT.

F. INTERVAL DICTATION DRILL

1. Having pressed NEXT, the screen presents a page first requesting that you turn the synthesizer on (you should have already done so).
   You have a number of options on this page: LAB, HELP, etc.

2. LAB allows you to choose an instrument for the music in the drill. It is recommended that you do not adjust this if doing the interval drill.

3. Pressing HELP will fully explain what this lesson does, and it is recommended that you press HELP and carefully read all the additional information.

4. Press NEXT to go to the unit titles. When you have these, press SHIFT-LAB to clear the computer.

5. Select the unit (lesson) you want by typing in the number of the unit and press NEXT.

The first unit reads:

Unit 1. P1, P5 (P1 = Perfect 1st, P5 = Perfect 5th)

Goal 4 out of 5 Your score = 0 Time = 20 seconds

Basic	P1						P5						
Enharmonic	d2						d6						

PLAY AGAIN

Which interval did you hear? Touch one of the boxes above.

Listen closely to the interval played through the earphones. The first note sounded is the tonic or first degree of the scale (doh). You are required to identify the second note played after the tonic. Did it sound the same as the first note? If so, the answer is P1, so touch that box. If the second note is higher than the first note, it must be P5, the fifth note of the scale (since in this unit you are only required to distinguish between the first and the 5th degrees of the scale). If it is higher, touch P5 on the screen.

The screen displays: "correct" - your score moves to 1 and the next interval is played.

Ignore the "Enharmonic" row of boxes on the screen. If you have already done Grade 3 or 4 theory, you should understand that a diminished second (d2) is the same as (the enharmonic equivalent of) a perfect first. However, you do not need this knowledge to do these lessons.

PLAY AGAIN

If you wish to hear the interval again, either touch the 'Play again' box on the screen, or press the space bar on the keyset.

GOAL 4 OUT OF 5

This means that you are required to complete four consecutive answers correctly (that is, 4 correct answers one after another) out of a series of five questions in order to "pass" a unit and go on to the next unit.

YOUR SCORE

This indicates your score (correct answers) at the moment.

TIME

This indicates the time allowed to answer the question. You can still answer a question if the time allowed has elapsed, but you do not score a correct answer (the screen displays 'Right' in this instance and not 'Correct').

If you touch the wrong box, an arrow appears below the box you touched, pointing towards the correct answer. If this happens, it is a good idea to 'Play again' so you can hear where you went wrong.

If you have attempted an answer that is incorrect, you may press TERM ANS and the computer supplies the answer. However, no point is added to your score.

When your score reaches the goal set (for example, 4 out of 5), this message is displayed: "Congratulations! You have completed this unit. Press NEXT". Press NEXT and you now proceed to the next unit.

PRACTICE UNIT

This is a lesson designed to revise the work covered in the previous lessons. It is for practice only and there is no time limit on any question. Also, it is impossible to "pass" a practice unit as no score is kept. If you are struggling with a particular unit, go to the previous and following practice units and revise.

Note: If you wish to continue with the units, you must press LAB. This message then appears: "Which unit would you like to use?" You must then type in the number of the unit you require. This number appears after the arrow (>). Then press NEXT and you will be moved on to the new unit.

G. RHYTHMIC DICTATION DRILL

1. Having pressed NEXT, the screen presents a page first requesting that you turn the synthesizer on (you should have already done so). You have a number of options on this page: LAB, HELP, etc.

2. LAB allows you to choose an instrument for the music in the drill.

   NOTE: If you are doing the rhythm drill, you must set this to "Sound for Rhythm Drill".

   To do this: 1) press LAB
   2) touch the box on the screen marked "Sound for Rhythm Drill".
   3) You will then automatically be returned to your page of options.

3. HELP

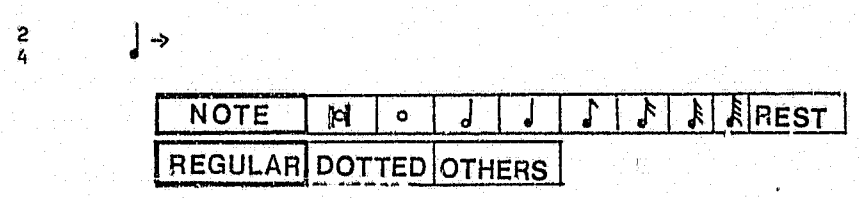
   Pressing HELP will fully explain what this lesson does, and it is recommended that you press HELP and carefully read all the additional information.

4. Press NEXT to go to the unit titles. When you have these, press SHIFT-LAB to clear the computer.

5. Select the unit (lesson) you want by typing in the number of the unit and press NEXT.

The first unit reads:

Unit 1 Simple time signature :2/4 (simple duple).



PLAY AGAIN METRONOME

This message first appears: "Please wait - Composing new exercise".

After a moment, this changes to: "Touch the notes you hear on the boxes below".

Listen carefully to the rhythm. Printed on the screen is the beginning of what you hear (♩→). In this instance, the first note you hear is a quarter note, and it is not necessary to answer the first note (since it is already given). This is followed by three more beats, each beat of the same length as the first given note. Therefore the answer must be : 2/4 ♩ ♩ | ♩ ♩ ‖
So touch the box marked ♩. At each touch, a new 1/4 note appears on the screen, completing two bars (measures) of rhythm.

If you have answered correctly, the screen indicates: "Your score 1 ; Goal 4 out of 5. Press NEXT".

Press NEXT and continue.

NOTE: 1) If you have attempted and your answer is incorrect, you may press TERM ANS and the correct note-value will be displayed. However, you do not score points.
2) If you need a dotted note, first touch the box marked "dotted" and then the note you require. You must remember to set it back to "Regular" after a dotted note.

PLAY AGAIN, GOAL, YOUR SCORE, TIME, PRACTICE UNIT, LAB

These are exactly the same as for the Interval Dictation Drill and are explained in that section.

H. When you have finished at the computer, press BACK repeatedly until you arrive at the list of units. You will then see asterisks (*) next to the unit numbers you have successfully completed, and an arrow (→) showing where you were last working.

Next to the computer system you will find a log book. Find your name and fill it in correctly:

Name	Date	Time	Disk Intervals (tick one) Rhythm	Units completed	Last at
John Smith	14/2/85	14H00-14H30	Int	1-3, 5, 6	4

Next time you come, simply look in the log book where you were working, and go directly to that lesson. However, you may also go to the practice unit nearest where you were working, to revise.

You could quite easily fill in the log book that you have completed units where in fact you have not. Please remember that the whole point of this training is to improve your ear in identifying sounds. Therefore, you are only misleading yourself by filling in false information. Also, the units are graded. If you cheat on unit 27 you will probably find it impossible to continue with unit 28.

This is not a competition, but a unique learning experience for which you have been chosen. No-one is checking to see how well or badly you are doing. The log book merely records what you have done and where you should continue. Even if you only complete one unit at a sitting, it is better for you if you did it well and learned something from it.

I. SWITCHING OFF

After completing your log book:

1. Press SHIFT-STOP.
2. Open disk drive gate.
3. Remove disk and replace in envelope (carefully please).
4. Close gate.
5. Switch off disk drive.
6. Switch off synthesizer.
7. Switch off monitor.
8. Lock the door after you and return key to me.

J. THINGS THAT MAY GO WRONG

The computer is only human! Things can go wrong.

The most common problem is that the screen box marked "Play again" lights up and no sound is heard. If this happens:

1) Press SILENCE button on synthesizer.
2) Press RESET button at bottom left-hand corner at back of synthesizer (that is, as it faces you).
3) Press SHIFT-NEXT.

If there is still no sound, repeat the above steps and if still no sound is heard, call me. (ALWAYS lock door if you leave the computer).

Sometimes the screen goes haywire. Lines become compressed and impossible to read. If this happens, press DATA. If there is no improvement, switch monitor off (not disk drive) and wait a few minutes before switching on. If there is still no improvement, call me.

NOTE: Never switch Disk Drive off while there is a disk in the machine. If you do, some of the program may be irretrievably rubbed off the disk.

Please note that this computer system is a very delicate, sophisticated and expensive piece of equipment. Always work gently with it. When touching the screen, press very lightly (not with your finger nail). A useful tip when doing Interval Dictation Drill is to rest your hand on top of the monitor and touch the appropriate box with the fleshy part of your thumb. This prevents your arm tiring from repeated lifting each time you answer a question.

Never leave the door of the computer room open when you leave. You must first obtain the key from me and then, after working with the computer, lock the door behind you and return the key to me. I trust that you will respect this property as if it were your own.

GOOD LUCK AND HAPPY COMPUTING!

APPENDIX B. CAMETS PROGRAM IN INTERVAL RECOGNITION

Explanation of Column Headings

1. Titles

   These are listed and each is numbered. The appropriate title appears in full on the screen, for each lesson.

2. Direction

   u: (up) indicates that intervals are to be presented as ascending intervals.

   d: (down) indicates that intervals are to be presented as descending intervals.

   u/d: indicates random directional generation of intervals.

3. Range

   b: specifies that the bottom or lower note of the interval is fixed.

   t: specifies that the top or upper note of the interval is fixed.

   r: indicates that top or bottom notes of intervals are generated randomly.

   ch: indicates that student may choose to fix lower or upper note of interval or random generation.

   C4 - C4: this specifies the range within which the lower or upper notes of an interval may be sounded. C4 = middle C, C5= an octave above middle C. The range is specified

by entering SEMITONE numbers. All 'C' notes are in multiples of 12 with middle C equal to 36.

4. Length

This indicates the time-length in seconds that each note of the interval will be sounded.

5. Time limit

This indicates the time, in seconds, in which the student must answer each question. If the student exceeds the time limit but answers correctly, he/she is not awarded a point.

6. Advancement

Read 'out of' for the slash (/). Therefore 4/5 means that a student is required to answer four intervals correctly out of a series of 5 intervals, before he/she may proceed to the next unit. If the student answers one interval incorrectly (in this example), his/her score is unaffected. However, after two mistakes (in a series of 5 questions), the student's score drops to zero.

7. Plays

u: unlimited

2: 2 plays

The student may request to hear an interval again by touching the PLAY AGAIN box on the screen. Unlimited plays means that the student may choose to listen to the interval over and over. However, if the number of plays is limited, this box disappears from the screen after the student has exercised this option.

8. Intervals included

The list of intervals from which the computer may randomly choose to present intervals in a particular lesson.

9. Practice unit

These lessons, spaced periodically in the linear sequence, are intended for revision purposes. The student who cannot 'pass' a particular unit may choose to move to the next (or previous) practice lesson. No score is kept and there is no time limit specified in practice lessons.

