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) The following code is run from the MATLAB editor:

```
clc
clear variables
fid = fopen('Question1.txt', 'wt');
x = 10;
y = 2*x;
fprintf('The value of y is %7.2f \n', y);
fclose(fid);
```

The user expected the file `Question1.txt` to contain the following line of text:

```
The value of y is   20.00
```

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 `Question1.txt`.

Problem 2: (4 points) What is `y` after this code runs?

```
clc
clear variables
y = 1;
counter = 1;
for i = 1:2
    counter = counter + 1;
    for j = 1:counter
        y = y + 1;
    end
end
```

a. The program crashes.

b. 1

c. 2

d. 4

e. 6

f. 9

g. Other (explain): _____

Problem 3: (4 points) What prints when we run the following code?

```
clc
clear variables
x = 5;
y = 10;
z = 2;
if (y > x) && (z < 2)
     x = y + z;
elseif (y == 5) || (x < z)
     x = x + 10;
end
fprintf('x = %2.0f \n', x)
```

a. The program crashes, so nothing prints.

b. The program runs, but nothing prints.

c. `x =  5`

d. `x = 12`

e. `x = 15`

f. `x = 20`

g. Other (explain): _____

Problem 4: (4 points) What is `daniel` after this code finishes running?

```
clc
clear variables
i = 1;
x = 2;
while x < 10
      daniel(i) = 2*x;
      x = x + 3;
      i = i + 1;
end
```

Problem 5: (4 points) You are given a matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

that is used in the following code segment:

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

What is `A` after this code segment runs?

Problem 6: (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 = 0:0.01:4
    x_vec(n) = x;
    f_vec(n) = sqrt(x) + x;
    g_vec(n) = x^2 + exp(-x);
    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 7: (4 points) What is `x(3)` after we run the following code?

```
clc
clear variables
counter = 0;
for i = 2:2:10
    counter = counter + 1;
    x(counter) = i + counter;
end
```

a. The program crashes.
b. 3
c. 6
d. 9
e. 12
f. Other (explain): _____

Problem 8: (4 points) Suppose you have defined in MATLAB the matrix

$$M = \begin{bmatrix} 1 & 3 & 2 & 5 \\ 7 & 4 & 6 & 9 \end{bmatrix}$$

If you issue the command `y = M(3,2)` in the Command Window, what is `y`?

a. 1
b. 3
c. 2
d. 5
e. 7
f. 4
g. 6
h. 9
i. MATLAB returns an error.

Problem 9: (6 points) We wish to copy the second row of the data in the Excel file `temp_data.xls` into a new column vector, `temp_C`. Complete the code below.

```
clc
clear variables
data = xlsread('temp_data.xls');
[m,n] = size(data);

for i = 1:__________

    temp_C(_______________) = data(___________________);

end
```

Problem 10: (4 points) What is `b` after this code runs?

```
clc
clear variables
A = [1 2 3];
m = 0;
for j = 1:2:3
     m = m + 1;
     b(m) = A(j);
end
```

a. 3

b. $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$

c. [1 2 3]

d. $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$

e. $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

f. [1 0 3]

g. $\begin{bmatrix} 1 \\ 0 \\ 3 \end{bmatrix}$

h. [1 2]

i. [1 3]

j. The program crashes.

k. Other (explain): _____

Problem 11: (8 points) Write a short program to create a matrix named `array`. In the first column of the matrix, put the sine of an angle that goes from 5 to 150 degrees in steps of 10 degrees. In the second column, put a 1 if the corresponding angle is less than 90 degrees; otherwise, put a 2.