

**Georgia Institute of Technology
College of Computing
CS 1371 Computing for Engineers
Test 1 Practice Test - Fall Semester 2006**

Use this practice test and the book questions for chapters 3-8 for practice.

Problem 1 – Short Answer

A) The two lines below are entered at the command prompt:

```
x = [ 9 3 0 6 3]
y = mod((sqrt(length((x+5).*[1 2 3 4 5]))*5)),3)
```

What is the value of y?

- a) 0
- b) 3
- c) 2
- d) 5

B) Consider the following vector in Matlab:

```
vec = [1 0 0 0 0];
```

Which of the following will produce an error?

- a) `vec(6) = 1;`
- b) `vec(4) = [];`
- c) `vec(0) = 1;`
- d) `vec([4 5]) = 1;`
- e) `vec = [[6 [5] vec]];`

C) If we define a vector **A** and we say:

$$\mathbf{B}(\langle \text{range1} \rangle) = \mathbf{A}(\langle \text{range2} \rangle)$$

where **B** did not exist beforehand.

What is true about **range1** and **range2**?

- A) They must be the same or you get an error
- B) **range2** must be greater than **range1** or you get an error
- C) **range1** must be greater than **range2** or you get an error
- D) They do not have to be same and **B** will be filled with zeros where assignments were not explicitly made.

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D) Which of the following commands will remove the negative values from the vector **A**:

A = [9 -4 2 3 -6 -1],
so that the resulting vector is [9 2 3]

I) **A(2)=[]**
A(5)=[]
A(6)=[]

II) **A([2 5 6]) = 0**

III) **A(6)=[]**
A(5)=[]
A(2)=[]

IV) **A(A<0)=[]**

- a) I only
- b) III and IV
- c) I and IV
- d) all of the above

E) Given the vector below, write a script that will remove all the numbers that are divisible by 4. In addition, reverse the order of the vector.

vec = [1 4 19 23 16 17 31 24 8 36]

The output should be:

vec = [1 19 23 17 31]

%% Your script here...

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F) Create a vector that starts at 4 and end at 286 and will have 1000 elements. Store your answer in **vec**.

- Find all the elements that are divisible by 3 with no remainder and store your answer in a variable **ind**.
- Remove every third element from **vec**.
- Find the sum of **vec** and store it in **sumVec**.
- Find the mean of **vec** and store it in **meanVec**.

Problem 2 - Iteration

Write a function called **stat** that takes in a vector of positive and negative numbers and returns four statistics about the data:

- Average of all positive numbers
- Maximum positive value
- Minimum positive value
- Standard Deviation of all positive numbers (formula given below)

You must use iteration to get any credit

```
stDev = sqrt((sum(data.^2)/length(data)) - mean)
```

Problem 3 – Functions

Write a function called 'crazyArray' that take in an array and two integers (a, m, n) respectively. This function returns an array containing the m'th, 2m'th, 3m'th, etc elements from the original array each raised to the power n.

Examples `crazyArray([2 3 5 6 7 8 3 5 6 7], 2, 3)`

[(3³) (6³) (8³) (5³) (7³)]

[27 216 512 125 343]

`crazyArray([2 3 5 6 7 8 3 5 6 7], 3, 2)`

[(5²) (8²) (6²)]

[25 64 36]

Problem 4 – Cell Arrays

Write a function called *sumCells* that consumes a Cell Array containing vectors of varying lengths and a number, N. It returns the sum of all the vectors in the cell array of length N.

Example: `sumCells({ [3 5 2], [2 5], [1 2], [], 42 } , 2)`
returns `sum([2 5]) + sum([1 2]) = 10`

Problem 5 – Multiple Choice

1. Rewrite the following command using linspace:

```
a = 1 : (1/100) : 2;
```

2. What are the values of variables 'ind' and 'x' after executing the following code:

```
x = 1:5  
for ind = x  
    x = 1  
end
```

- a) $x = 1:5$, $ind = 1:5$
- b) $x = 1:5$, $ind = 5$
- c) $x = 1$, $ind = 5$
- d) $x = 1$, $ind = 1:5$

3. Which of the following commands can be used to remove negative values from vector

```
A = [ 9 -4 2 3 -6 -1],  
so that the resulting vector is [9 2 3]
```

- I) $A(2)=[]$
 $A(5)=[]$
 $A(6)=[]$
- II) $A([2 5 6]) = 0$
- III) $A(6)=[]$
 $A(5)=[]$
 $A(2)=[]$
- IV) $A(A<0)=[]$

- a) II only
- b) all of the above
- c) III and IV
- d) I and IV

4. If B is any vector, then $\sim(\sim B) == B$ is always

- a) an Error
- b) True
- c) False
- d) Cannot be determined.

Problem 6 – Scripts

Given that the following code was run in MATLAB

```
clear
clc
A = [1 3 4 5 5 3];
B = [4 2 3 5 9 3];
C = (A>=B);
D = (B<=A);
E = A(C);
F = B(D);
if E(2) > F(3)
    disp('you got the answer right')
elseif B(2) < F(4)
    disp('you got it right again')
else
    disp('I dont know')
end
```

What is the value of the following at the end of the script?

C:

E:

F:

What does the script display in the MATLAB command line?

Problem 7 – Cell Arrays

Write a script that will remove from a cell array, **A**, all the cells containing data of length 1. Append every cell removed from **A** to the end of a second cell array, **B**. Hint: strings respond to the `length(...)` function with the number of characters in the string.

For example, given the following cell array

```
A = { 1:10, 2:20, 'c', 1, 2, [ 6, 7 ], 'cs1371' }  
B = { 'original data' }
```

The final arrays should look like this:

```
A = { 1:10, 2:20, [6, 7], 'cs1371' }  
B = { 'original data', 'c', 1, 2 }
```