**EXAM 1 – WRITTEN PORTION**

NAME _____

SECTION NUMBER _____01_____

CAMPUS MAILBOX NUMBER _____

EMAIL ADDRESS _____@rose-hulman.edu

| | |
|---|---|
| Written Portion | / 50 |
| Computer Portion | / 50 |
| Total | / 100 |

USE MATLAB SYNTAX FOR ALL PROGRAMS AND COMMANDS YOU WRITE.

**Problem 1:** (4 points) We wrote a very simple script (below) to practice our `'if'` statements. However, it is showing a syntax error. Fix the error so the script will run as intended.

written_ones.m

```
1 -     clc
2 -     clear variables
3 -     b=10;
4 -     a=10;
5 -     if (b=a)
6 -         fprintf('b is equal to a \n');
7 -     end
```

Command Window

New to MATLAB? See resources for Getting Started.

```
>> written_ones
Error: File: written_ones.m Line: 5 Column: 6
The expression to the left of the equals sign is not a valid target for an assignment.
```

**Problem 2:** (4 points) Fill in the first four lines of the table that will be printed when this script is executed:

```
clc
clear variables
fprintf(' i   j\n')
fprintf('--------\n')
for i=1:5
    for j=2:2:4
        fprintf('%2.0f  %2.0f \n',i,j)
    end
end
```

```
i   j
--------

__________

__________

__________

__________
.
.
.
.
.
.
```

**Problem 3:** (4 Points) The code below is supposed to make a vector named `t` that runs from 0 to 1 in increments of 0.1. It gives the error shown. Mark the changes on the code so that it operates properly.

written_ones.m

```
1 -     clc
2 -     clear variables
3 -     index = 0;
4 -     for time = 0:0.1:1
5 -        t(index) = time;
6 -        index = index + 1;
7 -     end
8
```

Command Window

New to MATLAB? See resources for Getting Started.

```
Subscript indices must either be real positive integers
or logicals.

Error in written_ones (line 5)
   t(index) = time;

>>
```

**Problem 4:** (4 points) You are given a matrix called M,

$$M = \begin{bmatrix} 1 & 2 \\ 3 & 7 \\ 5 & 6 \end{bmatrix}$$

and a code segment:

```
[m n] = size(M);
for a = 1:n
    M(a,a) = M(a,a) - n;
end
```

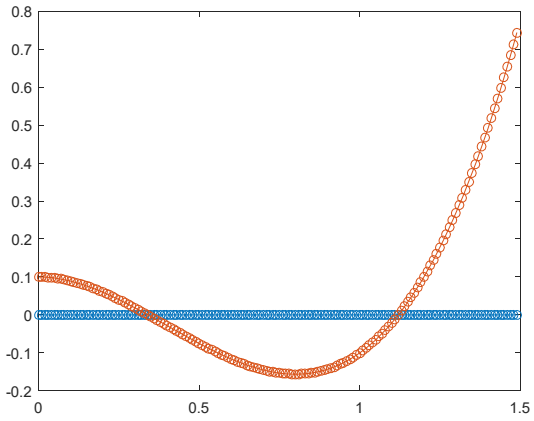
What is M after the code is executed?

**Problem 5:** (4 points) The following code segment produces the 2D plot shown below:

```
clear variables

for m = 1:150
    x(1,m) = (m-1)*0.01;
    y(2,m) = 0.1 + x(1,m)^3 - 1.2*x(1,m)^2;
end

plot(x,y,'o-')
```




There are two lines displayed on the plot. The curved line is the expected result while the straight line is not.

Indicate the necessary change on the code to correct for the problem (*i.e.* only plot the curved line).

**Problem 6:** (4 points) We have loaded a matrix called `SCAN0`. We wish to copy the 4th column of this matrix into a new vector called `TAP4`. Complete the code scrap below to accomplish this task:

```
[nrows ncols] = size(SCAN0);

for k = 1:_____________

   TAP4(_____________) = SCAN0(___________________);

end
```

**Problem 7:** (4 points) What is the value of x at the end of this snippet of code?

```
for i = 1:5
    if i == 2
        x = 1;
    elseif i > 4
        x = 2
    elseif i <= 5
        x = 3
    elseif i == 5
        x = 4;
    else
        x = 5;
    end
end
```

**Problem 8:** (4 points) What prints to the command window when we run the following script?

```
clc
clear variables
close all
for i=1:4
    for j=1:6
        M(i,j)=i*j^2;
    end
end
fprintf('M(2,4)=%2.0f \n',M(2,4))
```

**Problem 8:** (8 points) Write a short program using a `for` loop to generate a matrix called `mymat` which contains the following entries:

*First row* – multiples of 9 between 17 and 57

*Second row* – the square of the corresponding entry in the first row;

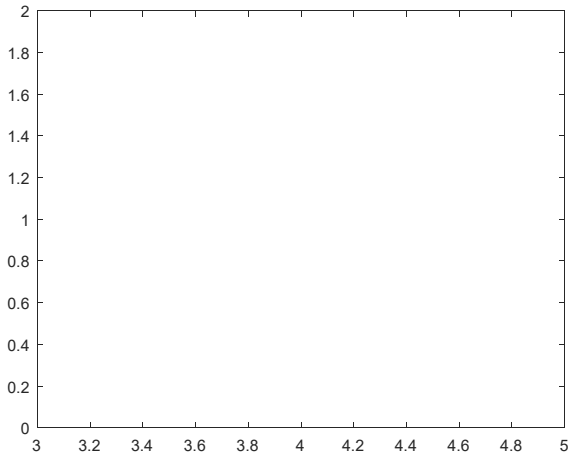
*Third row* – two times the corresponding entry in the first row.

You do not need to print out the answer. Just write the code required to do the computation.

**Problem 9:** (6 points) Write a short script that creates a vector named `theta` containing the angles from 0 to 360, in increments of 5 degrees.

**Problem 11:** (4 points) The following script runs without errors and produces a figure, but the plot doesn't look the way it should. The workspace after the script runs is also shown below. Fix the script so that it produces the appropriate plot (don't worry about labels and titles).

```
clc
clear variables
close all
n = 1;
for x = 0:0.01:4
    x_vec(n) = x;
    f_vec(n) = sqrt(x);
    n = n + 1;
end
plot(x, f_vec)
```




Workspace

| Name | Value |
|---|---|
| f_vec | *1x401 double* |
| n | 402 |
| x | 4 |
| x_vec | *1x401 double* |