CAMETS PROGRAM IN INTERVAL RECOGNITION
(Copyright remains vested in the author)

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
1	P1,P5,(P1=Perfect 1st,P5=Perfect 5th).	u	b C4-C4	2.6	20	4/5	u	x						x					
2	P1,M3,(P1=Perfect 1st,M3=Major 3rd).	u	b C4-C4	2.6	20	4/5	u	x				x							
3	M3,P5,(M3=Major 3rd,P5=Perfect 5th).	u	b C4-C4	2.6	20	8/10	u					x		x					
4	Practice unit.	u	b C4-C4	2.6	u	1/0	u	x				x		x					
5	P1,P5,(P1=Perfect 1st,P5=Perfect 5th).	u	b G3-C4	1.6	15	4/5	u	x						x					
6	P1,M3,(P1=Perfect 1st,M3=Major 3rd).	u	b G3-C4	1.6	15	4/5	u	x				x							
7	M3,P5,(M3=Major 3rd,P5=Perfect 5th).	u	b G3-C4	1.6	15	8/10	u					x		x					
8	Practice unit.	u	b G3-C4	1.6	u	1/0	u	x				x		x					
9	P1,M2,(P1=Perfect 1st,M2=Major 2nd).	u	b C4-C4	1.6	15	4/5	u	x		x									
10	M2,P5,(M2=Major 2nd,P5=Perfect 5th).	u	b C4-C4	1.6	15	8/10	u			x				x					
11	M2,M3,(M2=Major 2nd,M3=Major 3rd).	u	b C4-C4	1.6	15	8/10	u			x		x							
12	M2,M3,P5,(Maj.2nd,Maj.3rd,Perf.5th).	u	b C4-C4	1.6	15	11/12	u			x		x		x					
13	P1,M2,M3,P5.	u	b C4-C4	1.6	15	14/15	u	x		x		x		x					
14	Practice unit.	u	b C4-C4	1.6	u	1/0	u			x		x		x					
15	P1,M2,(P1=Perfect 1st,M2=Major 2nd).	u	b G3-C4	1.6	10	4/5	u	x		x									
16	M2,P5,(M2=Major 2nd,P5=Perfect 5th).	u	b G3-C4	1.6	10	8/10	u			x				x					
17	M2,M3,(M2=Major 2nd,M3=Major 3rd).	u	b G3-C4	1.6	10	8/10	u			x		x							
18	M2,M3,P5,(Maj.2nd,Maj.3rd,Perf.5th).	u	b G3-C4	1.6	10	11/12	u			x		x		x					
19	P1,M2,M3,P5.	u	b G3-C4	1.6	10	14/15	u	x		x		x		x					
20	Practice unit.	u	b G3-C4	c	u	1/0	u	x		x		x		x					
21	P1,P4,(P1=Perfect 1st,P4=Perfect 4th).	u	b C4-C4	1.6	10	4/5	u	x					x						
22	P4,P5,(P4=Perfect 4th,P5=Perfect 5th).	u	b C4-C4	1.6	10	8/10	u						x	x					
23	M2,P4,(M2=Major 2nd,P4=Perfect 4th).	u	b C4-C4	1.6	10	8/10	u			x			x						
24	M3,P4,(M3=Major 3rd,P4=Perfect 4th).	u	b C4-C4	1.6	10	8/10	u					x	x						
25	M2,M3,P4,(Maj.2nd,Maj.3rd,Perf.4th).	u	b C4-C4	1.6	10	12/13	u					x	x						
26	M2,M3,P4,P5.	u	b C4-C4	1.6	10	14/15	u			x		x	x	x					
27	Practice unit.	u	b C4-C4	c	u	1/0	u			x		x	x	x					
28	P1,P4,(P1=Perfect 1st,P4=Perfect 4th).	u	b G3-C4	1.6	8	4/5	u	x					x						
29	P4,P5,(P4=Perfect 4th,P5=Perfect 5th).	u	b G3-C4	1.6	8	8/10	u						x	x					
30	M2,P4,(M2=Major 2nd,P4=Perfect 4th).	u	b G3-C4	1.6	8	8/10	u			x			x						

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1 m2 M2 m3 M3 P4 P5 m6 M6 m7 M7 P8
31	M2,P4 [illegible]2=Major 2nd,P4=Perfect 4th).	u	b G4-C4	1.6	8	8/10	u	x x
32	M3,P4, [illegible]=Major 3rd,P4=Perfect 4th).	u	b G3-C4	1.6	8	8/10	u	x x
33	M2,M3,P4,(Maj.2nd,Maj.3rd,Per.4th).	u	b G3-C4	1.6	8	11/12	u	x x x
34	M2,M3,P4,P5.	u	b G3-C4	1.6	8	14/15	u	x x x x
35	Practice unit.	u	b G3-C4	c	u	1/0	u	x x x x
36	M3,P5,(M3=Major [illegible]rd,P5=Perfect 5th).	u	b C4-C4	1.6	6	8/10	u	x x
37	M3,P5,(M3=Major [illegible]rd,P5=Perfect 5th).	u	b G3-G5	1.6	6	8/10	u	x x
38	M2,P4,(M2=Major 2nd,P4=Perfect 4th).	u	b C4-C4	1.6	6	8/10	u	x x
39	M2,P4,(M2=Major 2nd,P4=Perfect 4th).	u	b G3-G5	1.6	5	8/10	u	x x
40	P4,P5,(P4=Perfect 4th,P5=Perfect 5th).	u	b C4-C4	1.6	5	8/10	u	x x
41	P4 P5,(P4=Perfect 4th,P5=Perfect 5th).	u	b G3-G5	1.6	5	8/10	u	x x
42	M3,P4,(M3=Major 3rd,P3=Perfect 4th).	u	b C4-C4	1.6	5	8/10	u	x x
43	M3,P4,(M3=Major 3rd,P3=Perfect 4th).	u	b G3-G5	1.6	5	8/10	u	x x
44	M2,M3,P5,(Maj.2nd,Maj.3rd,Perf.5th).	u	b C4-C4	1.6	4	11/12	u	x x x
45	M2,M3,P5,(Maj.2nd,Maj.3rd,Perf.5th).	u	b G3-G5	1.6	4	11/12	u	x x x
46	Practice unit.	u	b G3-G5	c	u	1/0	u	x x x
47	M2,M3,P4,(Maj.2nd,Maj.3rd,Perf.4th).	u	b C3-C4	1.6	4	11/12	u	x x x
48	M2,M3,P4,(Maj.2nd,Maj.3rd,Perf.4th).	u	b G3-G5	1.6	4	11/12	u	x x x
49	Practice unit.	u	b G3-G5	c	u	1/0	u	x x x
50	M2,P4,P5,(Maj.3rd,Perf.4th,Perf.5th).	u	b C3-C4	1.6	5	12/13	u	x x x
51	M2,P4,P5,(Maj.3rd,Perf.4th,Perf.5th).	u	b G3-G5	1.6	5	12/13	u	x x x
52	Practice unit.	u	b G3-G5	c	u	1/0	u	x x x
53	M2,M3,P4,P5.	u	b C3-C4	1.6	4	13/15	u	x x x x
54	M2,M3,P4,P5.	u	b C3-C6	1.6	4	14/16	u	x x x x
55	Practice unit.	u	b C3-C6	c	u	1/0	u	x x x x
56	M2,M3,P4,P5.	u	b G2-G6	1.6	4	14/16	u	x x x x
57	M2,M3,P4,P5.	u	b G2-G6	1.6	4	14/16	u	x x x x
58	M2,M3,P4,P5.	u	b G2-G6	1.6	4	14/16	u	x x x x
59	M2,M3,P4,P5.	u	b G2-G6	1.6	4	14/16	u	x x x x
60	M2,M3,P4,P5.	u	b G2-G6	1.6	3	14/16	u	x x x x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
61	P1,P5,(P1=Perfect 1st,P5=Perfect 5th).	u	b C4-C4	2.6	20	4/5	u	x						x					
62	P1,P8,(P1=Perfect 1st,P8=Perfect 8th).	u	b C4-C4	2.6	20	4/5	u	x											x
63	P5,P8,(P5=Perfect 5th,P8=Perfect 8th).	u	b C4-C4	2.6	20	8/10	u							x					x
64	P1,P5,(P1=Perfect 1st,P5=Perfect 5th).	u	b G3-C4	1.6	15	4/5	u	x						x					
65	P1,P8,(P1=Perfect 1st,P8=Perfect 8th).	u	b G3-C4	1.6	15	4/5	u	x											x
66	P5,P8,(P5=Perfect 5th,P8=Perfect 8th).	u	b G3-C4	1.6	15	8/10	u							x					x
67	P1,M3,(P1=Perfect 1st,M3=Major 3rd).	u	b C4-C4	1.6	12	4/5	u	x				x							
68	M3,P5,(M3=Major 3rd,P5=Perfect 5th).	u	b C4-C4	1.6	12	8/10	u					x		x					
69	M3,P5,P8,(Maj.3rd,Perf.5th,Perf.8th).	u	b C4-C4	1.6	12	11/12	u					x		x					x
70	P5,P8,(P5=Perfect 5th,P8=Perfect 8th).	u	b G3-C4	1.6	10	4/5	u	x				x							
71	M3,P5,(M3=Major 3rd,P5=Perfect 5th).	u	b G3-C4	1.6	10	8/10	u					x		x					
72	M3,P5,P8,(Maj.3rd,Perf.5th,Perf.8th).	u	b G3-C4	1.6	10	11/12	u					x		x					x
73	Practice unit.	u	b C4-C4	c	u	1/0	u					x		x					x
74	Practice unit.	u	b G3-C4	c	u	1/0	u					x		x					x
75	P1,M7,(P1=Perfect 1st,M7=Major 7th).	u	b C4-C4	1.6	12	4/5	u	x										x	
76	P1,M2,(P1=Perfect 1st,M2=Major 2nd).	u	b C4-C4	1.6	12	4/5	u	x		x									
77	M2,M7,(M2=Major 2nd,M7=Major 7th).	u	b C4-C4	1.6	12	8/10	u			x								x	
78	M2,M7,P8,(Maj.2nd,Maj.7th,Perf.8th).	u	b C4-C4	1.6	12	11/12	u			x								x	x
79	P1,M7,(P1=Perfect 1st,M7=Major 7th).	u	b G3-C4	1.6	10	4/5	u	x										x	
80	P1,M2,(P1=Perfect 1st,M2=Major 2nd).	u	b G3-C4	1.6	10	4/5	u	x		x									
81	M2,M7,(M2=Major 2nd,M7=Major 7th).	u	b G3-C4	1.6	10	8/10	u			x								x	
82	M2,M7,P8,(Maj.2nd,Maj.7th,Perf.8th).	u	b G3-C4	1.6	10	11/12	u			x								x	x
83	Practice unit.	u	b C4-C4	c	u	1/0	u			x								x	x
84	Practice unit.	u	b G3-C4	c	u	1/0	u			x								x	x
85	P1,P4,(P1=Perfect 1st,P4=Perfect 4th).	u	b C4-C4	1.6	10	4/5	u	x					x						
86	P1,M6,(P1=Perfect 1st,M6=Major 6th).	u	b C4-C4	1.6	10	4/5	u	x							x				
87	P4,M6,(P4=Perfect 4th,M6=Major 6th).	u	b C4-C4	1.6	10	8/10	u						x		x				
88	P4,M6,P8,(Perf.4th,Maj.6th,Perf.8th).	u	b C4-C4	1.6	10	11/12	u						x		x				x
89	Practice unit.	u	b C4-C4	c	u	1/0	u						x		x				x
90	P1,M6,(P1=Perfect 1st,M6=Major 6th).	u	b G3-C4	1.6	8	4/5	u	x							x				

