EXAM 1 – WRITTEN PORTION

NAME _____

SECTION NUMBER _____

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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 the value of the variable `cats` after we run the following code?

```
clc
clear variables
a=6;
b=4;
if (a==6)
    cats=10;
elseif (b==4)
    cats=0;
else
    cats=100;
end
```

(a) 10

(b) 0

(c) 100

(d) `cats` is not defined

(e) other (explain)_____

Problem 2: (4 points) Consider the following code, which produces the table shown to the right.

```
clc
clear variables
fprintf(' counter     fraction \n');
counter=0;
for frac=0:2/3:10
    counter=counter+1;
    fprintf('    %1.0f          %2.1f \n',counter,frac);
end
```

counter	fraction
1	0.0
2	0.7
3	1.3
4	2.0
5	2.7
6	3.3
7	4.0
8	4.7
9	5.3
10	6.0
11	6.7
12	7.3
13	8.0
14	8.7
15	9.3
16	10.0

The table does not have its columns aligned properly. Which of the following fprintf statements is most likely to produce a properly aligned table?

```
fprintf('    %1.0f          %4.1f \n',counter,frac);
```

```
fprintf('    %2.0f          %4.1f \n',counter,frac);
```

```
fprintf('    %1.0f          %2.1f \n',counter,frac);
```

```
fprintf('    %2.0f          %2.1f \n',counter,frac);
```

Problem 3: (8 points)   Write a short code that uses a `for` loop to count the number of multiples of 7 between 20 and 60. (The multiples of 7 would be 21, 28, 35, etc.) You do not need to print the answer but you should name the result variable `count`.

Problem 4: (6 points) Your friend would like to create a vector x that goes from 0 to 100 by 2's. The beginning of the vector should look like this:

	1	2	3	4	5	6
1	0	2	4	6	8	10

Your friend wrote a short code that they thought would work:

```
clc
clear variables
for i=0:2:100
    x(i)=i;
end
```

but the code gives this error:

```
Command Window

  Subscript indices must either be real positive integers or logicals.

  Error in mc (line 4)
      x(i)=i;
```

Complete the code below so that it creates the vector properly. Do not change any of the given statements:

```
clc
clear variables



for i=0:2:100




end
```

Problem 5: (6 points) What is the value of A after the following code runs?

```
clc
clear variables
A=[1 2 3;4 5 6;7 8 9];
for i=1:3
    for j=1:3
        A(i,j)=A(j,i);
    end
end
```

Problem 6: (4 points) The code below (line numbers given to the left) is supposed to print the following statement to the command window:

```
x is less than y
```

However, instead of printing this statement the code crashes (does not run) and gives the error message below. Make the necessary correction(s) to the code so that it produces the expected output:

```
1     x=10;

2     y=20;

3     if (x=y)

4          fprintf('x is equal to y\n');

5     elseif (x>y)

6          fprintf('x is greater than y\n');

7     else

8          fprintf('x is less than y\n');

9     end
```

```
Command Window
  >> P6
  Error: File: P6.m Line: 3 Column: 6
  The expression to the left of the equals sign is not a valid target for an assignment.
```

Problem 7: (6 points) You are given matrix, A, below. Fill in the blanks in the code scrap below to create matrix B from matrix A (you may assume that matrix A is already defined). Do not change any preexisting code. Matrix B is identical to matrix A, except the entries in its third column are the sum of the corresponding entries in the first two columns of matrix A (e.g., the entry in row 1, column 3 is 2 + 5 = 7).

$$A = \begin{bmatrix} 2 & 5 & 0 \\ 8 & 3 & 0 \\ 3 & 6 & 0 \\ 1 & 7 & 0 \end{bmatrix} \qquad \rightarrow \qquad B = \begin{bmatrix} 2 & 5 & 7 \\ 8 & 3 & 11 \\ 3 & 6 & 9 \\ 1 & 7 & 8 \end{bmatrix}$$
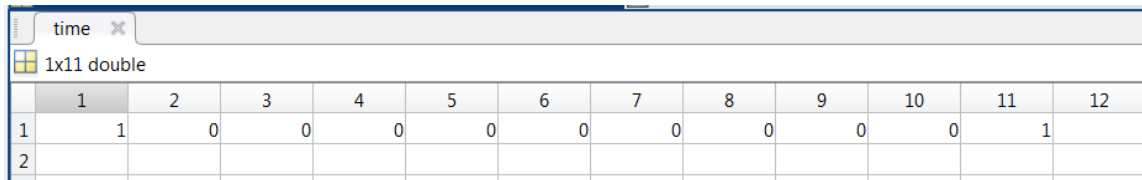
```
for x = 1:4

    for y = 1:3

        if(y ~= _____)

            B(_____) = _____

        else

            B(_____) = _____

        end
    end
end
```

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Problem 8: (4 Points) The code below is supposed to make a vector named `time` that runs from 0 to 1 in increments of 0.1. It runs without errors, but doesn't produce the correct `time` vector.

```
index = 1;


for time = 0:0.1:1
    time(index) = time;
    index = index + 1;
end
```
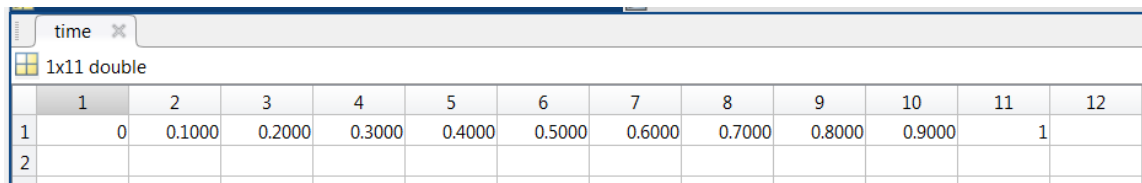
The code produces the incorrect `time` vector below:

time ✕
1x11 double

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	0	0	0	0	0	0	0	0	0	1	
2												

Mark the appropriate change(s) in the code scrap so that the `time` vector looks like this:

time ✕
1x11 double

	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0.1000	0.2000	0.3000	0.4000	0.5000	0.6000	0.7000	0.8000	0.9000	1	
2												

Problem 9: (4 Points) What is the value of a after the following code runs?

```
a = -1;
b = -2;
for i = 0:-2:-4
    a = a + b + 1;
    b = b * i - 1;
end
```

a.   1
b.   0
c.   -1
d.   -2
e.   Error – the program won't run.
f.   Other (explain): _____

Problem 10: (4 Points) The code below is supposed to print the first column of matrix H to the command window. Instead, it prints the incorrect output shown below. Fix the code so that it does what it is supposed to do.

```
H = [-1.451 4.295 4.729; 4.010 -9.251 8.620];
fprintf('The first column of matrix H is:\n')
for i = 1:2
    fprintf('%7.4f \n', H);
end
```

Here is the current, incorrect output to command window:

```
The first column of matrix H is:
-1.4510
 4.0100
 4.2950
-9.2510
 4.7290
 8.6200
-1.4510
 4.0100
 4.2950
-9.2510
 4.7290
 8.6200
-1.4510
 4.0100
 4.2950
-9.2510
 4.7290
 8.6200
```