

## Lab 3 for Math 398 Section 952: Scripts and Functions

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This document constitutes your third lab assignment, which will be largely worked in the lab session. It will draw on material from Lecture 4, so it would be a good idea to go to my Home Page (<http://www.math.unl.edu/~tshores/>) and thence to my Teaching Page, thence to the Math398 Section 952 Home Page. Really, it would be a good idea to bookmark the class home page.

Reminder: Here is how to do these lab assignments. You will need to open a Matlab session and have this pdf file open for reading as well. To keep a recording of your work, you issue the following command to Matlab

```
> diary 'myfile'
```

Matlab will then send a copy of all your typed input and the output to a file called 'myfile.' For clarity, use descriptive names for your files, such as 'jsmithasgn1' so that when I save the files that you will email me, I can tell what it's about by the title. If at any point you want to stop the diary feature, issue the command

```
> diary off
```

To resume the diary feature, simply type

```
> diary on
```

This will cause input to be appended to myfile. You can make comments in your homework file by typing % at the command line and this too will be recorded. For example

```
> % This is a comment.
```

Be sure to start your file with the comments

```
> % Name: yourname
```

```
> % Email: your email addresss
```

When you end your session, the file will be closed and you can view it and even edit it with a text editor. As a matter of fact, you can even edit and view it with the Matlab Editor. Just type

```
> edit myfile
```

For problems where you are asked to write a small script or function file, you should use the Matlab editor to do so, and once you are satisfied that it works correctly, save this copy for emailing to me as another attachment. Be sure to put your name in the script or function file by way of a comment line:

```
> % programmer: J. Smith, for exercise x of assignment xx.
```

When you have finished the assignment, email the files to me as attachments. My email address is [tshores@math.unl.edu](mailto:tshores@math.unl.edu). Here is the assignment. As usual, turn the diary command on to record your session. Unless otherwise indicated, it is not necessary to save the graphics you create for the assignment. Here is the assignment.

## Problems

1. Finish carrying out the commands in Matlab Lecture 4 from the Built-in and Inline subsections and all of the Scripts section.
2. Write a script file `scrpt1.m` that will read the length of a known vector  $x$  and display each coordinate, followed by the statement “This entry is positive.” or “This entry is negative.” or “This entry is zero.” as is appropriate. Test it, then save it and also save it as “`fcn1.m`” and convert it to a function file. Test this as well. Make sure that your function file can give appropriate “usage” and “description” when asked for help.
3. Write a minimal function file entitled “`nfact.m`” that computes  $n!$  by recursion and has the syntax “`retval = nfact(n)`”, given input of a positive integer  $n$ . You’ll need an “if” statement such that if the value of  $n$  is 1, then the routine ends, otherwise it computes  $n * nfact(n - 1)$ . Now try your function with  $n = 1, 3, 5, 5/2$ . What happens? Create a subfunction that bullet-proofs your code so that it takes care of exceptions with a return error message to the user. You should have the subfunction return a boolean “1” if it is ok to proceed and “0” otherwise. The first thing `nfact` should do is invoke the test and if the result is negative, exit with a warning.
4. Write a script file `scrpt1.m` that will ask the user for input, starting with the length of a vector, then one by one, the entries of the vector, then display “The entries of this vector are: ” followed by the each entry in the format “`i v(i)`”.