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
91	P4,M6,(P4=Perfect 4th,M6=Major 6th).	u	b G3-C4	1.6	8	8/10	u						x			x			
92	P4,M6,P8,(Perf.4th,Maj.6th,Perf.8th).	u	b G3-C4	1.6	8	11/12	u						x			x			x
93	Practice unit.	u	b G3-C4	c	u	1/0	u						x			x			x
94	M3,P5,M7,P8.	u	b C4-C4	1.6	8	12/13	u					x		x				x	x
95	M3,P5,M7,P8.	u	b G3-G5	1.6	7	12/13	u					x		x				x	x
96	M2,M3,P5,P8.	u	b C4-C4	1.6	7	12/13	u			x		x		x					x
97	M2,M3,P5,P8.	u	b G3-G5	1.6	7	12/13	u			x		x		x					x
98	M2,M3,P5,M7,P8.	u	b C4-C4	1.6	5	15/16	u			x		x		x				x	x
99	M2,M3,P5,M7,P8.	u	b G3-G5	1.6	5	15/16	u			x		x		x				x	x
100	Practice unit.	u	b C4-C4	c	u	1/0	u			x		x		x				x	x
101	Practice unit.	u	b G3-G5	c	u	1/0	u			x		x		x				x	x
102	M3,P4,P5,P8.	u	b C4-C4	1.6	6	12/13	u					x	x	x					x
103	M3,P4,P5,P8.	u	b G3-G5	1.6	5	12/13	u					x	x	x				x	x
104	M3,P5,M6,P8.	u	b C4-C4	1.6	6	12/13	u					x		x		x			x
105	M3,P5,M6,P8.	u	b G3-G5	1.6	5	12/13	u					x		x		x			x
106	M3,P4,P5,M6,P8.	u	b C4-C4	1.4	5	15/16	u					x	x	x		x			x
107	M3,P4,P5,M6,P8.	u	b G3-G5	1.4	5	15/16	u					x	x	x		x			x
108	Practice unit.	u	b C4-C4	c	u	1/0	u					x	x	x		x			x
109	Practice unit.	u	b G3-G5	c	u	1/0	u					x	x	x		x			x
110	M2,P4,M7,P8.	u	b C4-C4	1.4	5	12/13	u		x				x					x	x
111	M2,P4,M7,P8.	u	b G3-G5	1.4	4	12/13	u		x				x					x	x
112	M2,M6,M7,P8.	u	b C4-C4	1.4	5	12/13	u		x							x		x	x
113	M2,M6,M7,P8.	u	b G3-G5	1.4	4	12/13	u		x							x		x	x
114	M2,P4,M6,M7,P8.	u	b C4-C4	1.4	5	15/16	u		x				x			x		x	x
115	M2,P4,M6,M7,P8.	u	b G3-G5	1.4	4	15/16	u		x				x			x		x	x
116	Practice unit.	u	b C4-C4	c	u	1/0	u		x				x			x		x	x
117	Practice unit.	u	b G3-G5	c	u	1/0	u		x				x			x		x	x
118	All intervals: Major scale.	u	b C4-C4	1.4	5	15/16	u		x		x		x			x		x	x
119	All intervals: Major scale	u	b G3-G5	1.4	5	15/16	u		x		x		x			x		x	x
120	All intervals: Major scale.	u	b C4-C4	1.4	4	15/16	u		x		x		x			x		x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
121	All intervals: Major scale.	u	b C4-C4	1.4	4	15/16	u			x		x	x	x		x		x	x
122	All intervals: Major scale.	u	b G3-G5	1.4	4	15/16	u			x		x	x	x		x		x	x
123	All intervals: Major scale.	u	b C4-C4	c	3	15/16	1			x		x	x	x		x		x	x
124	All intervals: Major scale.	u	b C3-C6	c	3	15/16	1			x		x	x	x		x		x	x
125	Practice unit.	u	b C4-C4	c	u	1/0	u			x		x	x	x		x		x	x
126	Practice unit.	u	b C3-C6	c	u	1/0	u			x		x	x	x		x		x	x
127	P1,P5,descending(Perf.1st,Perf.5th).	d	t G4-G4	1.6	10	4/5	u	x						x					
128	P1,P8,descending(Perf.1st,Perf.8th).	d	t G4-G4	1.6	10	4/5	u	x											x
129	P5,P8,descending(Perf.5th,Perf.8th).	d	t G4-G4	1.6	10	8/10	u							x					x
130	P1,P5,descending(Perf.1st,Perf.5th).	d	t C4-G4	1.6	10	4/5	u	x						x					
131	P1,P8,descending(Perf.1st,Perf.8th).	d	t C4-G4	1.6	10	4/5	u	x											x
132	P5,P8,descending(Perf.5th,Perf.8th).	d	t C4-G4	1.6	10	8/10	u							x					x
133	P1,M3,descending(Perf.1st,Maj.3rd).	d	t G4-G4	1.6	8	4/5	u	x				x							
134	M3,P5,descending(Maj.3rd,Perf.5th).	d	t G4-G4	1.6	8	8/10	u					x		x					
135	M3,P5,P8,descending.	d	t G4-G4	1.6	8	9/11	u					x		x					x
136	P1,M3,descending(Perf.1st,Maj.3rd).	d	t G4-C5	1.6	8	4/5	u		x			x							
137	M3,P5,descending(Maj.3rd,Perf.5th).	d	t G4-C5	1.6	8	8/10	u					x		x					
138	M3,P5,P8,descending.	d	t G4-C5	1.6	8	9/11	u					x		x					x
139	Practice unit.	d	t C5-C5	c	u	1/0	u					x		x					x
140	Practice unit.	d	t G4-C5	c	u	1/0	u					x		x					x
141	P1,M7,descending(Perf.1st,Maj.7th).	d	t C5-C5	1.6	8	4/5	u		x									x	
142	P1,M2,descending(Perf.1st,Maj.2nd).	d	t C5-C5	1.6	8	4/5	u		x		x								
143	M2,M7,descending(Maj.2nd,Maj.7th).	d	t C5-C5	1.6	8	8/10	u				x							x	
144	M2,M7,P8,descending.	d	t C5-C5	1.6	8	9/11	u				x							x	x
145	P1,M7,descending(Perf.1st,Maj.7th).	d	t G4-C5	1.6	8	4/5	u		x									x	
146	P1,M2,descending(Perf.1st,Maj.2nd).	d	t G4-C5	1.6	8	4/5	u		x		x								
147	M2,M7,descending(Maj.2nd,Maj.7th).	d	t G4-C5	1.6	8	8/10	u				x							x	
148	M2,M7,P8,descending.	d	t G4-C5	1.6	8	9/11	u				x							x	x
149	Practice unit.	d	t C5-C5	c	u	1/0	u				x							x	x
150	Practice unit.	d	t G4-C5	c	u	1/0	u				x							x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
151	P1,P4,descending(Perf.1st,Perf.4th).	d	t C5-C5	1.6	8	4/5	u	x					x						
152	P1,M6,descending(Perf.1st,Maj.6th).	d	t C5-C5	1.6	8	4/5	u	x								x			
153	P4,M6,descending(Perf.4th,Maj.6th).	d	t C5-C5	1.6	8	8/10	u						x			x			
154	P4,M6,P8,descending.	d	t C5-C5	1.6	8	9/11	u						x			x			x
155	P1,P4,descending(Perf.1st,Perf.4th).	d	t G4-C5	1.6	8	4/5	u	x					x						
156	P1,M6,descending(Perf.1st,Maj.6th).	d	t G4-C5	1.6	8	4/5	u	x								x			
157	P4,M6,descending(Perf.4th,Maj.6th).	d	G4-C5	1.6	8	8/10	u						x			x			
158	P4,M6,P8,descending.	d	t G4-C5	1.6	8	9/11	u						x			x			x
159	Practice unit.	d	t C5-C5	c	u	1/0	u						x			x			x
160	Practice unit.	d	t G4-C5	c	u	1/0	u						x			x			x
161	M3,P5,M7,P8,descending.	d	t C5-C5	1.6	7	12/13	u					x		x				x	x
162	M3,P5,M7,P8,descending.	d	t G4-C5	1.6	7	12/13	u					x		x				x	x
163	M2,M3,P5,P8,descending.	d	t C5-C5	1.6	7	12/13	u			x		x		x					x
164	M2,M3,P5,P8,descending.	d	t G4-C5	1.6	7	12/13	u			x		x		x					x
165	M2,M3,P5,M7,P8,descending.	d	t C5-C5	1.6	7	15/16	u			x		x		x				x	x
166	M2,M3,P5,M7,P8,descending.	d	t G4-C5	1.6	7	15/16	u			x		x		x				x	x
167	Practice unit.	d	t C5-C5	c	u	1/0	u			x		x		x				x	x
168	Practice unit.	d	t G4-C5	c	u	1/0	u			x		x		x				x	x
169	M3,P4,P5,P8,descending.	d	t C5-C5	1.6	6	12/13	u					x	x	x					x
170	M3,P4,P5,P8,descending.	d	t G4-C5	1.6	7	12/13	u					x	x	x					x
171	M3,P5,M6,P8,descending.	d	t C5-C5	1.6	7	12/13	u					x		x		x			x
172	M3,P5,M6,P8,descending.	d	t G4-C5	1.6	7	12/13	u					x		x		x			x
173	M3,P4,P5,M6,P8,descending.	d	t C5-C5	1.4	6	15/16	u					x	x	x		x			x
174	M3,P4,P5,M6,P8,descending.	d	t C4-C5	1.4	6	15/16	u					x	x	x		x			x
175	Practice unit.	d	t C5-C5	c	u	1/0	u					x	x	x		x			x
176	Practice unit.	d	t C4-C5	c	u	1/0	u					x	x	x		x			x
177	M2,P4,M7,P8,descending.	d	t C5-C5	1.4	5	12/13	u			x			x					x	x
178	M2,P4,M7,P8,descending.	d	t G4-C5	1.4	5	12/13	u			x			x					x	x
179	M2,P4,M6,M7,P8,descending.	d	t C5-C5	1.4	5	12/13	u			x						x		x	x
180	M2,P4,M6,M7,P8,descending.	d	t G4-C5	1.4	5	12/13	u			x						x		x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
181	M2,M6,M7,P8,descending.	d	t G4-C5	1.4	5	12/13	u			x						x		x	x
182	M2,P4,M6,M7,P8,descending.	d	t C5-C5	1.4	5	15/16	u			x			x			x		x	x
183	M2,P4,M6,M7,P8,descending.	d	t G4-C5	1.4	5	15/16	u			x			x			x		x	x
184	Practice unit.	d	t C5-C5	c	u	1/0	u			x			x			x		x	x
185	Practice unit.	d	t G4-C5	c	u	1/0	u			x			x			x		x	x
186	All intervals:Major scale(descending).	d	t C5-C5	1.4	4	14/16	u			x		x	x	x		x		x	x
187	All intervals:Major scale(descending).	d	t G4-C5	1.4	4	14/16	u			x		x	x	x		x		x	x
188	All intervals:Major scale(descending).	d	t C5-C5	1.4	4	14/16	2			x		x	x	x		x		x	x
189	All intervals:Major scale(descending).	d	t G4-G5	1.4	4	14/16	2			x		x	x	x		x		x	x
190	All intervals:Major scale(descending).	d	t C4-C6	c	4	14/16	1			x		x	x	x		x		x	x
191	Practice unit.	d	t C5-C5	c	u	1/0	2			x		x	x	x		x		x	x
192	Practice unit.	d	t C4-C6	c	u	1/0	2			x		x	x	x		x		x	x
193	P5,P8,ascending & descending.	u/d	t C5-C5	1.6	4	12/13	u							x					x
194	P5,P8,ascending and descending.	u/d	t G3-G4	1.6	4	12/13	u							x					x
195	M3,P5,ascending and descending.	u/d	t C5-C5	1.6	4	12/13	u					x		x					
196	M3,P5,ascending and descending.	u/d	t G3-G5	1.6	4	12/13	u					x		x					
197	M2,M7,ascending and descending.	u/d	t C5-C5	1.6	4	12/13	u			x								x	
198	M2,M7,ascending and descending.	u/d	r G3-G5	1.6	4	12/13	u			x								x	
199	P4,M6,ascending and descending.	u/d	t C5-C5	1.6	4	12/13	u						x			x			
200	P4,M6,ascending and descending.	u/d	r G3-G5	1.6	4	12/13	u						x			x			
201	P4,P5,ascending and descending.	u/d	t C5-C5	1.6	4	12/13	u						x	x					
202	P4,P5,ascending and descending.	u/d	r G3-G5	1.6	4	12/13	u						x	x					
203	M3,P4,P5,M6,P8,asc.and desc.	u/d	t C5-C5	1.6	4	15/16	u					x	x	x		x			x
204	M3,P4,P5,M6,P8,asc.and desc.	u/d	r G3-G5	1.6	4	15/16	u					x	x	x		x			x
205	M2,P4,M6,M7,P8,asc.and desc.	u/d	t C5-C5	1.6	4	15/16	u			x			x			x		x	x
206	M2,P4,M6,M7,P8,asc.and desc.	u/d	r G3-G5	1.6	4	15/16	u			x			x			x		x	x
207	All intervals:Major scale(asc.& desc).	u/d	t C5-C5	1.4	4	14/16	u			x		x	x	x		x		x	x
208	All intervals:Major scale(asc.& desc).	u/d	r G3-G5	1.4	4	14/16	2			x		x	x	x		x		x	x
209	All intervals:Major scale(asc.& desc).	u/d	r G3-G5	c	4	14/16	1			x		x	x	x		x		x	x
210	Practice unit.	u/d	r G2-C6	c	u	1/0	u			x		x	x	x		x		x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
211	P1,m3,(P1=Perfect 1st,m3=minor 3rd).	u	b C4-C4	1.6	5	4/5	u	x			x								
212	m3,P5,P8,(min.3rd,Perf.5th,Perf.8th).	u	b C4-C4	1.6	5	9/11	u				x			x					x
213	P1,m3,(P1=Perfect 1st,m3=minor 3rd).	u	b G3-G4	1.6	5	6/7	u	x			x								
214	m3,P5,P8,(min.3rd,Perf.5th,Perf.8th).	u	b G3-G5	1.6	5	9/11	u				x			x					x
215	Practice unit.	u	b G3-G4	c	u	1/0	u				x			x					x
216	M2,M7,P8,(Maj.2nd,Maj.7th,Perf.8th).	u	b C4-C4	1.6	4	9/10	u			x								x	x
217	M2,M7,P8,(Maj.2nd,Maj.7th,Perf.8th).	u	b G3-G4	1.6	5	9/10	u			x								x	x
218	P1,m6,(P1=Perfect 1st,m6=minor 6th).	u	b C4-C4	1.6	5	6/7	u	x							x				
219	P4,m6,P8,(Perf.4th,min.6th,Perf.8th).	u	b C4-C4	1.6	5	9/11	u						x		x				x
220	P1,m6,(P1=Perfect 1st,m6=minor 6th).	u	b G3-G4	1.6	5	6/7	u	x							x				
221	P4,m6,P8,(Perf.4th,min.6th,Perf.8th).	u	b G3-G4	1.6	5	9/11	u						x		x				x
222	Practice unit.	u	b G3-G4	c	u	1/0	u						x		x				x
223	m3,P5,M7,P8.	u	b C4-C4	1.6	5	12/13	u				x			x				x	x
224	m3,P5,M7,P8.	u	b G3-G5	1.6	4	12/13	u				x			x				x	x
225	M2,m3,P5,M7,P8.	u	b C4-C4	1.6	5	14/16	u			x	x			x				x	x
226	M2,m3,P5,M7,P8.	u	b G3-G5	1.6	4	14/16	u			x	x			x				x	x
227	Practice unit.	u	b C4-C4	c	u	1/0	u			x	x			x				x	x
228	Practice unit.	u	b G3-G5	c	u	1/0	u			x	x			x				x	x
229	m3,P4,P5,P8.	u	b C4-C4	1.6	5	12/13	u				x		x	x					x
230	m3,P4,P5,P8.	u	b G3-G5	1.6	4	12/13	u				x		x	x					x
231	m3,P5,m6,P8.	u	b C4-C4	1.6	5	12/13	u				x			x	x				x
232	m3,P5,m6,P8.	u	b G3-G5	1.6	4	12/13	u				x			x	x				x
233	m3,P4,P5,m6,P8.	u	b C4-C4	1.6	5	1/16	u				x		x	x	x				x
234	m3,P4,P5,m6,P8.	u	b G3-G5	1.6	4	14/16	u				x		x	x	x				x
235	Practice unit.	u	b C4-C4	c	u	1/0	u				x		x	x	x				x
236	Practice unit.	u	b G3-G5	c	u	1/0	u				x		x	x	x				x
237	M2,P4,m6,M7,P8.	u	b C4-C4	1.6	4	14/16	u			x			x		x			x	x
238	M2,P4,m6,M7,P8.	u	b G3-G5	1.6	4	14/16	u			x			x		x			x	x
239	Practice unit.	u	b C4-C4	c	u	1/0	u			x			x		x			x	x
240	Practice unit.	u	b G3-G5	c	u	1/0	u			x			x		x			x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
241	m3,m6,(m3=minor 3rd,m6=minor 6th).	u	b C4-C4	1.6	5	9/10	u				x				x				
242	m3,m6,(m3=minor 3rd,m6=minor 6th).	u	b G3-G5	1.6	4	9/10	u				x				x				
243	All intervals: harmonic minor scale.	u	b C4-C4	1.4	5	14/16	u			x	x		x	x	x			x	x
244	All intervals: harmonic minor scale.	u	b G3-G5	1.4	5	14/16	u			x	x		x	x	x			x	x
245	All intervals: harmonic minor scale.	u	b C4-C4	1.4	4	14/16	2			x	x		x	x	x			x	x
246	All intervals: harmonic minor scale.	u	b G3-C5	1.4	4	14/16	2			x	x		x	x	x			x	x
247	Practice unit.	u	b C4-C4	c	u	1/0	u			x	x		x	x	x			x	x
248	Practice unit.	u	b G3-G5	c	u	1/0	u			x	x		x	x	x			x	x
249	P1,m3,descending (Perf.1st,min.3rd).	d	t G4-G4	1.6	5	6/7	u	x			x								
250	m3,P5,P8,descending.	d	t C5-C5	1.6	5	9/10	u				x			x					x
251	P1,m3,descending (Perf.1st,min.3rd).	d	t G4-C5	1.6	5	6/7	u	x			x								
252	m3,P5,P8,descending.	d	t G4-C5	1.6	5	9/10	u				x			x					x
253	Practice unit.	d	t G4-C5	c	u	1/0	u				x			x					x
254	M2,M7,P8,descending.	d	t C5-C5	1.6	5	9/10	u			x								x	x
255	M2,M7,P8,descending.	d	t G4-C5	1.6	5	9/10	u			x								x	x
256	P1,m6,descending (Perf.1st,min.6th).	d	t C5-C5	1.6	5	6/7	u	x							x				
257	m3,m6,descending (min.3rd,min.6th).	d	t C5-C5	1.6	5	7/8	u				x				x				
258	P1,m6,descending (Perf.1st,min.6th).	d	t G4-C5	1.6	5	6/7	u	x							x				
259	m3,m6,descending (min.3rd,min.6th).	d	t G4-C5	1.6	5	7/8	u				x				x				
260	P4,m6,P8,descending.	d	t C5-C5	1.6	5	9/10	u						x		x				x
261	P4,m6,P8,descending.	d	t G4-C5	1.6	5	9/10	u						x		x				x
262	Practice unit.	d	t G4-C5	c	u	1/0	u			x								x	x
263	Practice unit.	d	t C5-C5	c	u	1/0	u				x		x		x				x
264	Practice unit.	d	t G4-C5	c	u	1/0	u				x		x		x				x
265	m3,P5,M7,P8,descending.	d	t C5-C5	1.6	5	12/13	u				x			x				x	x
266	m3,P5,M7,P8,descending.	d	t G4-C5	1.6	5	12/13	u				x			x				x	x
267	M2,m3,P5,M7,P8,descending.	d	t C5-C5	1.6	5	14/16	u			x	x			x				x	x
268	M2,m3,P5,M7,P8,descending.	d	t G4-C5	1.6	5	14/16	u			x	x			x				x	x
269	Practice unit.	d	t C5-C5	c	u	1/0	u			x	x			x				x	x
270	Practice unit.	d	t G4-C5	c	u	1/0	u			x	x			x				x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
271	m3,P4,P5,P8,descending.	d	t C5-C5	1.6	5	12/13	u				x		x	x					x
272	m3,P4,P5,P8,descending.	d	t G4-C5	1.6	5	12/13	u				x		x	x					x
273	m3,P5,m6,P8,descending.	d	t C5-C5	1.6	5	12/13	u				x			x	x				x
274	m3,P5,m6,P8,descending.	d	t G4-C5	1.6	5	12/13	u				x			x	x				x
275	m3,P4,P5,m6,P8,descending.	d	t C5-C5	1.6	5	14/16	u				x		x	x	x				x
276	m3,P4,P5,m6,P8,descending.	d	t G4-C5	1.6	5	14/16	u				x		x	x	x				x
277	Practice unit.	d	t C5-C5	c	u	1/0	u				x		x	x	x				x
278	Practice unit.	d	t G4-C5	c	u	1/0	u				x		x	x	x				x
279	M2,P4,m6,M7,P8,descending.	d	t C5-C5	1.6	5	14/16	u			x			x		x			x	x
280	M2,P4,m6,M7,P8,descending.	d	t G4-C5	1.6	5	14/16	u			x			x		x			x	x
281	Practice unit.	d	t C5-C5	c	u	1/0	u			x			x		x			x	x
282	Practice unit.	d	t G4-C5	c	u	1/0	u			x			x		x			x	x
283	All intervals:harm. minor scale(desc).	d	t C5-C5	1.4	5	14/16	u			x	x		x	x	x			x	x
284	All intervals:harm. minor scale(desc).	d	t G4-C5	1.4	5	14/16	u			x	x		x	x	x			x	x
285	All intervals:harm. minor scale(desc).	d	t C5-C5	1.4	4	14/16	2			x	x		x	x	x			x	x
286	All intervals:harm. minor scale(desc).	d	t C4-G5	c	4	14/16	2			x	x		x	x	x			x	x
287	Practice unit.	d	t C5-C5	c	u	1/0	u			x	x		x	x	x			x	x
288	Practice unit.	d	t C4-G5	c	u	1/0	u			x	x		x	x	x			x	x
289	m3,P4,P5,m6,P8,ascending & descending.	u/d	b C4-C4	1.6	5	14/16	u				x		x	x	x				x
290	m3,P4,P5,m6,P8,ascending & descending.	u/d	r G3-G5	1.6	5	14/16	u				x		x	x	x				x
291	M2,P4,m6,M7,P8, asc. and desc.	u/d	b C4-C4	1.6	5	14/16	u			x			x		x			x	x
292	M2,P4,m6,M7,P8, asc. and desc.	u/d	r G3-G5	1.6	5	14/16	u			x			x		x			x	x
293	Practice unit.	u/d	b C4-C4	c	u	1/0	u			x			x		x			x	x
294	Practice unit.	u/d	r G3-G5	c	u	1/0	u			x			x		x			x	x
295	All intervals:harm.min.scale(asc&desc).	u/d	b C4-C4	1.4	5	14/16	u			x	x		x	x	x			x	x
296	All intervals:harm.min.scale(asc&desc).	u/d	r G3-C6	1.4	5	14/16	u			x	x		x	x	x			x	x
297	All intervals:harm.min.scale(asc&desc).	u/d	b C4-C4	c	4	14/16	2			x	x		x	x	x			x	x
298	All intervals:harm.min.scale(asc&desc).	u/d	r G3-C6	c	4	14/16	2			x	x		x	x	x			x	x
299	Practice unit.	u/d	b C4-C4	c	u	1/0	u			x	x		x	x	x			x	x
300	Practice unit.	u/d	r G3-C6	1.4	u	1/0	u			x	x		x	x	x			x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	P5	m6	M6	m7	M7	P8
301	m3,M3,(m3=minor 3rd,M3=Major 3rd).	u	b C4-C4	1.6	5	9/10	u				x	x							
302	m3,M3,(m3=minor 3rd,M3=Major 3rd).	u	b G3-G4	1.6	5	9/10	u				x	x							
303	m6,M6,(m6=minor 6th,M6=Major 6th).	u	b C4-C4	1.6	5	9/10	u								x	x			
304	m6,M6,(m6=minor 6th,M6=Major 6th).	u	b G3-G4	1.6	5	9/10	u								x	x			
305	Practice unit.	u	b C4-C4	c	u	1/0	u				x	x			x	x			
306	Practice unit.	u	b G3-G4	c	u	1/0	u				x	x			x	x			
307	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u	b C4-C4	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
308	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u	b G3-G5	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
309	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u	b C4-C4	1.4	4	14/16	u			x	x	x	x	x	x	x		x	x
310	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u	b G3-G5	1.4	4	14/16	u			x	x	x	x	x	x	x		x	x
311	Practice unit.	u	b C4-C4	c	u	1/0	u			x	x	x	x	x	x	x		x	x
312	Practice unit.	u	b G3-G5	c	u	1/0	u			x	x	x	x	x	x	x		x	x
313	m3,M3,(m3=minor 3rd,M3=Major 3rd).	d	b C4-C4	1.6	5	9/10	u				x	x							
314	m3,M3,(m3=minor 3rd,M3=Major 3rd).	d	b C4-C5	1.6	5	9/10	u				x	x							
315	m6,M6,(m6=minor 6th,M6=Major 6th).	d	b C4-C4	1.6	5	9/10	u								x	x			
316	m6,M6,(m6=minor 6th,M6=Major 6th).	d	b C4-G4	c	5	9/10	u								x	x			
317	Practice unit.	d	b C4-C4	c	u	1/0	u				x	x			x	x			
318	Practice unit.	d	b C4-G4	c	u	1/0	u				x	x			x	x			
319	M2,m3,M3,P4,P5,m6,M6,M7,P8.	d	b C4-C4	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
320	M2,m3,M3,P4,P5,m6,M6,M7,P8.	d	b G3-C5	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
321	M2,m3,M3,P4,P5,m6,M6,M7,P8.	d	b C4-C4	1.4	4	14/16	2			x	x	x	x	x	x	x		x	x
322	M2,m3,M3,P4,P5,m6,M6,M7,P8.	d	b G3-C5	1.4	4	14/16	2			x	x	x	x	x	x	x		x	x
323	Practice unit.	d	b C4-C4	c	u	1/0	u			x	x	x	x	x	x	x		x	x
324	Practice unit.	d	b G3-C5	c	u	1/0	u			x	x	x	x	x	x	x		x	x
325	m3,M3,m6,M6,ascending & descending.	u/d	b C4-C4	1.6	5	12/13	u				x	x			x	x			
326	m3,M3,m6,M6,ascending & descending.	u/d	r G3-C5	1.6	5	12/13	u				x	x			x	x			
327	Practice unit.	c	c G3-C5	c	u	1/0	u				x	x			x	x			
328	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u/d	b C4-C4	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
329	M2,m3,M3,P4,P5,m6,M6,M7,P8.	u/d	r G3-C5	1.4	5	14/16	u			x	x	x	x	x	x	x		x	x
330	Practice unit.	c	c G3-C5	c	u	1/0	u			x	x	x	x	x	x	x		x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
331	P1,Tt,P1=Perfect 1st,Tt=Tritone).	u	b C4-C4	1.6	5	6/7	u	x						x						
332	P4,Tt,P4=Perfect 4th,Tt=Tritone).	u	b C4-C4	1.6	5	9/10	u						x	x						
333	Tt,P5,(Tt=Tritone,P5=Perfect 5th).	u	b C4-C4	1.6	5	9/10	u							x	x					
334	P4,Tt,P5,(Perf.4th,Tritone,Perf.5th).	u	b C4-C4	1.6	5	11/12	u						x	x	x					
335	P1,Tt,P1=Perfect 1st,Tt=Tritone).	u	b G3-C5	1.6	5	6/7	u	x						x						
336	P4,Tt,P4=Perfect 4th,Tt=Tritone).	u	b G3-C5	1.6	5	9/10	u						x	x						
337	Tt,P5,(Tt=Tritone,P5=Perfect 5th).	u	b G3-C5	1.6	5	9/10	u							x	x					
338	P4,Tt,P5,(Perf.4th,Tritone,Perf.5th).	u	b G3-C5	1.6	5	11/12	u						x	x	x					
339	Practice unit.	u	b C4-C4	c	u	1/0	u						x	x	x					
340	Practice unit.	u	b G3-C5	c	u	1/0	u						x	x	x					
341	P1,m2,(P1=Perfect 1st,m2=minor 2nd).	u	b C4-C4	1.6	5	6/7	u	x	x											
342	m2,M2,(m2=minor 2nd,M2=Major 2nd).	u	b C4-C4	1.6	5	9/10	u		x	x										
343	P1,m7,(P1=Perfect 1st,m7=minor 7th).	u	b C4-C4	1.6	5	6/7	u	x										x		
344	m7,M7,(m7=minor 7th,M7=Major 7th).	u	b C4-C4	1.6	5	9/10	u											x	x	
345	P1,m2,(P1=Perfect 1st,m2=minor 2nd).	u	b G3-G5	1.6	5	6/7	u	x	x											
346	m2,M2,(m2=minor 2nd,M2=Major 2nd).	u	b G3-C5	1.6	5	9/10	u		x	x										
347	P1,m7,(P1=Perfect 1st,m7=minor 7th).	u	b G3-C5	1.6	5	6/7	u	x										x		
348	m7,M7,(m7=minor 7th,M7=Major 7th).	u	b G3-C5	1.6	5	9/10	u											x	x	
349	m2,M2,m7,M7,(m=minor,M=Major).	u	b C4-C4	1.6	5	12/13	u		x	x								x	x	
350	m2,M2,m7,M7,(m=minor,M=Major).	u	b G3-C5	1.6	5	12/13	u		x	x								x	x	
351	M6,m7,(M6=Major 6th,m7=minor 7th).	u	b C4-C4	1.6	5	9/10	u									x			x	
352	M6,m7,(M6=Major 6th,m7=minor 7th).	u	b G3-C5	1.6	5	9/10	u									x			x	
353	m2,M2,M6,m7,M7,(m=minor,M=Major).	u	b C4-C4	1.4	5	14/16	u		x	x						x	x	x		
354	m2,M2,M6,m7,M7,(m=minor,M=Major).	u	b G3-C5	1.4	5	14/16	u		x	x						x	x	x		
355	Practice unit.	u	b C4-C4	c	u	1/0	u		x	x						x	x	x		
356	Practice unit.	u	b G3-C5	c	u	1/0	u		x	x						x	x	x		
357	m2,Tt,m7,(minor 2nd,Tritone,minor 7th).	u	b C4-C4	1.4	5	11/12	u		x					x				x		
358	m2,Tt,m7,(minor 2nd,Tritone,minor 7th).	u	b G3-C5	1.4	5	11/12	u		x					x				x		
359	m2,M2,P4,Tt,P5,m7,M7.	u	b C4-C4	1.4	5	14/16	u		x	x			x	x	x			x	x	
360	Practice unit.	u	b C4-C4	c	u	1/0	u		x	x			x	x	x			x	x	

