

Homework 8

Create a single MATLAB script with each problem below as a separate section (hint: %%).

1. Create a new script
2. Create a comment section at the top with your name, date, HW#, class, etc.
3. The first script commands should erase all the workspace data, command window output, and close all figures.
4. Create separate sections (%%) for each problem

Problem 1 (25 pts)

The built-in **clock** function returns a vector with six elements representing the year, month, day, hours, minutes, and seconds; the first five elements are integers whereas the last is a **double** value, but calling it with **fix** will convert all to integers. The built-in **date** function returns the day, month, and year as a string. For example,

```
>> fix(clock)
ans =
    2008     4    25    14    25    49
>> date
ans =
25-Apr-2008
```

Write a script that will call both of these built-in functions, and then compare results to make sure that the year is the same. The script will have to convert one from a string to a number, or the other from a number to a string in order to compare.

Problem 2 (25 pts)

Write a function *rid_multiple_blanks* that will receive a string as an input argument. The string contains a sentence that has multiple blank spaces in between some of the words. The function will return the string with only one blank in between words. For example,

```
>> mystr = 'Hello  and how  are  you?';
>> rid_multiple_blanks(mystr)
ans =
Hello and how are you?
```

Problem 3 (25 pts)

A script stores information on potential subjects for an experiment in a vector of structures called *subjects*. The following show an example of what the contents might be:

```
>> subjects
subjects =
1x3 struct array with fields:
    name
    sub_id
    height
    weight

>> subjects(1)
ans =
name: 'Joey'
sub_id: 111
height: 6.7000
weight: 222.2000
```

For this particular experiment, the only subjects who are eligible are those whose height or weight is lower than the average height or weight of all subjects. The script will print the names of those who are eligible. Create a vector with sample data in a script, and then write the code to accomplish this. Don't assume that the length of the vector is known; the code should be general.

Problem 4 (25 pts)

A vector x has been obtained from measurements. Suppose we want to consider any data value in the range $-0.1 < x < 0.1$ as being erroneous. We want to remove all such elements and replace them with zeros at the end of the array. Develop two ways of doing this. An example is given in the following table.

	Before	After
$x(1)$	1.92	1.92
$x(2)$	0.05	-2.43
$x(3)$	-2.43	0.85
$x(4)$	-0.02	0
$x(5)$	0.09	0
$x(6)$	0.85	0
$x(7)$	-0.06	0

Bonus question (20 pts)

1. Animation using `plot()` and `pause()` functions
 - a. Create an x vector from 0 to 360 degrees with a stepsize of 10
 - b. Create a y vector that is the sin of x. (Hint: use `sind()` to calculate sine in degrees)
 - c. Initialize theta to be 0.
 - d. Create a while-loop to do the following for 2 dance cycles:
 - i. Create a `y_plot` vector that equals y times `sind(theta)`
 - ii. Plot the x and `y_plot` data
 - iii. Add your name to the plot
 - iv. Make sure the axis doesn't resize every time
 - v. Have MATLAB wait for 0.1 seconds before continuing
 - vi. Increment theta by 10
2. Animation using movie objects
 - a. Create a movie object of the dancing sine wave for 2 dance cycles (you can create a new loop or insert commands into the loop you made above). Be sure to include your name somewhere on the plot.
 - b. Create an avi using all the frame from your movie object.
 - c. Create an animated gif of **ONLY THE FIRST 10 FRAMES** of your movie. If you do all the frames, your gif will be REALLY SLOW.

Turn in the following:

1. A Word (.doc, .docx) document created using the MATLAB publish feature to publish your script.
 2. Your .m script file(s) (these are separate files from the document above). Make sure you use plenty of comments. Before submitting, rename all *.m files to have a .txt extension. For example, rename MyHW6.m to MyHW6.txt before submitting.
- Submit all files electronically on Blackboard. See syllabus for late assignment policy.

Late submissions will receive a 10% deduction!

No submissions will be accepted after one day!