EE 3054: Signals, Systems, and Transforms

MATLAB Quiz 1 — Spring 2013

No laptop, no notes, no documentation.

Some MATLAB commands on this quiz may produce errors. For those cases, please state that.

1. Given the following array `a`,

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

determine the result of each of the following commands.

```
>> a(1, 3)
>> a(0, 0)
>> a(2, :)
>> a(1)
>> a(end)
>> a(2, 1:2:end)
>> a([2 1], 1:3)
>> a([2 3 ], [1 4])
>> a(end:-1:1, end:-1:1)
>> sum(a)
>> max(a(:))
>> b = a; b(2,:) = []; b
```

2. Given the following vector `a`,

```
a =
     1     2     3    -1
```

determine the result of each of the following commands.

```
>> length(a)
>> size(a)
>> a(1,2)
>> a(2,1)
>> a'
>> a * a
>> a * a'
>> a .* a
>> a.^2
>> [a; a]
>> [a; a']
>> abs(a)
>> [M, k] = min(a)
>> a > 1
>> find(a > 1)
>> a(a > 1)
```

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

```
>> n = [0 1 2 4 8];
>> x = [2 3 1 4 0];
>> plot(x)
>> plot(x, 'o')
>> plot(n, x)
>> plot(n, x, 'o')
>> plot(n, x, n, -x)
```

4. Write a MATLAB function called `myfun.m` that has two inputs, `x` (vector) and `a` (scalar), and one output, `y` (vector). The output `y` should be the same size as `x` and defined as

$$y(n) = \begin{cases} 1, & x(n) > a \\ 0, & x(n) = a \\ -1, & x(n) < a \end{cases}$$

For example:

```
>> >> myfun([0.2 0.9 0.6 -0.1 1.2], 0.6)

ans =

    -1     1     0    -1     1
```

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).