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
361	m2,M2,P4,Tt,P5,m7,M7.	u	b G3-C5	1.4	5	14/16	u		x	x			x	x	x			x	x	
362	Practice unit.	u	b G3-C5	c	u	1/0	u		x	x			x	x	x			x	x	
363	P1,Tt,descending(Perf.1st,Tritone).	d	b C4-C4	1.6	5	6/7	u	x						x						
364	P4,Tt,descending(Perf.4th,Tritone).	d	b C4-C4	1.6	5	9/10	u						x	x						
365	Tt,P5,descending(Tritone,Perf.5th).	d	b C4-C4	1.6	5	9/10	u							x	x					
366	P4,Tt,P5,desc.(P=Perfect,Tt=Tritone).	d	b C4-C4	1.6	5	11/12	u						x	x	x					
367	P1,Tt,descending(Perf.1st,Tritone).	d	b G3-C5	1.6	5	6/7	u	x						x						
368	P4,Tt,descending(Perf.4th,Tritone).	d	b G3-C5	1.6	5	9/10	u						x	x						
369	Tt,P5,descending(Tritone,Perf.5th).	d	b G3-C5	1.6	5	9/10	u							x	x					
370	P4,Tt,P5,desc.(P=Perfect,Tt=Tritone).	d	b G3-C5	1.6	5	11/12	u						x	x	x					
371	Practice unit.	d	b C4-C4	c	u	1/0	u						x	x	x					
372	Practice unit.	d	b G3-C5	c	u	1/0	u						x	x	x					
373	P1,m2,descending(Perf.1st,minor 2nd).	d	b C4-C4	1.6	5	6/7	u	x	x											
374	m2,M2,descending(minor 2nd,Major 2nd).	d	b C4-C4	1.6	5	9/10	u		x	x										
375	P1,m7,descending(Perf.1st,minor 7th).	d	b C4-G4	1.6	5	6/7	u	x										x		
376	m7,M7,descending(minor 7th,Major 7th).	d	b C4-C4	1.6	5	9/10	u											x	x	
377	P1,m2,descending(Perf.1st,minor 2nd).	d	b G3-C5	1.6	5	6/7	u	x	x											
378	m2,M2,descending(minor 2nd,Major 2nd).	d	b G3-C5	1.6	5	9/10	u		x	x										
379	P1,m7,descending(Perf.1st,minor 7th).	d	b G3-C5	1.6	5	6/7	u	x										x		
380	m7,M7,descending(minor 7th,Major 7th).	d	b G3-C5	1.6	5	9/10	u											x	x	
381	m2,M2,m7,M7,desc.(m=minor,M=Major).	d	b C4-C4	1.6	5	12/13	u		x	x								x	x	
382	m2,M2,m7,M7,desc.(m=minor,M=Major).	d	b G3-C5	1.6	5	12/13	u		x	x								x	x	
383	M6,m7,descending(Major 6th,minor 7th).	d	b C4-C4	1.6	5	9/10	u									x	x			
384	M6,m7,descending(Major 6th,minor 7th).	d	b G3-C5	1.6	5	9/10	u									x	x			
385	m2,M2,M6,m7,M7,desc.(m=min.,M=Maj).	d	b C4-C4	1.6	5	14/16	u		x	x						x	x	x		
386	m2,M2,M6,m7,M7,desc.(m=min.,M=Maj).	d	b G3-C5	1.6	5	14/16	u		x	x						x	x	x		
387	Practice unit.	d	b C4-C4	c	u	1/0	u		x	x						x	x	x		
388	Practice unit.	d	b G3-C5	c	u	1/0	u		x	x						x	x	x		
389	m2,Tt,m7,desc.(min.2nd,Tritone,min.7th).	d	b C4-C4	1.6	5	11/12	u							x				x		
390	Practice unit.	d	b C4-C4	c	u	1/0	u		x					x				x		

