

their course score enough to improve their letter grade by one letter. Situations may also arise in which students see that going into an assignment (the final exam, for example) that their achievement level on the upcoming work can be low and still not affect their course score enough to result in the lowering of their course letter grade. Their study time can then be managed accordingly.

Near the beginning of a course the range of forecast course scores (highest possible score to 60 percent level of achievement) is quite large. This is due to only a small percentage of the course work having been completed. The relatively large amount of remaining work presents an opportunity for a wide variation in possible course scores. As the amount of remaining course work decreases, the range in possible course scores narrows. Depending on the course value of the remaining graded items, the range in possible course scores forecast may narrow to within a letter grade spread.

When all the course work has been completed and scores entered into the SCORES file, the course score analysis and forecast program produces a modified output. Figure 5 represents the final output for the three students of our graphics course. This output provides a sequential listing of scores received on all graded items and the students' final course scores. The instructor may assign a letter grade to these course scores.

Figure 5. Output from the course score analysis and forecast program when all course work has been completed.

```
8      10, 10, 9.5, 10, 9, 9, 9, 8.5, 9, 9.5, 9.5, 10, 9.5. 96
YOU HAVE NOW COMPLETED 100% OF THE
COURSE WORK.
YOUR ACHIEVEMENT RATE HAS RESULTED IN
A COURSE SCORE OF 93.97.
2      10, 9.5, 9.5, 10, 8, 8.5, 8.5, 7.5, 7, 8, 9, 0, 0, 0, 87
YOU HAVE NOW COMPLETED 100% OF THE
COURSE WORK
YOUR ACHIEVEMENT RATE HAS RESULTED IN
A COURSE SCORE OF 71.63.
12     10, 9, 9, 10, 8.5, 9, 9.5, 7.5, 7.5, 8.5, 8, 8.5, 7.5,
8.5, 85
YOU HAVE NOW COMPLETED 100% OF THE
COURSE WORK.
YOUR ACHIEVEMENT RATE HAS RESULTED IN
A COURSE SCORE OF 85.81.
```

Conclusion

The course score analysis and forecast computer program has been in use one and one-half years to provide analysis and forecast information to approximately 250 students in various courses. The use of this program appears to the authors to have the following benefits.

- Enhances the student-teacher relationship with respect to course scores and grading practices.
- Keeps the student aware of past, present, and projected course scores information.
- Minimizes situations involving grade misunderstandings and errors in recordkeeping.
- Saves instructor's time in computations of final course score.

A Computerized Interactive Gradebook

Greg Baker and
Bob Creel

Introduction

The use of a computer to assist in storage and calculation of student grades can greatly simplify the process. Several types of computer programs have been written to accomplish this task. The Computerized Interactive Gradebook¹ (CIG) was written to incorporate the best features of these programs and to introduce features which allow student interaction with the computer.

Types of Computer Gradebooks

The first type of program is the batch type program such as the Purdue Student Grade Report (SGR) (Downey and Taylor). This program requires the use of formatted data stored on cards or card images to be submitted as input with the gradebook program to a batch processing computer. Other than computing weighted averages, the SGR allows the instructor to drop the lowest score(s) of a student in a category. The program also generates a host of statistics for use by the instructor in determining the final grade.

The interactive program such as that written by Tice is for use on a microcomputer. An interactive program prompts the user with messages when input is needed. Thus, very little knowledge of the computer is needed.

The third type of program utilizes one of the many spreadsheet software packages now available, such as Visicalc or Lotus 1-2-3 (Burton). This type of program has the potential for widespread use because of the availability of spreadsheet software. However, it is difficult to conduct much data manipulation or generate statistics other than weighted averages without a more extensive program.

CIG is an interactive program which can be run on a microcomputer or mainframe computer. In addition to complete flexibility as to the number of categories,

¹Information concerning the CIG may be obtained by writing Greg Baker, Department of Agricultural Economics and Agricultural Business, Box 3169, New Mexico State University, Las Cruces, New Mexico 88003. Both Baker and Creel are New Mexico State staff.

scores, and students. the program allows the user to enter excused absences for a student and to drop the lowest score(s) in a category for all students. Students not only receive a complete listing of each of their scores and their weighted average, but also a listing of the scores of all students in descending order.

Program Description

Program operation

The operation of the program is facilitated because it:

- is interactive
- uses a system of menus
- may be used on a microcomputer or mainframe computer.

Since the program is interactive, very little computer knowledge is needed. The program is self-loading, so that when using a microcomputer, the user must simply put the diskette into the disk drive and turn the computer on. Interactive programs require much less computer knowledge of the user than noninteractive programs. Whenever input is needed from the user, a message appears on the screen informing the user of what is needed and the format for entry. In general, this method reduces the number of data entry errors and diagnosis of these errors is immediate.

Unlike most programs which require entering data on cards or card images to establish category names, category weights, student grades, etc., CIG utilizes a system of menus. The initial menu gives the user the choice of setting the gradebook controls, updating scores, setting the reporting date, generating student reports, generating instructor category reports, generating instructor summary reports, or exiting the program, by selecting the proper code (Figure 1). Once the user enters the code, another menu appears. For example, if updating scores is chosen, a menu with the choices of adding scores for new assignments, editing existing scores, dropping the lowest scores for all students in a category, or exiting the menu appears. This process continues until the desired input is made.

