

ME 352

Quiz 1

16 October 2008

Your Name: \_\_\_\_\_

This exam booklet contains

1. This cover sheet.
2. A sheet with information on MATLAB built-in functions.
3. Four short answer questions.
4. Two questions requiring an understanding of MATLAB m-file functions.

*Do not open the exam booklet until you are instructed to do so.*

You will have 40 minutes to complete the quiz.

## Universal Cheat Sheet

```
>> help disp
```

DISP Display array.

DISP(X) displays the array, without printing the array name. In all other ways it's the same as leaving the semicolon off an expression except that empty arrays don't display.

If X is a string, the text is displayed.

```
>> help linspace
```

Linspace Linearly spaced vector.

Linspace(X1, X2) generates a row vector of 100 linearly equally spaced points between X1 and X2.

Linspace(X1, X2, N) generates N points between X1 and X2. For N < 2, Linspace returns X2.

See also LOGSPACE, :.

```
>> help max
```

MAX Largest component.

For vectors, MAX(X) is the largest element in X. For matrices, MAX(X) is a row vector containing the maximum element from each column. For N-D arrays, MAX(X) operates along the first non-singleton dimension.

See also MIN, MEDIAN, MEAN, SORT.

```
>> help min
```

MIN Smallest component.

For vectors, MIN(X) is the smallest element in X. For matrices, MIN(X) is a row vector containing the minimum element from each column. For N-D arrays, MIN(X) operates along the first non-singleton dimension.

See also MAX, MEDIAN, MEAN, SORT.

For questions 1 through 3, the following MATLAB statements (or sequence of MATLAB statements) indicate the result of the last statement. If the last statement is an assignment, write out the contents of the variable that is assigned. If the statements cause an error, provide a *meaningful error message* instead of writing a (any) numerical value(s).

**Example:**

```
>> x = 5;
>> y = 3;
>> z = x/y
```

Your answer:

```
z = 1.6667
```

Each one of problems one through three is worth five points.

1. `>> x = 0:1:1`
  
2. `>> x = [0 2 4 6 8 10];`  
`>> y = x/max(x)`
  
3. `>> x = linspace(10,50,5);`  
`>> y = ( min(x) < pi )`

4. [10 points] The MATLAB function `fun` is defined

```
function y = fun(a,b)
x = a^2 + b;
y = b - a;
```

What is result of executing the `disp` command when the following statements are entered in the command window?

- (a) `>> z = fun(1,2);`  
`>> disp(x)`
- (b) `>> z = fun(1,2);`  
`>> x = 2*z;`  
`>> disp(x)`

5. [15 points] The `myMax` function listed below correctly returns the value of the maximum element in a vector.

```
function xmax = myMax(x)

xmax = x(1);
for i=2:length(x)
    if x(i)>xmax
        xmax = x(i);
    end
end
```

For example,

```
>> x = -8:3;
>> myMax(x)
ans =
     3
```

Using `myMax` as a starting point, write a `myMinMax` function that computes and returns *both* `xmin` and `xmax`, where the value of the smallest (minimum) element is returned in `xmin`. For example, your `myMinMax` function should behave like this:

```
>> x = -8:3;
>> [a,b] = myMinMax(x)
a =
   -8
b =
     3
```

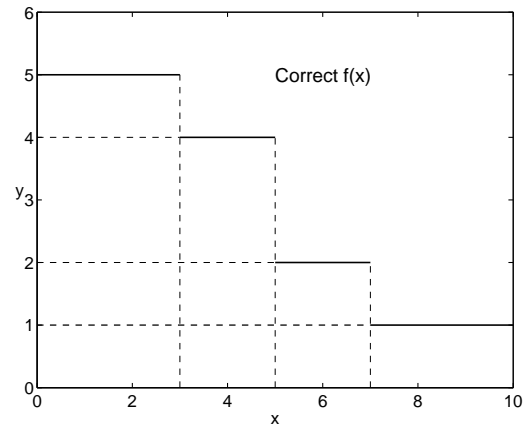
*Do not* use the built-in `min` or `max` functions.

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6. [15 points] The `stepFun` function contains errors. It is supposed to evaluate the discontinuous function depicted in the plot to the right.

```
function y = stepFun(x)
% stepFun Evaluate a discontinuous f(x)

if x<3
    y = 5;
elseif x>3
    y = 4;
elseif x>5
    y = 2;
elseif x>7
    y = 1;
end
```



The following MATLAB session shows the result of running `stepFun` for four different inputs.

```
>> stepFun(2)
ans =
    5
>> stepFun(4)
ans =
    4
>> stepFun(6)
ans =
    4
>> stepFun(8)
ans =
    4
```

Identify, and fix the error(s) in the `stepFun` function. You can indicate your changes directly in the listing of `stepFun`, or you can create a separate (handwritten) version of the function.

Although there are many ways to correct the function, solutions that are excessively complex or convoluted may not get full points even if they are correct. In other words, keep it simple.