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
391	m2,Tt,m7,desc.(min.2nd,Tritone,min.7th).	d	b G3-C5	1.6	5	11/12	u		x					x				x		
392	Practice unit.	d	b G3-C5	c	u	1/0	u		x					x				x		
393	m2,M2,P4,Tt,P5,m7,M7,descending.	d	b C4-C4	1.4	5	14/16	u		x	x			x	x	x			x	x	
394	m2,M2,P4,Tt,P5,m7,M7,descending.	d	b G3-C5	1.4	5	14/16	u		x	x			x	x	x			x	x	
395	Practice unit.	d	b C4-C4	c	u	1/0	u		x	x			x	x	x			x	x	
396	Practice unit.	d	b G3-C5	c	u	1/0	u		x	x			x	x	x			x	x	
397	P4,Tt,asc. and desc.(Perf.4th,Tritone).	u/d	b C4-C4	1.4	5	12/14	u						x	x						
398	Tt,P5,asc. and desc.(Tritone,Perf.5th).	u/d	b C4-C4	1.4	5	12/14	u							x	x					
399	P4,Tt,P5,ascending and descending.	u/d	b C4-C4	1.4	5	14/16	u						x	x	x					
400	P4,Tt,asc. and desc.(Perf.4th,Tritone).	u/d	b G3-C5	1.4	5	12/14	u						x	x						
401	Tt,P5,asc. and desc.(Tritone,Perf.5th).	u/d	b G3-C5	1.4	5	12/14	u							x	x					
402	P4,Tt,P5,ascending and descending.	u/d	b G3-C5	1.4	5	14/16	u						x	x	x					
403	Practice unit.	u/d	c G3-C5	c	u	1/0	u						x	x	x					
404	m2,M2,asc. and desc.(min.2nd,Maj.2nd).	u/d	b C4-C4	1.4	5	11/12	u		x	x										
405	m7,M7,asc. and desc.(min.7th,Maj.7th).	u/d	b C4-G4	1.4	5	11/12	u											x	x	
406	m2,M2,m7,M7,(m=minor,M=Major).	u/d	b C4-C4	1.4	5	14/16	u		x	x								x	x	
407	m2,M2,asc. and desc.(min.2nd,Maj.2nd).	u/d	b G3-C5	1.4	5	11/12	u		x	x										
408	m7,M7,asc. and desc.(min.7th,Maj.7th).	u/d	b G3-C5	1.4	5	11/12	u											x	x	
409	m2,M2,m7,M7,(m=minor,M=Major).	u/d	b G3-C5	1.4	5	14/16	u		x	x								x	x	
410	Practice unit.	u/d	c G3-C5	c	u	1/0	u		x	x								x	x	
411	M6,m7,asc. and desc.(Maj.6th,min.7th).	u/d	b C4-C4	1.4	5	11/12	u									x	x			
412	m2,M2,M6,m7,M7,asc. and desc.	u/d	b C4-C4	1.4	5	14/16	u		x	x						x	x	x		
413	M6,m7,asc. and desc.(Maj.6th,min.7th).	u/d	b G3-C5	1.4	5	11/12	u									x	x			
414	m2,M2,M6,m7,M7,asc. and desc.	u/d	b G3-C5	1.4	5	14/16	u		x	x						x	x	x		
415	Practice unit.	u/d	c G3-C5	c	u	1/0	u		x	x						x	x	x		
416	m2,Tt,M7,asc. and desc.	u/d	b G3-C5	1	5	14/16	u		x					x				x		
417	Practice unit.	u/d	c G3-C5	c	u	1/0	u		x					x				x		
418	m2,M2,P4,Tt,P5,m7,M7,asc. and desc.	u/d	b C4-C4	1.4	5	14/16	u		x	x			x	x	x			x	x	
419	m2,M2,P4,Tt,P5,m7,M7,asc. and desc.	u/d	b G3-C5	1.4	5	14/16	u		x	x			x	x	x			x	x	
420	Practice unit.	u/d	c G3-C5	c	u	1/0	u		x	x			x	x	x			x	x	