Figure 1. CIG Initial Menu.

CODE	FUNCTION
1	Print student report
2	Print category report
3	Print summary report
4	Set reporting date
5	Update scores
6	Set gradebook controls
7	Exit menu

The program which is written in the APL language may be used on a microcomputer or mainframe computer. Both systems have their advantages. When using a microcomputer, the user has complete control of the program and its operation. With the use of a mainframe computer, other users, such as students, may be allowed access to the program. It is possible to utilize both micro and mainframe computers. Because the printers used with microcomputers are generally

very slow, it may be desirable to store all the data and perform all the calculations on the microcomputer, and use a mainframe computer for printing.

Program Features

The following functions and options are available with CIG:

- weighted average scores
- excused absences
- lowest scores dropped
- editing of scores
- unlimited number of categories
- unlimited number of scores
- unlimited number of students

The instructor must assign weights to each category of scores. CIG will then average all grades for a category and multiply them by the appropriate weights to arrive at a weighted average grade. The instructor may also excuse a student from an assignment by entering the proper code. An excused absence would not be used in calculating the average for the category. A major time saving feature of the program is the ability to drop scores. When the instructor tells CIG to drop the lowest score for a category, the grades of each student are scanned, the lowest score in that category is dropped, and the number of scores by which the average is computed, for that category, is reduced by one. The original grade is still stored in memory so that the decision may be reversed at any time. Along with making the process much easier, it greatly reduces the number of errors that can occur when the scanning is done visually. It is also possible to edit previously entered scores at any time.

Unlike most other grade reporting programs, CIG is completely flexible as to the number of categories, number of scores, or number of students which may be entered within the program. The user is limited only by the available storage space.

Student Reports

The student reporting feature gives students:

- a printed report with all scores, their weighted average, ranked weighted average of all other students, plus other statistics
- access to a copy of their report at any time when a mainframe computer is used
- the ability to ask CIG what grade is required on the last test to achieve a certain grade in the course.

The basic student report can be seen on the computer terminal or printed and passed out to every student in the class (see example in figure 2). This report gives every score the student has received in every category, the possible points and class average for every score, the category weight, the grades dropped per category, the weighted average for that student, and the weighted average for every student in the course (without student identification) ranked in descending order. This allows the student not only to

evaluate his or her progress, but to evaluate his or her standing in light of the progress of other students. Because it is a simple matter to print and distribute each student's scores, it is possible to give students continuous feedback at important times throughout the semester, such as before a course drop date or an exam, at very little cost to the instructor. It is also much easier for students to catch errors in the recording of their grades, since they receive frequent copies of their recorded grades.

Figure 2. Sample Student Grade Report.

CLASS: AGEC321		STUDENT: HAROLD ARNOLD						
SECTION: 1		SOC SEC: 325894031						
TEACHER: GREG BAKER								
STUDENT GRADE REPORT								
10/04/84								
AVERAGE								
HOMWORKS	1	2	3					
YOUR SCORE	100.0	80.0	99.0					
POSSIBLE	100.0	100.0	100.0					
PERCENT	100.0	80.0	99.0					
CLASS PER	81.1	54.7	83.3					

AVERAGE	92.2							

QUIZES	1	2	3					
YOUR SCORE	100.0	78.0	83.0					
POSSIBLE	100.0	100.0	100.0					
PERCENT	100.0	78.0	83.0					
CLASS PER	92.0	62.7	79.3					

AVERAGE	78.0							

EXAMS	1	2	3	4	5	AVERAGE		
YOUR SCORE	93.0	92.0	93.0	90.0	90.0			
POSSIBLE	100.0	100.0	100.0	100.0	100.0			
PERCENT	93.0	92.0	93.0	90.0	90.0	92.5		
CLASS PER	79.4	75.2	74.6	86.2	49.8	81.9		

CURRENT WEIGHTED SCORE:								
CATEGORY:	PERCENTAGE	WEIGHT	TOTAL	SCORES DROPPED				
HOMWORKS	92.2	x	0.20 =	18.5	0			
QUIZES	87.0	x	0.30 =	26.1	0			
EXAMS	92.5	x	0.50 =	46.2	1			

WEIGHTED AVERAGE 92.8								

CURRENT RANKINGS OF ALL STUDENTS:								
	90.8	87.2	85.4	85.0	82.9	82.9	78.1	76.1
	73.8	73.0	72.5	68.6				

Two additional features were added to encourage student use of the computer. Students may access a separate file containing a copy of the student reports to obtain updated information on their grade at any time. Use of the feature is simple. After logging on and loading the program, the student enters his or her social security number to gain access to his or her record. This feature is available only on a mainframe computer. This feature is especially advantageous in introductory courses, since many students may have had no previous computer experience and it encourages familiarity with the computer. Instructors may encourage or require the use of this feature to the extent which they desire. It also allows the instructor more flexibility as to the number of printed student reports to hand out.

