

<http://www.uky.edu/its/enterprise-systems/data-center>



Bubble Sheet Information

Computerized Grading Facilities

INTRODUCTION

Computerized exam grading is available at the University of Kentucky using the Scantron **General Purpose Answer Sheet (306726)**. This may be a blue-and-white or green-and-white **five-response**, 240-question answer sheet. Another form, a **green-and-white Scantron General Purpose Answer Sheet (form 6703)**, may be used for grading exams of up to 120 questions, with **10 choices per question**.

The parenthesized number following the form name is a **purchase number** for ordering from the University Supply Center. The **green ten-response** form is not currently available from the University Supply Center, but may be ordered directly from Scantron.

The program for grading 5-response exams is called the **TEST** program, and the program for grading 10-response exams is called **TENRESP**. Both programs will sort student scores into differently ordered lists, produce a histogram, and item analysis. More information on both of these programs can be found below.

To use the grading facility a Scan Request Form must be filled out and submitted with the answer sheets. It is the instructor's responsibility to prepare the key sheet(s), weight sheet, and to fill out a Scan Request Form.

Scan Request Forms are available in Room 61 McVey Hall (Data Center), and online at <http://www.uky.edu/its/enterprise-systems/data-center> (scroll down to bottom of page).

Leave your bubble sheets with a technician at the Data Center window Room 61.)

All test forms must be marked with #2 or #2 1/2 pencil; no type of ink is acceptable to the Optical Scanner. Student's forms must not have any marks in the 'DO NOT WRITE' space.

When retrieving your data, be sure to check the output carefully. Light or multiple marks can cause invalid results. An incorrect key can be disastrous.

Most of the sheet is self-explanatory; simply choose the exam grading options for your output. Each option is described below.

The GRADE program

This program is used to score and evaluate up to 240 examination questions coded on the General Purpose Answer Sheet (306726). **Up to 510 tests may be processed without special handling; there must be at least 3 student exam sheets to be graded.**

Following is a list of features available using the GRADE program. Options which may be chosen by the instructor are indicated in the descriptions and are designated on the Scan Request Form.

1. Both objective questions (answers) and verbal questions (scores) can be handled up to a maximum of 240 questions per test form. Verbal questions are graded by the instructor, who enters a score of 0 (blank) to 5 on the student's answer sheet. Verbal questions as well as objective questions can be weighted and/or grouped. Verbal questions have no "correct" answers (unlike objective questions), so no answer for them should be marked on the key. Verbal questions may be used for grading essay questions. If the instructor wants to have extra credit points added to the student's test score, she/he can bubble in certain point values on the students' scan

sheets which add up to that number of points. From 1 to 5 points may be given, for as many questions as is desired.

For example: to give 12 points credit for verbal questions, 2 fives would be coded for the first 2 questions, then a 2 for the third. Some students may have no verbal questions coded on their scan sheets if the instructor chooses to not give them credit.

2. There may be more than one correct answer per question. In this case multiple keys must be provided by the instructor. *(Up to 5 Keys may be used for 5-response exams, and each key must be marked 'A I' in the Do Not Write space. Up to 10 keys may be used for 10-response exams, and each key must be marked '38' in the Day field).*

NEVER mark more than one choice per item on the same key, or if you make a change to an answer, be sure to erase completely. The student, however, is limited by the machine to one answer per question, even if more than one choice is correct. If two or more responses are coded for one question, either the darkest mark will be recorded or the response is read as a blank, depending on the intensity of the marks.

3. **Questions may be weighted** from 1 (no weight) to 5. If weighting is desired, the instructor submits a weight sheet (marked **B II** in the **DO NOT WRITE** space) with his forms. If the green ten-response form is used, then the weight sheet is designated by marking '**39**' in the Day field.
4. **Questions may be rejected** from the test by the instructor, perhaps in the event of an ambiguity. Rejected questions are indicated on the Scanning Request Form and are not included in grading or analysis.
5. **Questions may be grouped** in order to obtain individual group results addition to total test analysis. Grouping may be used to determine a student's knowledge of specific subject areas or to test his ability to answer certain types of questions; e.g., objective versus verbal.

The instructor indicates the groups on the Scan Request Form; up to 10 groups may be defined, with a maximum of 99 questions per group.

6. **Several different output listings** are available to the instructor and are indicated on the Scan Request Form (see OUTPUT section below).
7. **Extensive question evaluation** (item analysis) and a histogram of scores is produced.

A **Discrimination Index** is computed by ranking the weighted scores in decreasing order and dividing them into thirds; any extra questions are placed in the middle third category. The results of the upper third of the class are then compared to the results of the lower third for each question.

For **Objective questions** the formula used is $(a1-a3)/int(n/3)$ where **a1** is the number of students in the upper third who answered the question correctly; **a3** is the number of students in the lower third who answered the question correctly; **n** is the total number of students; and **int** means that any fraction resulting in the division is dropped.