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
421	All simple intervals, ascending.	u	b C4-C4	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
422	All simple intervals, ascending.	u	b G3-C5	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
423	Practice unit.	u	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
424	Practice unit.	u	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
425	All simple intervals, descending.	d	b C4-C4	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
426	All simple intervals, descending.	d	b G3-C5	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
427	Practice unit.	d	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
428	Practice unit.	d	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
429	All simple intervals, asc. and desc.	u/d	b C4-C4	1.4	u	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
430	All simple intervals, asc. and desc.	u/d	b G3-C5	1.4	u	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
431	Practice unit.	u/d	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
432	Practice unit.	u/d	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
433	All simple intervals, asc. and desc.	u/d	c C4-C4	c	3	14/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
434	All simple intervals, asc. and desc.	u/d	b G3-C5	c	3	14/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
435	All simple intervals, asc. and desc.	u/d	b C4-C4	c	3	15/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
436	All simple intervals, asc. and desc.	u/d	b G2-C5	c	3	15/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
437	Practice unit.	c	c F2-C4	c	3	1/0	1	x	x	x	x	x	x	x	x	x	x	x	x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
421	All simple intervals, ascending.	u	b C4-C4	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
422	All simple intervals, ascending.	u	b G3-C5	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
423	Practice unit.	u	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
424	Practice unit.	u	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
425	All simple intervals, descending.	d	b C4-C4	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
426	All simple intervals, descending.	d	b G3-C5	1.4	4	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
427	Practice unit.	d	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
428	Practice unit.	d	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
429	All simple intervals, asc. and desc.	u/d	b C4-C4	1.4	u	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
430	All simple intervals, asc. and desc.	u/d	b G3-C5	1.4	u	14/16	u	x	x	x	x	x	x	x	x	x	x	x	x	x
431	Practice unit.	u/d	b C4-C4	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
432	Practice unit.	u/d	b G3-C5	c	u	1/0	u	x	x	x	x	x	x	x	x	x	x	x	x	x
433	All simple intervals, asc. and desc.	u/d	c C4-C4	c	3	14/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
434	All simple intervals, asc. and desc.	u/d	b G3-C5	c	3	14/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
435	All simple intervals, asc. and desc.	u/d	b C4-C4	c	3	15/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
436	All simple intervals, asc. and desc.	u/d	b G2-C5	c	3	15/16	1	x	x	x	x	x	x	x	x	x	x	x	x	x
437	Practice unit.	c	c F2-C4	c	3	1/0	1	x	x	x	x	x	x	x	x	x	x	x	x	x

UNIT	TITLE	DIRECTION	RANGE	LENGTH	TIME LIMIT	ADVANCEMENT	PLAYS	INTERVALS INCLUDED P1	m2	M2	m3	M3	P4	Tt	P5	m6	M6	m7	M7	P8
1	Test questions:Grade 1.	u	b C4-C4	2.0	10	10/11	u	x		x		x	x		x					
2	Test questions:Grade 1.	u	b G3-F4	2.0	10	10/11	u	x		x		x	x		x					
3	Test questions:Grade 1.	u	b C4-C4	2.0	10	10/11	u	x		x		x	x		x					
4	Test questions:Grade 1.	u	b G3-F4	2.0	10	10/11	u	x		x		x	x		x					
5	Test questions:Grade 2.	u	b C3-C5	1.6	9	10/11	u			x		x	x		x					
6	Test questions:Grade 2.	u	b C3-C5	1.6	9	10/11	u			x		x	x		x					
7	Test questions:Grade 2.	u	b C3-C5	1.6	9	10/11	u			x		x	x		x					
8	Test questions:Grade 2.	u	b C3-C5	1.6	9	10/11	u			x		x	x		x					
9	Test questions:Grade 3.	u	b C4-C4	1.6	8	10/11	u			x		x	x		x	x		x	x	
10	Test questions:Grade 3.	u	b G2-D5	1.6	8	10/11	u			x		x	x		x	x		x	x	
11	Test questions:Grade 3.	u	b C4-C4	1.6	8	10/11	u			x		x	x		x	x		x	x	
12	Test questions:Grade 3.	u	b G2-D5	1.6	8	10/11	u			x		x	x		x	x		x	x	
13	Test questions:Grade 4.	u	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
14	Test questions:Grade 4.	u	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
15	Test questions:Grade 4.	u	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
16	Test questions:Grade 4.	u	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
17	Test questions:Grade 5.	u/d	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
18	Test questions:Grade 5.	u/d	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
19	Test questions:Grade 5.	u/d	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
20	Test questions:Grade 5.	u/d	b F2-A5	1.6	7	10/11	u			x		x	x		x	x		x	x	
21	Test questions:Grade 6.	u/d	b F2-A5	1.6	7	10/11	u			x	x		x		x	x		x	x	
22	Test questions:Grade 6.	u/d	b F2-A5	1.6	7	10/11	u			x	x		x		x	x		x	x	
23	Test questions:Grade 6.	u/d	b F2-A5	1.6	7	10/11	u			x	x		x		x	x		x	x	
24	Test questions:Grade 6.	u/d	b F2-A5	1.6	7	10/11	u			x	x		x		x	x		x	x	
25	Test questions:Grade 7.	u	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	
26	Test questions:Grade 7.	u/d	b F2-A5	1.6	7	10/11	u			x	x	x	x		x	x	x		x	
27	Test questions:Grade 7.	u	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	
28	Test questions:Grade 7.	u/d	b F2-A5	1.6	7	10/11	u			x	x	x	x		x	x	x		x	
29	Test questions:Grade 8.	u/d	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	
30	Test questions:Grade 8.	u/d	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	
31	Test questions:Grade 8.	u/d	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	
32	Test questions:Grade 8.	u/d	b F2-A5	1.6	7	10/11	u		x	x	x	x	x	x	x	x	x	x	x	

APPENDIX C. CAMETS PROGRAM IN RHYTHM DICTATION

Explanation of Column Headings

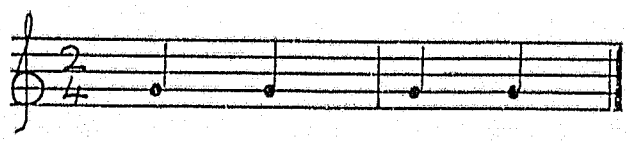
The master table given in Appendix C is rather more complex than that of the CAMETS Interval Recognition table. This is because note-values must be entered in a numerical format. A simplified explanation of the master table follows:

The title of the lesson, as well as number of measures in each question is specified. Speed, that is, the metronomic tempo as well as the pitch on which the rhythm is played, is specified.

The Rhythm Dictation program is spread over eight disks. Titles and patterns are specified for each disk and are numbered. The number assigned to titles and specific lists appears in the master table of units for each disk.

1. Simple-Compound Ratio

This indicates the ratio of question using simple time signatures to questions using compound time signatures, to be asked. For example 1:0 indicates that only questions using simple time signatures will be presented. The time limit represents the length of time allowed for each note of the answer. Therefore, if ten seconds is specified as the time limit for a two-measure rhythm of crotchets in simple duple time (i.e., :



),

the student would be allowed forty (10 x 4) seconds in which to give the answer. 'Plays' and 'Advancement' are specified as for the Interval Recognition master table.

2. Percent

This indicates the percentage of total notes in a rhythm that the student must answer correctly, in order to achieve one mark. For example, if there are four notes in a rhythm and the student makes one error, he/she is awarded seventy five per cent for that question (i.e., 3/4 x 100). If 'Percent' has been specified as eighty per cent, then the student's answer is counted as incorrect.

