

**EXAM 2 – WRITTEN PORTION**

NAME \_\_\_\_\_

SECTION NUMBER \_\_\_\_\_

CAMPUS MAILBOX NUMBER \_\_\_\_\_

Short Answer	/ 40
Coding Problem	/ 60
Total	/ 100

**Problem 1:**

This piece of code is supposed to print the squares of integers, so long as the squares are less than 5:

```
clc
clear variables
close all
m=0;
while (a < 5)
    fprintf('a = %2i \n',a)
    m=m+1;
    a=m*m;
end
```

However, it doesn't run at all. It produces one of those annoying red error messages in the command window:

```
??? Undefined function or variable 'a'.

Error in ==> written at 5
while (a < 5)
```

What is wrong with the code? Fix it!

**Problem 2:**

Consider the following code scrap:

```
clc
clear variables
close all
for i=1:3
    if (i==2)
        x=2;
    elseif (i > 2)
        x=2;
    elseif (i >= 3)
        x=3;
    end
end
```

What is the value of x after the code executes?

**Problem 3:**

We have written a short main program that calls a simple function:

```
clc
clear variables
close all
a=1;
b=2;
c=simple(b,a);
fprintf('c = %2i \n',c)
```

```
function [c]=simple(a,b)
%
%   function to compute c=a+b*b
%
c=a+b*b;
```

We thought that the program would print out  $c=5$ , but it says  $c=3$ . Fix the error in the code so that it works as intended.

**Problem 4:**

We have written a main routine that calls a very simple function:

```
clc
clear variables
close all
fred=1;
sam=2;
tina=3;
bob=4;
answer=simple(fred,sam)
```

```
function [c]=simple(a,b)
%
%   function to compute c=a+b*b
%
c=a+b*b;
```

Suppose that we run the debugger and put a breakpoint inside the function. Circle the correct option for each of the variables below:

fred=	1	2	3	4	not defined
sam=	1	2	3	4	not defined
tina=	1	2	3	4	not defined
bob=	1	2	3	4	not defined
a=	1	2	3	4	not defined
b=	1	2	3	4	not defined

**EXAM 2 – Computer PORTION**

Put your code in two m-files: a main routine called lastname\_main.m and a function called lastname\_function.m.

Include your name, section number, and CM number in the header section of your main routine. There should be no output other than what is requested.

---

**Problem (60 pts)**

We wish to plot the displacement ( $y$ ) of a damped mass-spring system:

$$y = e^{-t/\tau} \sin(\omega t) \quad (1)$$

where

$$\begin{aligned} \tau \text{ (tau)} &= 1 \text{ s} \\ \omega \text{ (omega)} &= 2 \text{ rad/s} \end{aligned}$$

We wish to use a time step size of  $dt=0.01$  seconds and plot the curve starting at time zero and ending when the displacement of the mass is less than  $miny=-0.1$  meters. (Note that  $miny$  is a negative number!)

Use a main routine and a function to accomplish this task.

The main routine should

- Set up the constants for the problem
- Call the function to create the time and displacement vectors for equation (1)
- Plot the vectors returned by the function
- Put good axis labels, a title, and a legend on the plot

The function should start with the line

```
function [t_vector,y_vector]=lastname_function(tau,omega,dt,miny)
```

(Here lastname should be your last name.) The function outputs are the time vector and the displacement vector.

---

When you are done, post your m-file answer to the correct folder:

1. Double-click on "My Network Places". If it is not on your desktop, look in your start menu.
2. Double-click on "[DFS] Root". *Not [AFS] Root.*
3. Log in with your email address and password.
4. Double-click on Academic Affairs.
5. Double-click on ME.
6. Double-click on ME123.
7. Double-click on Exams.
8. Double-click on the folder with your section number.
9. Copy and paste your m-file to this folder.

NOTE: All programming must stop at 10:40 AM. You will have a few minutes after that to post your file if you need that time.