CSCI 1320 Computer Science I: Engineering Applications Fall 2017
Instructor: Zagrodzki
Assignment 8
Due Sunday, November 5th, by 11:55pm

## Working with data files

Large amounts of data can become useful if the information is organized and presented visually. The learning goals for this assignment are:

1. How to read from data files. We will be using Excel files (.xlsx) and we will explore the **xlsread** Matlab command.
http://www.mathworks.com/help/matlab/ref/xlsread.html
2. How to extract parts of the data, compare it, manipulate it, and then plot the results. The final task will be to plot a histogram of the resulting data.
http://www.mathworks.com/help/matlab/ref/histogram.html

During the Fall 2015 semester, 101 CU Boulder students took a quiz. The quiz consisted of 17 multiple-choice questions, and 1 essay question. Your task is to compute the final quiz scores and to plot a histogram of the scores.

### What is given?

You are given one file named *Section9_data.xlsx* which contains (see figure below):

1. The answer key for the multiple-choice part of the quiz (cells G2:W2),
2. The student ID numbers (column B),
3. The score the students received for the Essay portion of the quiz (column E),
4. The section number (column F),
5. The student answers to each of the 17 multiple-choice questions (columns G through W).

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Student ID No. | Score | # Multiple-choice | Essay | Section | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 | Q 6 | Q 7 | Q 8 | Q 9 | Q 10 | Q 11 | Q 12 | Q 13 | Q 14 | Q 15 | Q 16 | Q 17 |
| 2 | Key | | 100 | 17 | 15 | | D | B | C | B | A | C | B | D | D | B | B | A | B | B | A | D | C |
| 3 | | CSCI1320000'3 | | | 0 | 9 | A | A | B | C | C | B | A | B | A | B | B | A | B | B | A | B | B |
| 4 | | CSCI1320000'4 | | | 0 | 9 | D | A | D | C | A | A | D | B | A | B | A | B | A | B | B | D | B |
| 5 | | CSCI1320000'17 | | | 2 | 9 | D | B | B | A | C | C | A | B | C | B | A | A | B | A | B | D | C |
| 6 | | CSCI1320000'18 | | | 2 | 9 | D | B | B | B | A | B | A | D | D | B | A | B | A | A | B | D | B |
| 7 | | CSCI1320000'59 | | | 7 | 9 | A | A | B | C | A | A | A | C | C | B | A | B | A | A | B | B | D |
| 8 | | CSCI1320000'60 | | | 7 | 9 | D | B | B | B | A | C | B | D | D | D | B | B | B | B | A | D | C |
| 9 | | CSCI1320000'61 | | | 7 | 9 | C | A | C | C | A | B | D | B | C | B | A | B | A | B | B | B | D |
| 10 | | CSCI1320000'90 | | | 9 | 9 | D | B | C | D | A | E | B | D | D | B | A | B | B | B | A | D | C |
| 11 | | CSCI1320000'91 | | | 9 | 9 | D | A | C | C | A | B | D | C | D | A | A | A | B | B | B | B | C |
| 12 | | CSCI1320000'92 | | | 9 | 9 | D | B | C | B | A | C | A | D | D | D | B | A | B | B | A | D | C |
| 13 | | CSCI1320000'114 | | | 10 | 9 | D | B | C | B | A | C | B | D | D | B | A | B | A | B | A | D | C |
| 14 | | CSCI1320000'115 | | | 10 | 9 | D | A | D | C | A | B | D | B | B | B | A | B | B | B | B | B | D |
| 15 | | CSCI1320000'147 | | | 11 | 9 | D | B | B | B | A | C | B | D | D | B | B | A | B | B | A | D | B |
| 16 | | CSCI1320000'148 | | | 11 | 9 | C | C | C | C | A | C | D | C | A | C | C | A | C | C | C | C | A |
| 17 | | CSCI1320000'188 | | | 13 | 9 | D | B | B | B | A | B | B | D | A | D | B | B | B | A | A | C | C |
| 18 | | CSCI1320000'210 | | | 14 | 9 | D | A | C | A | A | B | A | B | A | B | A | A | B | B | A | D | D |
| 19 | | CSCI1320000'211 | | | 14 | 9 | C | C | C | C | A | B | D | A | C | B | A | B | A | B | B | A | D |
| 20 | | CSCI1320000'275 | | | 15 | 9 | A | A | C | C | A | B | D | B | A | C | A | A | B | B | B | B | C |
| 21 | | CSCI1320000'276 | | | 15 | 9 | D | A | C | C | A | B | D | B | C | B | A | A | B | B | B | B | D |
| 22 | | CSCI1320000'277 | | | 15 | 9 | D | A | D | C | A | B | D | B | A | B | A | B | B | A | A | B | D |
| 23 | | CSCI1320000'278 | | | 15 | 9 | D | A | C | C | A | A | D | B | A | B | A | B | B | B | B | B | C |
| 24 | | CSCI1320000'279 | | | 15 | 9 | D | A | B | C | A | A | D | B | A | B | B | A | B | B | A | B | D |
| 25 | | CSCI1320000'280 | | | 15 | 9 | D | A | B | C | A | A | D | B | A | A | A | A | B | B | B | B | D |
| 26 | | CSCI1320000'281 | | | 15 | 9 | D | A | D | C | A | A | D | B | D | B | A | A | B | B | B | B | D |

## What do you need to do?

1. Read into Matlab the provided data file – here is where the *xlsread* function will come in handy.
2. Compare the students' answers with the provided key (cells G2:W2) and compute the number of correct answers to the multiple-choice (MC) part of the quiz.
3. Compute the final scores for the quiz using the following formula:

    Final score = (#correct answers for MC part) * 5 + Essay score

4. Create a histogram plot of the final scores.

## Extra credit (10 pts)

Define your own task. Think about something useful/interesting you can extract from the data. Your task should include a visualization component: graph, bar graph, pie chart, histogram, animation, ... Comment heavily to give the grader a clear idea of what you set out to do and what steps you took to get it done.

## Good programming practices:

Remember, one of the course goals is to make modular programs. See if you can identify parts of your program which are either repetitive, or that could be useful in other programs in the future.

Make sure each script and function file is well commented and it includes in the header your name, course number, assignment number and instructor name.

## Submitting the assignment:

Zip all the .m files together and submit the resulting *.zip* file through Moodle as Assignment 8 by Sunday, November 5th, by 11:55pm. **Note:** ONLY zip files will be accepted.