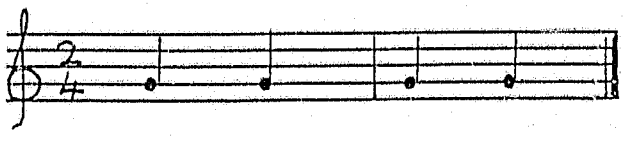
In the CAMETS master table the variable 'metronome' was always specified as 'student choice'. A student could exercise this option by touching the box marked 'Metronome' on the screen. The rhythm played would then be preceded by one bar of the metronome set to the appropriate time signature (i.e., one bar of the beat).

3. Simple/Compound Lists

Notes and note patterns of the appropriate value are assigned to lists. Each list has a number. This number is specified under 'Simple' or 'Compound' Lists. This allows the computer to 'read' only from the lists specified and construct an exercise using any of the note patterns on these lists. For example, List 1 appears as follows:

List 1 1 (1.00 : 1.00) 1/4 1

The penultimate number specifies the type of note, in this instance, a quarter-note or crotchet. The last number indicates the number of notes in this pattern. Therefore List 1 comprises one crotchet. For a detailed explanation of the ratio, refer to Figure 14 on page 227. Now, Unit 1 specifies that list 1 is to be used. Since the length of Unit 1 is specified as two bars, and the time signature as 2/4 (see below), the computer can only construct a rhythmic pattern consisting of crotchets:

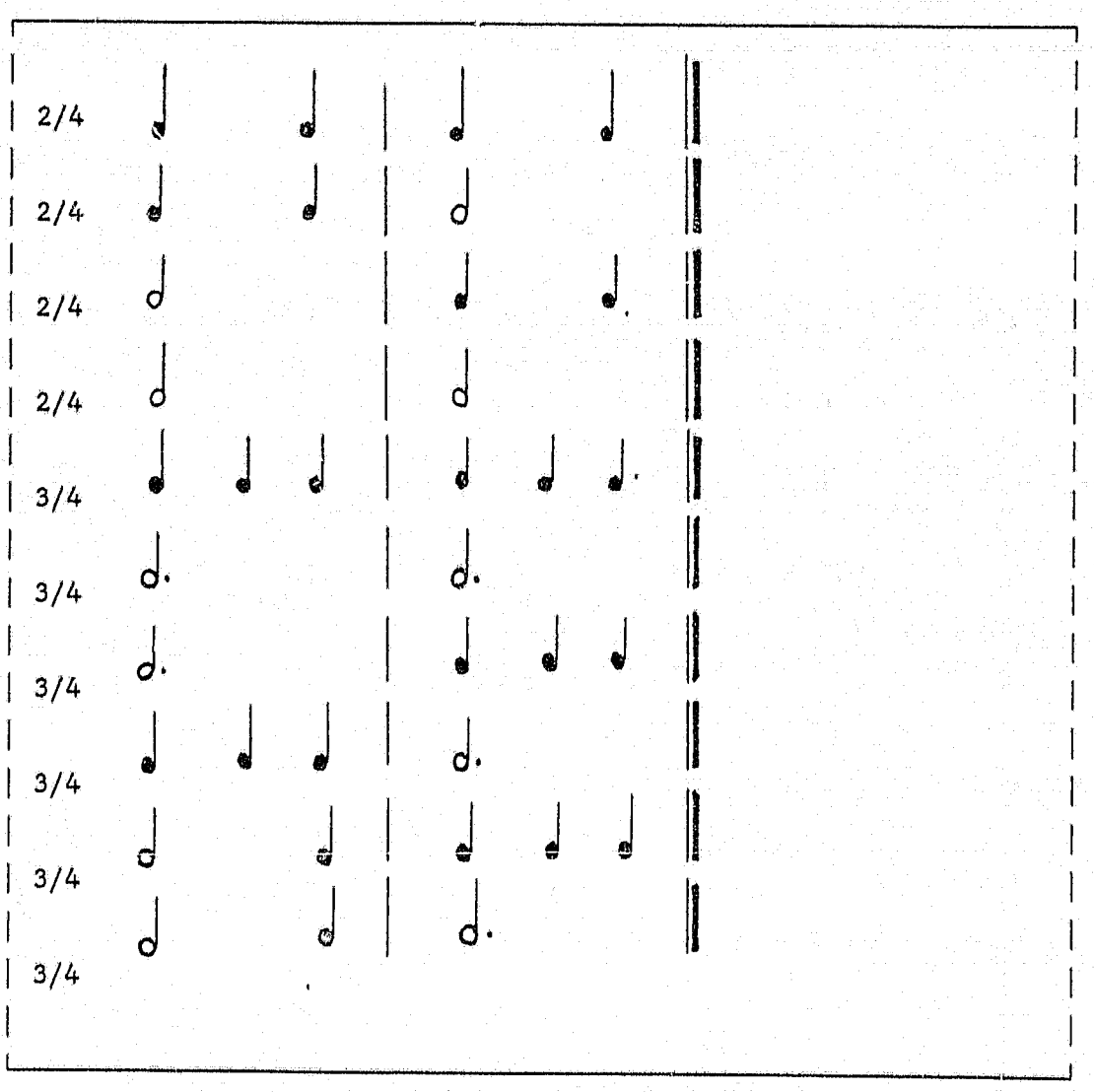

),

Again, in Unit 24, the time signature is specified as either 2/4 or 3/4 and the rhythm is to be two bars long. The specified list is no. 4. This is given as:

List 4

```
1 (1.00 : 1.00) 1/4  1
2 (2.00 : 2.00) 1/2  1
3 (3.00 : 3.00) 3/4  1
```

This means that the rhythm may be constructed using one crotchet, one minim, one dotted minim or any combination of these. Now, the computer 'reads' from list no. 4 and may generate any of the following examples:



As can be seen, the list of possible combinations has not been exhausted. It is therefore evident that this process of constructing rhythms is a highly controlled, yet random procedure.

4. Simple/Compound values

The numbers specified indicate the relative weighting for each list. For example, if the following is specified:

Simple List 1, 2
Simple values 2, 1 (see Unit no. 3)

this means that the computer must 'read' from list no. 1 twice as many times as it does so from list no. 2.

Note that if simple time signatures are specified, only Simple Lists (and Values) may be used. Similarly, if compound time signatures are specified, only Compound Lists (and Values) may be used. It is noted that Simple/Compound values are only specified in the master table when unequal weightings are allocated to lists. In all cases where these values are not specified this means that each list was given a value of 1.

5. Ties

The percentage (0 - 100) of beats which are to use ties may be specified.

6. Time Signatures

These are given by specifying both the top and bottom numbers of the time signatures, either Simple or Compound. Combinations of time signatures may be specified (e.g.,: 2/4 and 3/4 : see unit no.24).

The following information is presented on the screen to assist an instructor in understanding the lists and creating new lists. Its serves to fully explain the lists (Figure 14 on page 227).

List 1

1 (1.00 : 1.00) 1/4 1

Each line represents a rhythmic pattern. The 2 numbers in parenthesis in each pattern show the metric ratio. They will always be the same when you want a regular duration. Make them different for borrowed and irregular divisions : the ratio should indicate the fraction of its regular length which a borrowed or irregular note should take (for example, the numbers for a triple should be 2:3 since each note lasts 2/3 as long as it otherwise would; the numbers for a quintuplet should be 4:5). The fraction are the lengths of the notes, where a whole note equals 1. The last number in the line is the number of notes in the pattern.

Press BACK to choose another list; LAB to see the next list; DATA to replot this display; SHIFT-NEXT to add patterns; SHIFT-HELP to delete patterns; SHIFT-DATA to create a new list; SHIFT-BACK to return to the main index.

Figure 14. Sample display from GUIDO Rhythm Parameter editor: explanation of lists of note-patterns

CAMETS PROGRAM IN RHYTHM DICTATION (Copyright remains vested in the author)

RHYTHM Disk 1

TITLES (Disk 1)

1 Simple time signature: 2/4 (simple duple).
2 Simple time signature: 3/4 (simple triple).
3 Simple time signatures: 2/4 and 3/4.
4 Simple time signature: 4/4 (simple quadruple).
5 Simple time signatures: 2/4 and 4/4.
6 Practice unit.

PATTERNS (Disk 1):

List 1 1 (1.00:1.00) 1/4 1

2 1 (2.00:2.00) 1/2 1

3 1 (3.00:3.00) 3/4 1

4 1 (1.00:1.00) 1/4 1
2 (2.00:2.00) 1/2 1
3 (3.00:3.00) 3/4 1

5 1 (4.00:4.00) 1/1 1

6 1 (3.00:3.00) 1/2 1/4 2

7 1 (3.00:3.00) 1/4 1/2 2

8 1 (2.00:2.00) 1/2 1
2 (1.00:1.00) 1/4 1

9 1 (2.00:2.00) 1/4 1/4 2

10 1 (2.00:2.00) 3/8 1/8 2

UNITS (Disk 1):

No	Title	Bars	Speed	Pitch	S/C Ratio	T-lim	Plays	%	Adv	Met	Simple lists Simple values	Ties	Time sig
1	1	2-2	75	C4-C4	1:0	10	'	80	4/5	c	sl 1	0	2/4
2	1	2-2	75	C4-C4	1:0	10	u	80	4/5	c	sl 2	0	2/4
3	1	2-2	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,2 sv 2,1	0	2/4
4	1	2-2	75	G3-G5	1:0	10	u	80	4 /5	c	sl 1,2 sv 1,2	0	2/4
5	1	3-3	75	G3-G5	1:0	10	u	80	4/5	c	sl 1	0	2/4
6	1	3-3	75	G3-G5	1:0	10	u	80	4/5	c	sl 2	0	2/4
7	1	3-3	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,2 sv 2,1	0	2/4

8	1	3-3	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,2	0	2/4	
											sv 1,2			
9	1	3-4	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,2	0	2/4	
10	1	3-4	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,2	0	2/4	
11	6	2-4	75	G3-G5	1:0	u	u	80	1/0	c	sl 1,2	0	3/4	
12	2	2-2	75	C4-C4	1:0	8	u	80	4/5	c	sl 1	0	3/4	
13	2	2-2	75	C4-C4	1:0	8	u	80	4/5	c	sl 3	0	3/4	
14	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 6	0	3/4	
15	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 7	0	3/4	
16	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 1,6	0	3/4	
17	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 7,1	0	3/4	
18	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 3,6	0	3/4	
19	2	2-2	75	G3-G5	1:0	8	u	80	4/5	c	sl 3,7	0	3/4	
20	2	3-3	75	G3-G5	1:0	10	u	80	4/5	c	sl 1,3	0	3/4	
21	2	3-3	75	G3-G5	1:0	8	u	80	4/5	c	sl 1,3,6	0	3/4	
22	2	3-3	75	G3-G5	1:0	8	u	80	4/5	c	sl 1,3,7	0	3/4	
23	2	3-4	75	G3-G5	1:0	8	u	80	4/5	c	sl 1,3,6,7	0	3/4	
24	2	3-4	75	G3-G5	1:0	8	u	80	4/5	c	sl 1,2,3,7	0	3/4	
25	6	2-4	75	G3-G5	1:0	u	u	0	1/0	c	sl 4,6,7	0	2/4, 3/4	
26	3	2-2	75	G3-G5	1:0	6	u	80	6/7	c	sl 1,2	0	2/4, 3/4	
27	3	2-2	75	G3-G5	1:0	6	u	80	6/7	c	sl 4	0	2/4, 3/4	
28	3	3-4	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,2	0	2/4, 3/4	
29	3	4-4	75	C3-C5	1:0	6	u	80	6/7	c	sl 4	0	2/4, 3/4	
30	6	2-4	75	G3-G5	1:0	u	u	0	1/0	c	sl 1,2	0	4/4	
31	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 1	0	4/4	
32	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 5	0	4/4	
33	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,9	0	4/4	
34	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,5,9	0	4/4	
35	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 1,5	0	4/4	
36	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,5,9	0	4/4	
37	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,9	0	4/4	
38	4	2-2	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,5,9	0	4/4	
39	4	3-4	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,9	0	4/4	
40	4	3-4	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,5,9	0	4/4	
41	4	3-4	75	C3-C5	1:0	6	u	80	4/5	c	sl 2,5,9	0	4/4	
42	4	4-4	75	C3-C5	1:0	6	u	80	6/7	c	sl 2,5,9	0	4/4	
43	6	2-4	75	G3-G5	1:0	u	u	0	1/0	c	sl 2,5,9	0	2/4, 4/4	
44	5	2-2	75	C3-C5	1:0	6	u	80	6/7	c	sl 2,9	0	2/4, 4/4	
45	5	2-2	75	G3-G5	1:0	6	u	80	6/7	c	sl 2,5,9	0	2/4, 4/4	
46	5	2-2	75	G3-G5	1:0	6	u	80	6/7	c	sl 2,5,9	0	2/4, 4/4	
47	5	3-4	75	G3-G5	1:0	6	u	80	6/7	c	sl 2,9	0	2/4, 4/4	
48	5	3-4	75	G3-G5	1:0	6	u	80	6/7	c	sl 2,5,9	0	2/4, 4/4	

