EXAM 1 – WRITTEN PORTION

NAME _____

SECTION NUMBER _____

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) Which of the following lines of code <u>will not produce an error</u> if used in MATLAB to assign the value of 10 to the given variable? Circle all options which <u>will not produce an error.</u>

a) `dataPoint1 = 10;`

b) `10April2014 = 10;`

c) `T42v7 = 10;`

d) `M*g = 10;`

e) `sin_x = 10;`

f) `x-data = 10;`

Problem 2: (4 points) The following code is run from the MATLAB editor:

```
clc
clear variables

filename = fopen('datafile.txt', 'wt');

Fred = 5;
Bob = 2*Fred;

fprintf('The value of y is %7.2f \n', y);
fclose(filename);
```

The user expected the file `datafile.txt` to contain the following line of text:

```
                    The value of y is   10.00
```

However, when the file is opened, the user finds it blank! Mark on the code the change(s) needed to fix the code so the expected output is written to the file `datafile.txt`.

Problem 3: (4 points) The code below successfully creates three vectors: `x_vec`, `f_vec`, and `g_vec`. The code is also supposed to plot `f_vec` and `g_vec` against `x_vec` (that is, `x_vec` is on the horizontal axis, and `f_vec` and `g_vec` are on the vertical axis), but MATLAB returns the error shown below and does not generate a plot. Fix the code so it produces the expected plot. (Do not worry about axis labels, a title, a legend, and line styles.)

```
clc
clear variables
close all
n = 1;
for x = -10:0.02:10
    x_vec(n) = x;
    f_vec(n) = x^2 + x;
    g_vec(n) = exp(-x) + sin(x/10);
    n = n + 1;
end

plot(x_vec, f_vec, g_vec)
```

Command Window

```
Error using plot
Data must be a single matrix Y or a list of pairs X,Y.

Error in code (line 14)
plot(x_vec, f_vec, g_vec)
```

Problem 4: (4 points) Consider the code scrap shown below:

```
clc
clear variables
a=5;
b=10;
if (a > 5)
    fprintf('I like cats.\n');
elseif (b==10)
    fprintf('I like dogs.\n');
else
    fprintf('I like cats and dogs.\n');
end
```

What prints when we run this code? Circle the correct output.

(a) I like cats.

(b) I like dogs.

(c) I like cats and dogs.

(d) I like dogs.
    I like cats and dogs.

Problem 5: (4 points) What is y after we run the following code?

```
clc
clear variables
y = 1;
for i = 6:-2:2
    if i >= 3
        y = y + i;
    else
        y = y - i;
    end
end
```

   a.   The program crashes.

   b.   −2

   c.   1

   d. 7

   e. 9

   f. 11

   g. Other (explain): _____

Problem 6: (4 points) Suppose you have defined in MATLAB the row vector

$$v = \begin{bmatrix} 4 & 2 & -5 & 8 & -10 \end{bmatrix}$$

If you issue the command z = abs(min(v)) in the Command Window, what is z?

   a. −10   g. 4

   b. −8   h. 5

   c. −5   i. 8

   d. −4   j. 10

   e. −2   k. MATLAB returns an error.

   f. 2

Problem 7: (4 points) The following code is supposed to create a time vector, but it gives the error shown. Fix the code to eliminate the error.
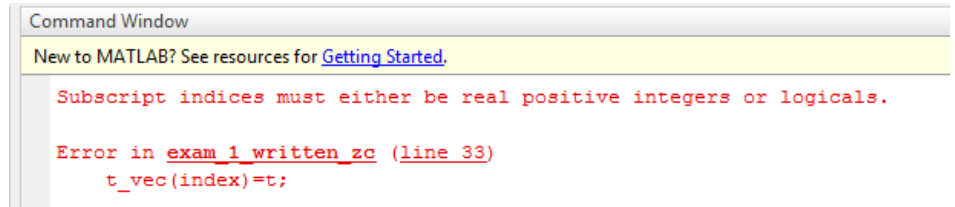
```
clc
clear variables

index=0;

deltat=0.001;

for t=0:deltat:1
    t_vec(index)=t;
    index=index+1;

end
```

Command Window

New to MATLAB? See resources for Getting Started.

Subscript indices must either be real positive integers or logicals.

Error in exam_1_written_zc (line 33)
    t_vec(index)=t;

Problem 8: (4 points) The following code runs and does not give any errors, but it produces an empty plot. Fix the code so that it correctly produces a line on the plot. (Do not worry about the axis labels or titles.)
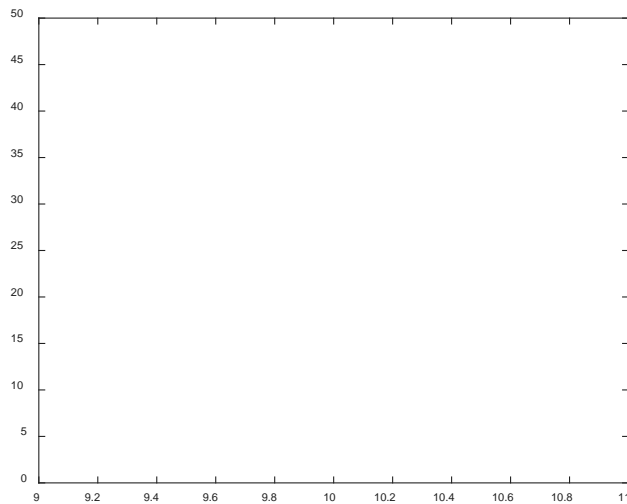
```
clc
clear variables
close all

i=0;

for t=0:10
    i=i+1;
    t2(i)=t;
    x(i)=1/2*t^2;

end

plot(t,x)
```

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Problem 9: (4 points) What is the value of x after this code scrap is executed?

```
clc
clear variables

x = 0;
for dx = 1:5
    x = x + dx;
end
```

Problem 10: (4 points)   Circle program which will properly calculate the following summation.

$$y = \sum_{k=2}^{12} 4^k$$

a.
```
for k = 1:12
    y = y + k^4;
end
```

d.
```
y = 0;
for k = 2:12
    y = y + 4^k;
end
```

b.
```
y = 0;
for k = 2:12
    y = 4^k;
end
```

e.
```
y = 0;
for k = 1:12
    y = y + 4^k;
end
```

c.
```
y = 2;
for k = 2:12
    y = y + 4^k;
end
```

f.   Other (explain):

Problem 11: (4 points) The following code is used to turn the matrix Fred into a different matrix named Bob.

```
clc
clear variables

Fred = [1 2 3; 4 5 6]
for i=1:3
    for j=1:2
        Bob(i,j) = Fred (j,i);
    end
end
```

In the space below, write down the resulting `Bob` matrix after the code executes. If you think that the script will produce an error message, write an "X".

Problem 12: (6 points) Write a scrap of code to ask the user to input two different numbers, one for player A and one for player B. The code should write to the command window whoever has the highest number. If the numbers are the same, the code should write that a tie occurred. Here is some code to get started

```
clc
clear variables

A = input('Enter a number for player A:');
```