MAE 8 - Spring 2022
Homework 8

Instructions: Follow the homework solution template. Put all answers in a MATLAB script named **hw8.m**. For this homework, you will need to submit multiple files. Create a zip archive named **hw8.zip**. The zip archive should include the following files: **hw8.m**, **note.mat**, and **class_survey.dat**. Make sure figure 1 is plotted when your homework script is executed. Submit **hw8.zip** in CANVAS before 10 pm on Wednesday 6/08/2022. Use double precision unless otherwise stated.

Problem 1: Download the file **note.mat** from CANVAS and load it into MATLAB. The file contains a cell array named **note**. Perform the following exercises.

(a) What is the dimension (size) of **note**. Put the answer in **p1a**.

(b) Extract all elements in the first column of **note** and put them into a column cell array **p1b**.

(c) Extract all elements in the last row of **note** and put them into a row cell array **p1c**.

(d) Extract the content of the 3^{rd}-row 2^{nd}-column element of **note** and put it into a row vector **p1d**. Note that **p1d** should have double datatype, not a cell class.

(e) Copy cell array **p1b** into cell array **p1e**. Use **for** loop to modify cell array **p1e** such that the first letters of both first and last names in each element of the cell array are capitalized. Hint: the first letter of the last name is preceded by a blank space.

Problem 2:

Field names	student(1)	student(2)	student(3)
name	Noah Williams	Benjamin Frank	Oliver Harper
PID	A01	A02	A03
homework	70 91 82 93 84 85 96 78	90 81 92 83 67 85 86 92	80 71 92 73 64 75 96 77
project	96	82	77
midterm	93	83	91
final_exam	63	91	76

Table 1: Students' record.

Use table 1 to create a vector of structure named **student** to store the records of three students. The data structure should have the following fields: name, PID, homework, project, midterm and final_exam. The name and PID fields are strings. The homework field is a vector of 8 homework grades. The project, midterm and final_exam fields contain a single number.

(a) Set **p2a = student(1)**.

(b) Set **p2b = student(2)**.

(c) Set **p2c = student(3)**.

(d) Add a new field, named hw_average, to store the average homework grade out of the best 7 assignments. Be sure to drop the lowest homework score before computing the average. Set **p2d = [student.hw_average]**.

Problem 3: Download the file **class_survey.dat** from CANVAS. The file contains data collected in the survey which you had taken during homework 5. The following 6 questions were asked:

1. What is your class level?
2. Do you have any MATLAB / coding experience prior to the course?
3. Which of the following lab sessions do you attend most frequently?
4. What grade do you expect for the course?
5. On average how many hours per week do you spend studying outside of class?
6. How difficult was the midterm?

The data file has 6 columns which contain the answers to the questions above. Note that, when students did not answer the question, the collected data is a string 'Null'. Load the data into MATLAB, and perform the following exercises:

(a) Make a bar graph to show the number of students who most frequently attended the lab on Tuesday, Wednesday, Thursday or Friday. Label the axes and give a title. Set **p3a = 'See figure 1'**.

(b) How many students have previous MATLAB/coding experience? Put the answer into **p3b**.

(c) How many students spent more than 6 hours studying outside of class? Put the answer into **p3c**.

(d) How many sophomores expected to receive an A for the course? Put the answer into **p3d**.