RHYTHM Disk 2

TITLES (Disk 2)

1 Simple time signature: 2/4 (simple duple).
2 Simple time signature: 3/4 (simple triple).
3 Simple time signatures: 2/4 and 3/4.
4 Simple time signatures: 2/4 and 4/4.
5 Simple time signatures: 3/4 and 4/4.
6 Simple time signatures: 2/4, 3/4 and 4/4.
7 Practice unit.

PATTERNS Disk 2):

LIST 1 1 (1.00:1.00) 1/4 1

2 1 (2.00:2.00) 1/2 1

3 1 (3.00:3.00) 3/4 1

4 1 (1.00:1.00) 1/4 1
2 (2.00:2.00) 1/2 1
3 (3.00:3.00) 3/4 1

5 1 (4.00:4.00) 1/1 1

6 1 (3.00:3.00) 1/2 1/4 2

7 1 (3.00:3.00) 1/4 1/2 2

8 1 (2.00:2.00) 1/2 1
2 (1.00:1.00) 1/4 1

9 1 (2.00:2.00) 1/4 1/4 2

10 1 (0.50.0.50) 1/8 1

11 1 (1.00:1.00) 1/8 1/8 2

12 1 (2.00:2.00) 3/8 1/8 2

13 1 (3.00:3.00) 1/8 1/8 1/8 1/8 1/8 1/8 6

14 1 (3.00:3.00) 1/4 1/4 1/8 1/8 4

15 1 (3.00:3.00) 1/4 1/8 1/8 1/4 4

16 1 (3.00:3.00) 1/8 1/8 1/4 1/4 4

17 1 (3.00:3.00) 1/2 1/4 2
2 (3.00:3.00) 1/4 1/2 2

18 1 (4.00:4.00) 1/2 1/4 1/4 3

2 (4.00:4.00) 1/4 1/4 1/2 3

UNITS (Disk 2):

1	5	3-4	75	C4-G5	1:0	6	u	80	6/7	c	sl 2,5,9	0	2/4, 4/4
2	3	3-4	75	G3-C5	1:0	6	u	0	1/0	c	sl 2,5,9	0	2/4, 4/4
3	5	2-2	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,3,18	0	3/4, 4/4
4	5	2-2	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,3,5,18	0	3/4, 4/4
5	5	2-2	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,3,5,186	0	3/4, 3/4
6	5	3-4	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,3,5,18	0	3/4, 4/4
7	5	3-4	75	C3-C5	1:0	6	u	80	6/7	c	sl 1,3,5,9,18	0	3/4, 4/4
8	7	3-4	c	G3-C5	1:0	5	u	0	1/0	c	sl 1,3,5,18	0	3/4, 4/4
9	6	2-2	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
10	6	2-2	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
11	6	3-4	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
12	6	3-4	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
13	6	4-4	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
14	6	4-4	c	C3-C5	1:0	5	u	80	7/8	c	sl 4,5	0	2/4, 3/4, 4/4
15	7	4-4	c	G3-C5	1:0	5	u	0	1/0	c	sl 4,5	0	2/4
16	1	2-2	c	C3-C5	1:0	10	u	80	4/5	c	sl 11	0	2/4
17	1	2-2	c	C3-C5	1:0	10	u	80	4/5	c	sl 1,11	0	2/4
18	1	2-2	c	G3-C5	1:0	10	u	80	4/5	c	sl 1,2,11	0	2/4
19	1	2-2	c	C3-C5	1:0	10	u	80	4/5	c	sl 12	0	2/4
20	1	2-2	c	C3-C5	1:0	10	u	80	4/5	c	sl 1,2,11,12	0	2/4
21	1	3-4	c	C3-C5	1:0	10	u	80	4/5	c	sl 1,11	0	2/4
22	1	3-4	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,2,11	0	2/4
23	1	3-4	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,12	0	2/4
24	1	3-4	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,2,11,12	0	2/4
25	7	2-4	c	G3-C5	1:0	8	u	0	1/0	c	sl 1,2,11,12	0	3/4
26	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 13	0	3/4
27	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 14	0	3/4
28	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 15	0	3/4
29	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 16	0	3/4
30	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,11 sv 3,2	0	3/4
31	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,3,11	0	3/4
32	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 4,11	0	3/4
33	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 1,12	0	3/4
34	2	2-2	c	C3-C5	1:0	8	u	80	4/5	c	sl 4,11,12	0	3/4
35	2	3-4	c	C3-C5	1:0	7	u	80	4/6	c	sl 1,11	0	3/4
36	2	3-4	c	C3-C5	1:0	7	u	80	4/5	c	sl 4,11	0	3/4
37	2	3-4	c	C3-C5	1:0	7	u	80	4/5	c	sl 4,11,12	0	3/4
38	7	2-4	c	G3-C5	1:0	u	u	0	1/0	c	sl 4,11,12	0	3/4

RHYTHM Disk 3

TITLES (Disk 3):

1 Simple time signatures: 2/4 and 3/4.
2 Simple time signature: 4/4 (simple quadruple).
3 Simple time signatures: 3/4 and 4/4.
4 Simple time signatures: 2/4, 3/4 and 4/4.
5 Practice unit.

PATTERNS (Disk 3):

LIST	1	1 (1.00:1.00) 1/4 1
	2	1 (2.00:2.00) 1/2 1
	3	1 (3.00:3.00) 3/4 1
	4	1 (1.00:1.00) 1/4 1 2 (2.00:2.00) 1/2 1 3 (3.00:3.00) 3/4 1
	5	1 (4.00:4.00) 1/1 1
	6	1 (3.00:3.00) 1/2 1/4 2
	7	1 (3.00:3.00) 1/4 1/2 2
	8	1 (2.00:2.00) 1/2 1 2 (1.00:1.00) 1/4 1
	9	1 (2.00:2.00) 1/4 1/4 2
	10	1 (0.50:0.50) 1/8 1
	11	1 (1.00:1.00) 1/8 1/8 2
	12	1 (2.00:2.00) 3/8 1/8 2
	13	1 (3.00:3.00) 1/8 1/8 1/8 1/8 1/8 1/8 6
	14	1 (3.00:3.00) 1/4 1/4 1/8 1/8 4
	15	1 (3.00:3.00) 1/4 1/8 1/8 1/4 4
	16	1 (3.00:3.00) 1/8 1/8 1/4 1/4 4
	17	1 (2.00:2.00) 1/8 1/8 1/8 1/8 4
	18	1 (4.00:4.00) 1/2 1/4 1/4 3 2 (4.00:4.00) 1/4 1/4 1/2 3
	19	1 (4.00:4.00) 1/2 1/4 1/8 1/8 1/8 5

```
          2 (4.00:4.00) 1/8 1/8 1/8 1/8 1/2 5

     20   1 (2.00:2.00) 1/8 1/8 1/4 3
          2 (2.00:2.00) 1/4 1/8 1/8 3
          3 (2.00:2.00) 1/8 1/8 1/8 1/8 4

     21   1 (4.00:4.00) 3/4 1/4 2
          2 (4.00:4.00) 3/4 1/8 1/8 3

     22   1 (4.00:4.00) 1/1 1
          2 (2.00:2.00) 1/2 1
```

UNITS (Disk 3):

1	1	2-2	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,11	0	2/4, 3/4
2	1	2-2	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,11,12 sv 1,1,2	0	2/4, 3/4
3	1	2-2	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,2,11	0	2/4, 3/4
4	1	2-2	c	C3-C5	1:0	6	3	80	6/8	c	sl 4,11,12	0	2/4, 3/4
5	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,11 sv 3,2	0	2/4, 3/4
6	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,11,12 sv 2,1,3	0	2/4, 3/4
7	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 1,2,11	0	2/4, 3/4
8	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 4,11,12	0	2/4, 3/4
9	5	2-4	c	G3-C5	1:0	u	u	0	1/0	c	sl 2,3,9,11,12	0	2/4, 3/4
10	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 17	0	4/4
11	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 9,17	0	4/4
12	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 2,9,17	0	4/4
13	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 2,5,9,17	0	4/4
14	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 2,9,17,18,19	0	4/4
15	2	2-2	c	C3-C5	1:0	7	u	80	4/5	c	sl 9,12,20,21,22 sv 1,2,1,1,1	0	4/4
16	2	3-4	c	C3-C5	1:0	6	u	80	4/5	c	sl 9,17	0	4/4
17	2	3-4	c	C3-C5	1:0	6	u	80	4/5	c	sl 18,19,20	0	4/4
18	2	3-4	c	C3-C5	1:0	6	u	80	4/5	c	sl 5,18,19,20	0	4/4
19	2	3-4	c	C3-C5	1:0	6	u	80	4/5	c	sl 18,19,20,21,220		4/4
20	2	3-4	c	C3-C5	1:0	6	u	80	4/5	c	sl 12,19,20,21,220 sv 2,1,1,1,1		4/4
21	5	2-4	c	G3-G5	1:0	u	u	0	1/0	c	sl 12,18,19,20,220		4/4
22	1	2-2	c	C3-C5	1:0	7	3	80	6/8	c	sl 20	0	2/4, 4/4
23	1	2-2	c	C3-C5	1:0	7	3	80	6/8	c	sl 2,9,18,20	0	2/4, 4/4
24	1	2-2	c	C3-C5	1:0	7	3	80	6/8	c	sl 18,19,20,21,220		2/4, 4/4
25	1	2-2	c	C3-C5	1:0	7	3	80	6/8	c	sl 12,18,19,20,220 sv 2,1,1,1,1		2/4, 4/4
26	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 2,18,19,20	0	2/4, 4/4
27	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 18,19,20,21,220		2/4, 4/4
28	1	3-4	c	C3-C5	1:0	6	3	80	6/8	c	sl 12,18,19,20,220 sv 2,1,1,1,1		2/4, 4/4
29	5	2-4	c	G3-G5	1:0	u	u	0	1/0	c	sl 12,18,19,20,220		2/4, 4/4
30	3	2-2	c	C3-C5	1:0	7	3	80	6/8	c	sl 1,11 sv 3,1	0	3/4, 4/4

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