

## EE322 Lab 02: Programming in MATLAB

### Introduction

In this lab, you will become more familiar with writing your own functions that will prove useful at different points in the course. Section 3.6 in *Introduction to MATLAB* goes over requirements for user-defined functions.

Good functions have comments so that someone who wishes to use the function can easily see how it is used. For example, if your function is called *computethings*, if a user types `>> help computethings` then instructions should appear in the command window that specify the function's inputs/outputs and how to use it.

Also, a good function makes sure that the person using it is using it correctly; if not, it displays some error message.

### I. A Function Library

1. Write a MATLAB function called *isodd* that will determine if an input integer is odd or not. You would use it as in:

```
>> y=isodd(x)
```

where  $x$  is the input value, and  $y$  is equal to 1 if  $x$  is odd, and 0 otherwise. If  $x$  is not an integer, this function should return  $y = []$  (which is the NULL value) and display an error message.

Important considerations:

How do you tell if a number is an integer or not? Hint: one way is to use the *round* function.

How do you tell if an integer is odd or not? Hint: one way is to use the *mod* function.

2. Write a MATLAB function called *iseven* that will determine if an input integer is even or not. You would use it as in:

```
>> y=iseven(x)
```

where  $x$  is the input value, and  $y$  is equal to 1 if  $x$  is even, and 0 otherwise. If  $x$  is not an integer, this function should return  $y = []$  (which is the NULL value) and display an error message. USE YOUR *isodd* FUNCTION INSIDE *iseven.m*.

3. Write a MATLAB function called *stats* that will display the overall statistics of an input array. The statistics that should display are: mean, standard deviation, minimum value, maximum value, range of values (max – min), and array size. The function doesn't have to return any values, just display the statistics. Whatever the type of data coming in, the function should first convert it to type *double*. You would use it as in:

```
>> stats(x)
```

where  $x$  is the input value. Use the *sprintf* function to display the results as in:

```
>> stats(x)
```

```
Size: 1 rows by 10000 cols
Min. value = -4.322578
Max. value = 7.534297
Range of values = 11.856875
Mean value = 2.004388
Standard deviation = 1.506422
```

## II. Test Your Function Library

- Using your both your even/odd functions, make sure your functions work by recording your answers to these problems:

Input value	<i>isodd</i> output:	<i>iseven</i> output:
4		
-5		
1.3		
pi		

- Import into MATLAB the weather data contained in the Excel spread sheet located at the course website under the “Lab Files” link. This is easily done using the `xlsread` function (type `>> help xlsread` to learn how to use it). This is a matrix containing rainfall each day in Asheville, NC. There are 12 rows (1 per month), and 31 columns (one for each day of the month). Since some months don’t have 31 days, the value -99999 is filled in in those cases.

Run your *stats* function on the `Weather_Data` array and record your results below:

Size:	
Min. value	
Max. value	
Range of values	
Mean value	
Standard deviation	

Recall that this is rainfall for each day of the year for one year in Asheville, NC. Create a vector of all of the values in `Weather_Data` that are NOT equal to -99999 (i.e., all of the valid measurements of rainfall data from the spreadsheet). Note: the *find* command may be useful to you here. Run your *stats* function on this vector and record your results below:

Size:	
Min. value	
Max. value	
Range of values	
Mean value	
Standard deviation	

Determine the average rainfall for the month of September: \_\_\_\_\_ Note: You should NOT have a negative average rainfall.

Determine the average rainfall for the 2<sup>nd</sup> day of each month of the year (i.e., Jan 2, Feb 2, etc): \_\_\_\_\_

**For this lab's write-up: Turn a hard copy of your functions' code and fill out the tables above with your answers.**