

EXAM 1 – WRITTEN PORTION

NAME _____

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Written Portion	/ 50
Computer Portion	/ 50
Total	/ 100

USE MATLAB SYNTAX FOR ALL PROGRAMS AND COMMANDS YOU WRITE

Problem 1: (4 points) What is y after we run the following code?

```
clc
clear variables
y = 1;
for i = 4:-1:1
    if i >= 3
        y = y^2 + i;
    else
        y = y - 5*i;
    end
end
```

- The program crashes.
- 25
- 1
- 5
- 13
- 28
- Other (explain): _____

Problem 2: (4 points) The following code is supposed to copy the third column of the data in the Excel file `experiment.xls` into a new vector called `speed`. However, upon executing the code, we receive the error shown below from MATLAB, and `speed` is not generated. Fix the code so it runs as expected.

```
clc
clear variables
data = xlsread('experiment.xls');
[m,n] = size(data);
for i = 1:m
    speed(i) = data(3,i);
end
```

Command Window

Index exceeds matrix dimensions.

Error in code (line 8)
speed(i) = data(3,i);

Problem 3: (4 points) What is x after this code runs?

```
clc
clear variables
x = -20;
y = 10;
while y > 1
    if y > 7
        x = x + 4*y;
    else
        x = x - 2*y;
    end
    y = y - 3;
end
```

- The program crashes.
- 4
- 2
- 10
- 38
- 40
- Other (explain): _____

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

$$v = [4 \ 2 \ -5 \ 8 \ -10]$$

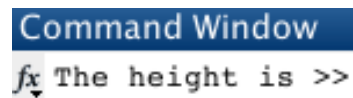
If you issue the command `z = min(abs(v))` in the Command Window, what is z ?

- | | |
|--------|-----------------------------|
| 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 5: (4 points) Suppose we run the code shown below from the MATLAB editor:

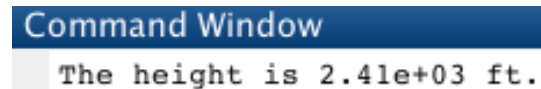
```
clc
clear variables
height = 2410;           % ft
fprintf('The height is %8.2 ft. \n', height)
```

We find that the following is printed to the Command Window:



Command Window
fx The height is >>

However, we intended to see the following text:



Command Window
The height is 2.41e+03 ft.

Fix the code so it generates the expected output.

Problem 6: (4 points) What is z after this code finishes running?

```
clc
clear variables
x = 6;
for k = 1:2:5
    z(k) = x*k;
    x = x - 2;
end
```

Problem 7: (4 points) What is a after we run the following code?

```

clc
clear variables
a = 7;
b = 4;
c = 2;
if (a <= c) || (b > 4)
    a = 2*b + c;
else
    if (a > 5) && (b == 2*c)
        a = a - 2*b + c^2;
    else
        a = 3*a;
    end
end
end

```

- The program crashes.
- 3
- 7
- 10
- 21
- Other (explain): _____

Problem 8: (4 points) The code below is supposed to plot the parabola $y(x) = x^2$, with x on the horizontal axis. The code runs without MATLAB returning an error, but it produces the unexpected plot shown below. Fix the code so it generates the expected plot. (Do not worry about axis labels, a title, etc.)

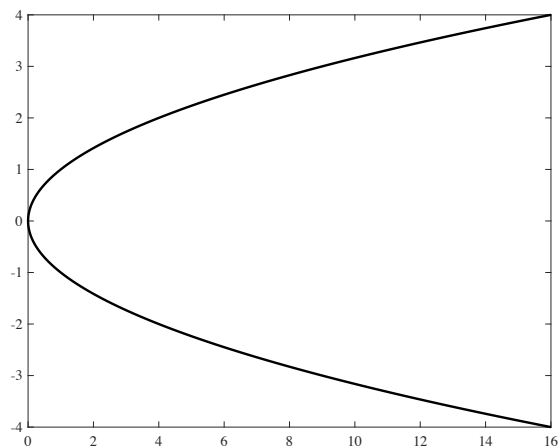
```

clc
clear variables
close all

i = 0;
for x = -4:0.05:4
    i = i + 1;
    x_vec(i) = x;
    y_vec(i) = x^2;
end

plot(y_vec, x_vec)

```



Problem 9: (4 points) You are given a matrix

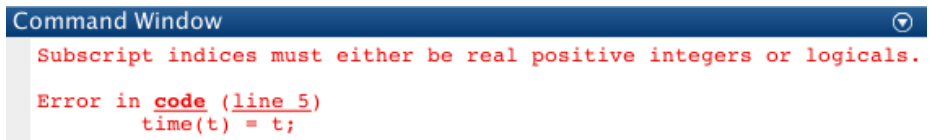
$$M = \begin{bmatrix} 9 & 2 & 8 \\ 1 & 6 & 5 \\ 7 & 3 & 10 \end{bmatrix}$$

that is used in the following code segment:

```
for i = 1:3
    for j = 1:3
        if M(i,j) > 5
            M(i,j) = 1;
        else
            M(i,j) = 0;
        end
    end
end
```

What is M after this code segment runs?

Problem 10: (6 points) The following code is supposed to create a vector called `time` that contains time values ranging from 1 second to 10 seconds in steps of 0.2 seconds. However, when we run the code, MATLAB returns the error shown below and does not generate `time`. Fix the code so it works as expected.



Command Window

Subscript indices must either be real positive integers or logicals.

Error in `code` (line 5)
time(t) = t;

```
clc
clear variables

for t = 1:0.2:10
    time(t) = t;
end
```

Problem 11: (8 points) Write a short program to evaluate a piecewise function $y(x)$ and create a corresponding matrix called `results`. In the first row of the matrix, store the values of x , which range from -6 to 12 in steps of 0.1 . In the second row, put the value of the function $y(x)$ for the corresponding value of x : if x is less than 1 , then $y(x) = x^3$; otherwise, $y(x) = \sqrt{x}$.

Remember to use proper MATLAB syntax.