

EE 3054: Signals, Systems, and Transforms

MATLAB Quiz 1 — Fall 2012

No laptop, no notes, no documentation.

Some MATLAB commands on this quiz may produce errors. For those cases, answer 'error'.

1. Given the following array **a**,

```
a =  
    1     4     7     0  
    2     5     8     1  
    3     6     9     2
```

determine the result of each of the following commands.

```
>> a(2)  
>> a(2, 2)  
>> a(2, 0)  
>> a(2, end)  
>> a(2, end-1)  
>> a(2, :)  
>> a(2, [2 1])  
>> a(2, [2 2])  
>> a([1 2], [3 2])  
>> min(a')  
>> min(a(:))  
>> b = sort(a); b(end-1)
```

2. Given the following vector **a**,

```
a =  
    5     4     8     7     6
```

determine the result of each of the following commands.

```
>> a(3)  
>> a(1, 3)  
>> a(1:4:end)  
>> a .* a  
>> a * a  
>> (-1).^a  
>> [a; a]  
>> [M, k] = min(a)  
>> a > 5  
>> find(a > 5)
```

3. Sketch each graph produced by the following code fragment. Indicate the horizontal and vertical coordinates in your sketch.

```
>> n = [0 6 1 5 4];  
>> x = [5 4 3 2 1];  
>> plot(x)  
>> plot(n,x)  
>> plot(n,x,'.')  
>> plot(n,x,'.-')  
>> plot(conv(x, [1 1]))
```

4. Write a MATLAB function called `MySystem.m` that has two inputs and one output. The function should simulate the system

$$y(n) = \begin{cases} 0, & \text{if } |x(n)| \leq A \\ x(n) - A, & \text{if } x(n) > A \\ x(n) + A, & \text{if } x(n) < -A \end{cases}$$

The inputs to your function should be `x` and `A`. The output of your function should be `y`. For example:

```
>> x = -3:3;
>> MySystem(x, 1.5)
ans =
    -1.5    -0.5     0     0     0     0.5     1.5
```

Your program should not use any `for` or `while` loops and it should not use any `if` statements. Your program need not do any error checking. For full credit, write the correct syntax for a MATLAB function (the full contents of the `.m` file).

5. Write MATLAB code to generate two figure like the ones below. For full credit, your code should use no loops or `if` statements.

