ENGR 160 Algorithms and Applications Sec 02 Spring 2018

Homework Assignment #10 Due 9:00am Mar 23(F) 2018

Read Chapter 8 of the book.

Problem 10.1
Write a MATLAB program genNvectors.m to prompt the user to input a positive integer N, and generate N random vectors, each with 10 random numbers uniformly distributed between 0 and 1. Each vector will be stored in a variable with a name called 'vector1', 'vector2', 'vector3'…, 'vectorN'. Your program should perform error checking for the user input value of N. After testing your program, there should be N variables, vector1,…, vectorN. created in your workspace, each with 10 random numbers.

Problem 10.2
Write a MATLAB function called ***wordparser*** that can parse words for a text document. The function should take the document as input, and return one single output argument which stores all distinctive words (not case sensitive) in the document. Your program should be able to eliminate any punctuations leading or trailing each word. It should also be able to handle an empty input. Use the following input to test your program:

1. This is a test.
2. Good!
3. He said, "Go, go for it!"

Problem 10.3
Write a MATLAB program that will call the following two functions.

1) EnterStudentInfo.m: this function takes a positive integer N as the input arguments, and return a single output argument, which is a cell array that stores the names, student IDs and GPAs for a total of N students. The function should prompt the user to input appropriate information interactively. An example is illustrated below.

```
>> students = EnterStudentInfo(2)
Please enter the name of student No. 1: John
Please enter the student ID for John: 1234
Please enter the GPA for John: 4.0
Please enter the name of student No. 2: Mary
Please enter the student ID for Mary: 5678
Please enter the GPA for Mary: 5.0
```

The result of the above testing should result in the following variable:

```
>> students
students =
  2×3 cell array
    'John'    [1234]    [4]
    'Mary'    [5678]    [5]
```

2) PrintStudentInfo.m: this function takes one single input argument with all the above mentioned student information, and print in a table format with a heading line as shown below.

```
>> PrintStudentInfo(students)
Student Name    Student ID      GPA
        John          1234      4.00
        Mary          5678      5.00
```

Problem 10.4

Create and run a MATLAB program to solve exercise 20 of Chapter 8 with the following changes: The main program should call three functions:

1) datagen.m: generate and return (as output arguments) a structure array of N subjects, where N is the input argument. The names of the subjects can be generated from the 26 alphabets randomly with 3 – 8 letters (all in lower case). The id is simply the index of the subject in the structure array. The heights of the subjects is uniformly distributed random numbers between 5.5 and 6.8; The weights of the subjects is uniformly distributed between 90 and 250;
2) calcavg.m: calculate the average height and weight of all subject and return them as output arguments.
3) printdata.m: print the generated subjects and the results to the screen as shown below

```
 Name           Id             Height         Weight
 joey           1              6.7            222.2
 mary           2              5.6            112.5
      …                 …                 …              …
Average height is 6.3
Average weight is 125.7
Eligible subjects are:  mary
      ….
```

Problem 10.5

Create and run a MATLAB program to solve exercise 21 of Chapter 8. Write a function to create the data file named studentinfo.dat. You can use the examples in the book as the contents in the data file, or create your own one.