For **Verbal questions** the formula is $(a1-a3)/n$.

A **Kuder-Richardson Reliability Index** is computed which indicates the probability that the results obtained on this test would be repeated if given to another group of students. The technique is basically an analysis of variance statistical model.

The **standard error of measurement** is a statistic which indicates a value of apparent significance between two scores.

For example: if the standard error of measurement is 5, then scores of 75 and 80 (or 70 and 75, etc.) on this test are essentially the same. The formula is $sd*\sqrt{1-kr}$

where **sd** is the standard deviation of the raw score and **kr** is the Kuder-Richardson Index.

If **verbal questions** are to be included, the instructor grades the questions and assigns a value of 0 (blank) to 5 for the answers and codes the score in the question area following the objective questions. Any unused response areas between the objective and verbal questions must be rejected by means of the Scanning Request Form. If a test contains only verbal questions, they are coded beginning with response area (question) 1.

The instructor prepares a test form as a key coded with the correct answers for the objective questions. If a question has more than one correct answer, the additional answers are coded on separate test (key) sheets; one answer question per key sheet may be coded, making a maximum of 5 keys. Only those questions with multiple answers are coded on the second and subsequent keys; questions with one answer are coded on one sheet only.

All keys must have the 'A' and the 'I' marked in the 'DO NOT WRITE' space.

If **weighting** is desired, the instructor also prepares a test form coded with the weight for each question (1 through 5). Both objective and verbal questions may be weighted.

All questions must have a weight value associated with them; some questions are to be weighted and some are not to be weighted, the unweighted questions should have a weight of 1 (no weight) coded on the weight sheet.

This sheet must have the 'B' and the 'II' marked in the 'DO NOT WRITE' space.

Data Center personnel prepare the necessary control parms for GRADEing from the Scan Request Form supplied by the instructor.

This form indicates the correct parm columns for the parameter codes.

If question grouping or question rejection is requested, the question numbers are to be indicated on the Request Form in the Grouping/Rejecting section. The order of the question numbers is unimportant.

OUTPUT

Following are short descriptions of the various types of output which may be obtained from GRADE. By default, only one copy of student output and instructor output is printed, although multiple copies may be requested. If you have questions about the various options, check with Data Center Operations personnel when you drop off your exams, or call 257-2222.

1. **Student Output** consists of a separate sheet for each student and is designed to be given out by the instructor. Each sheet contains the student's name and student number and test identification.
 - a. **The objective questions** which were missed are listed along with the student's answers and the correct answers.
 - b. **Verbal questions** are listed along with the score and question weight. Summaries of objective questions, verbal questions, and the total test are printed for raw and weighted scores, including the highest possible score, the student's score, and the percentage. Student Output is optional and is requested on the Scan Request Form. One page is printed for each student unless additional copies are requested.
2. **Frequency and Statistical Output** is optional and includes a distribution of the weighted scores which is printed with standard deviation break marks to indicate grouping of standard deviations away from the weighted mean.

In parallel with the distribution, a printer plot of the percent of the class receiving each weighted score versus each weighted score is produced. Class performance statistics (mean, median, standard deviation, standard error) are also printed for both raw and weighted scores.

3. **Student Score Lists** may be requested in various arrangements. They include the student number, student raw and weighted scores for objective questions, verbal questions, and the total test. A Student Score List in the order the tests were processed is always printed.

The following additional lists may also be requested on the Scanning Request Form.

- a. Decreasing order by raw score
 - b. Decreasing order by weighted score
 - c. Increasing order by student number
 - d. Alphabetic by student name
 - e. Ascending order by special code by student name alphabetically
4. The **question grouping** option produces a listing including the student's name, student number, weighted score, and percent weighted score for each group and an overall group mean, standard deviation, and standard error for scores and percentages.
 5. **Question Analysis** output is always printed, and for each question the following information is given. Rejected questions are indicated.
 - a. The correct answer(s) for objective questions or score for verbal questions.
 - b. The number of students in the upper, middle, and lower thirds responding for each possible answer.
 - c. The total number of students responding for each possible answer for objective questions or getting each score for verbal questions.
 - d. The percent of the class answering the question correctly.
 - e. The Discrimination Index for each question.
 - f. Overall test statistics are always printed and include the average discriminating power (average of all Discrimination Indices), the Kuder-Richardson Reliability Index and the standard error of measurement.
 6. If requested on the Scan Request Form, a csv (comma separated variable) file suitable for use in a spreadsheet is produced with the following columns (in order):
 - a. Examination identification
 - b. Student number
 - c. Student name
 - d. Raw score
 - e. Weighted score
 - f. Percentage of weighted score
 7. **Special codes** may be used to have exam output sorted by class section number or some other designated codes. On the back of the answer sheet, the special codes are bubbled in the 6-digit field. If less than 6 digits are used, it is important that all students right- or left-justify the codes in the field, or the codes will not be sorted properly.