Another feature available on a mainframe installation which is particularly useful at the end of the semester or quarter is a program which allows students to ask the computer what grade will be required on the last exam to receive a certain final weighted average score. For example, if 90 percent was the cutoff for an A, a student might ask, "What grade will I need on the last exam to receive a weighted average of 90 percent for the course?" This feature is appreciated by both the students and the instructor. It is a question on most students' minds at the end of the semester which often goes unasked. It is also very time consuming for instructors to answer. This feature allows every student to ask the question at no cost to the instructor.

Figure 3. Sample Category Grade Report.

CLASS: AGEC321		SECTION: 1		TEACHER: GREG BAKER	
CATEGORY GRADE REPORT					
10/05/84					
CATEGORY 1: HOMEWORKS					
NAME:	1	2	3	4	AVERAGE
HAROLD ARNOLD	100.0	80.0	99.0	90.0	92.2
LOUIS BARNARD	76.0	45.0	96.0	89.0	75.5
ALBERT COLLINS	50.0	100.0	96.0	90.0	84.0
JANE BOCCETT	72.0	25.0	97.0	80.0	68.5
TODD GATES	54.0	40.0	94.0	100.0	72.0
FRED HOLLAND	97.0	60.0	100.0	100.0	89.2
ELBERT HOWARD	87.0	20.0	81.0	100.0	72.0
JERRY JAMESON	70.0	30.0	77.0	76.0	63.2
KATHY MCKENNA	86.0	95.0	85.0	80.0	86.7
JUDY OLSEN	100.0	57.0	80.0	74.0	77.7
DAVID SANDERS	100.0	20.0	68.0	86.0	68.5
LAURI WHITE	81.0	85.0	94.0	95.0	88.7
CLASS SCORE:	81.1	54.7	89.0	88.0	78.2

Instructor Reports

The instructor has access to reports concerning:

- the scores and category averages of every student in a category
- the category averages and weighted averages of all students.

The category report allows an instructor to look at all the scores of every student in a category in addition to each student's average for that category (see example in figure 3). This is useful for comparing a student's or a class' progress within a category. The summary report gives the instructor each student's average within a category and weighted average (see example in figure 4). This allows the instructor to consider more than just the weighted average in assigning grades. It is also possible to list the students ranked by descending order of their weighted averages. This makes it much easier to assign final grades, since the effect of using different cutoff points can be readily seen.

Figure 4. Sample Summary Grade Report.

CLASS: AGEC321		SECTION: 1		TEACHER: GREG BAKER	
SUNNARY GRADE REPORT					
10/05/84					
NAME:	HOMWORKS	QUIZES	EXAMS	WEIGHTED SCORE	
	20 PCT	30 PCT	50 PCT		
HAROLD ARNOLD	92.2	87.0	92.5	90.8	
LOUIS BARNARD	75.5	88.7	91.0	87.2	
ALBERT COLLINS	84.0	96.7	80.5	85.4	
ELBERT HOWARD	72.0	77.3	94.7	85.0	
KATHY MCKENNA	86.7	85.3	80.0	82.8	
JANE BOCCETT	68.5	96.0	89.7	82.9	
FRED HOLLAND	89.2	54.7	87.7	78.1	
DAVID SANDERS	68.5	78.0	80.2	77.2	
TODD GATES	72.0	68.3	82.5	76.1	
LAURI WHITE	81.0	91.0	95.0	88.7	
JERRY JAMESON	63.2	77.3	73.2	72.5	
JUDY OLSEN	77.7	37.7	83.5	68.6	
CLASS PERCENTS	78.2	78.0	81.9	80.0	

Disadvantages of Computer Gradebooks

One disadvantage of using CIG is the initial learning time. However, since the program is interactive, the time required to become familiar with CIG is very small in comparison with traditional non-interactive programs. The time used in learning how to operate the program should easily be saved by using it over the course of a grading period. It is also possible to lose data because of malfunctions in hardware or the system going down unexpectedly. This problem can usually be eliminated by making backup copies of all work that is done. A computer gradebook is not a substitute for the traditional gradebook as far as record storage is concerned. Both should be kept as a matter of security. Another problem is that of computer downtime which can become a problem when using a mainframe computer over which one has little control. One is at the mercy of the computer center when it

comes to computer and printer use. Inflexibility is also generally a problem with this type of program.

Summary

The use of computers to store students' grades and calculate statistics can result in significant time savings. CIG is used to store student grades and calculate weighted average scores. Once the grades are entered into memory, they need never be handled again. CIG is an interactive program requiring very little prior computer knowledge. The number of categories, scores per student, and students is limited only by available storage. CIG may be used on a microcomputer or a mainframe computer. It is a simple matter to keep students and the instructor informed of the students' progress throughout the course. When a mainframe computer is used, students may access their student report via a computer terminal. They may also determine the grade they will need on the last exam to assure them of a certain grade in the course.


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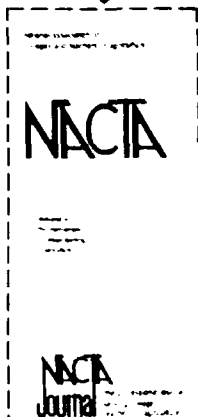
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