**ECE 1111: Engineering Computation I**

**Laboratory No. 3: Basic Command Line Programming and File Manipulations**

**Goal:** Demonstrate that you understand basic file input/output (I/O), how to process command line arguments, and can read and write text to a file.

**Deliverables:**

1. *Source Code:* Do all your work in this directory:

/data/courses/ece\_1111/current/labs/lab\_03/<lastname\_firstname>

You must comment your code, following the guidelines and templates provided in class. Create directories *p01*, *p02*, and *p03* for the corresponding parts below. Your program filename should be *p01/mycat*.

1. *Check Off:* You will arrange a meeting with your TA during the lab session. The TA will ask you to make a small modification to your print statement, compile and run your program, and manipulate the output file using command line tools.

**Description:**

1. (p01) Simple File I/O

Create a Python program that does the following:

mycat <filename1>

This program should read the contents of filename1 and print those contents to stdout with any extra linefeeds. It should function similar to the Unix command “cat”. Your program should not be a script but a well-formed program with a main function as demonstrated in class. It should read the command line arguments and process the data accordingly.

1. (p02) Redirecting Standard Output (stdout)

Demonstrate that you understand how to redirect your output to a file:

mycat filename1 > filename2

As we discussed in class, the “>” sign instructs the program to direct output to the corresponding file. The “~” character denotes your home directory. Re-run this command and send the output to your home directory:

mycat filename1 > ~/p02\_2.txt

mycat filename1 > $HOME/p02\_3.txt

You now have 3 versions of the same file in the directory tree that starts with your home directory. Let’s demonstrate how we can use find to locate and manipulate these files.

Run find to locate these files:

cd

find . -name "\*.txt"

The first command returns you to your home directory. The second command searches all the files in the directory tree that starts with your home directory. How many files are returned?

1. (p03) Copying Data

Enhance your mycat program so that it copies files:

mycopy filename1 filename2

This should copy the contents of filename1 to filename2. Use the Unix diff command:

diff filename1 filename2

to demonstrate the new file is identical to the original file.

1. (p04) Matrix Addition

Create a program that reads two matrices from files, and prints the sum of the two matrices in a user-friendly way:

mymatrixadd filename1 filename2

This should add the matrices stored in filename1 and filename2, and display the result.

For example, let’s assume filename1 contains:

1 0 0

0 1 0

0 0 1

And filename2 contains:

0 0 1

1 0 1

1 0 0

The output of your program should be:

1 0 1

1 1 1

1 0 1

**Summary:**

This assignment introduces you to some basic programming concepts such as command line processing, file I/O, and program structure. We will build on these concepts to write programs that process real-world data.