EE 3054: Signals, Systems, and Transforms
MATLAB Quiz 1 — Spring 2012

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 \( a \),

\[
\begin{array}{cccc}
7 & 0 & 5 & 8 \\
1 & 9 & 4 & 6 \\
2 & 3 & 7 & 3 \\
\end{array}
\]
determine the result of each of the following commands.

\[
\begin{align*}
&\text{>> a(0, 0)} \\
&\text{>> a(1, 3)} \\
&\text{>> a(:, 2)} \\
&\text{>> a(5)} \\
&\text{>> a(2, end)} \\
&\text{>> a([2 1], 1:3)} \\
&\text{>> a(end, [1 4])} \\
&\text{>> a(3:-1:1, 1:2:4)} \\
&\text{>> a(3, end:-1:1)} \\
&\text{>> min(a)} \\
&\text{>> max(a(:))} \\
&\text{>> b = a; b(2,:) = []; b}
\end{align*}
\]

2. Given the following vector \( a \),

\[
a = \begin{bmatrix} 5 & 8 & 3 & 2 & 6 \end{bmatrix}
\]
determine the result of each of the following commands.

\[
\begin{align*}
&\text{>> a(1,3)} \\
&\text{>> a(3,1)} \\
&\text{>> a'} \\
&\text{>> a * a} \\
&\text{>> a .* a} \\
&\text{>> a.^2} \\
&\text{>> [a; a]} \\
&\text{>> [M, k] = min(a)} \\
&\text{>> a > 5} \\
&\text{>> find(a > 5)} \\
&\text{>> a(find(a > 5))}
\end{align*}
\]

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

\[
\begin{align*}
&\text{>> n = [-2 0 2 4 6 8];} \\
&\text{>> x = [5 2 3 2 4 1];} \\
&\text{>> plot(x,'x')} \\
&\text{>> plot(x)} \\
&\text{>> plot(n,x,'o')} \\
&\text{>> plot(n,x)} \\
&\text{>> plot(n,x,n,x,'o')} \\
\end{align*}
\]
4. Write a MATLAB function called `mymin.m` that has two inputs, `x` (vector) and `a` (scalar), and one output, `b` (scalar). The output `b` should be the minimum of the elements of `x` that are greater than `a`.

For example:

```
>> mymin([1.2 4.3 0.5 8.3], 0.9)
```

```
ans =

1.2
```

because 1.2 is the minimum element of `[1.2 4.3 0.5 8.3]` that is greater than 0.9.

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 a figure like the one below of the discrete-time signal

\[ x(n) = 0.8 (0.9)^n \sin(0.2\pi n) u(n) \]

including axis labels, and title.