CS2110 Computer Programming Lab

Lab 0: Getting Started...

Release Date: August 4, 2014
Due Date: August 8, 2014 11:55 PM

1 Unix Tutorial

In this lab session, we will first try and get used to working in the Unix environment. You are required to go through the first two links given below during the lab session. The last subtask here is a slightly lengthier tutorial and can be done at leisure (which means, before the next lab session).

1. We will first go through the basics from here: http://www.cse.iitm.ac.in/~cs2110/intro_to_linux.html
2. A list of frequently used Unix Commands can be found here: http://www.cse.iitm.ac.in/~cs2110/commands.html. By the end of this week try to use the terminal to do most of the things. If you don't know how to do something using the terminal - GIYF
3. A Unix tutorial for beginners can be found here: http://www.cse.iitm.ac.in/~cs2110/unix_tutorial/

2 Thinking Programmatically

The zeroth problem here doesn't require you to write code. You are required to discuss the solution to the fun problem with your mentor by the end of the lab session. The rest of the problems given below need to be written in **C** only. Please follow the submission guidelines given at the end of this section before you make your submission on Moodle.

0. **Fun Problem:** Suppose there are 300 pills out of which one is poisonous. The poisonous pill has a different weight compared to the other pills. Given a weighing balance how would you find the poisonous pill?
1. Write a program that computes the GCD of any two numbers. Your program should take as input two space separated numbers and should output the GCD followed by a newline character.
2. Please write a program to check if a string has all unique characters. Assume only alphabet (lowercase) in the string. The input to the program is a string and the output is 1 if the string has all unique characters, zero otherwise. *Hint: See if you can do it efficiently by using less space (memory)*
3. Write a program such that if an element in an $M \times N$ matrix is 0, its entire row and column are set to 0. Can you do it using as little space (memory) as possible?

   Input:
   M N
   a_{11} a_{12} .... a_{1N}
   .
   .
   .
   a_{M1} a_{M2} .... a_{MN}

Output:

b_{11} b_{12} .... b_{1N}
.
.
.
b_{M1} b_{M2} .... b_{MN}

4. Write a program to check if a string is a permutation of other. Your program should take as input two strings and output 1 if it is, 0 otherwise. The output should be followed by a newline character.
5. Assume a method `isSubstring` is given, which checks if one word is a substring of another. Given two strings, s_1 and s_2, write a function `isRotation` to check if s_2 is a rotation of s_1. Please use the inbuilt string function `strstr` to check if a string is a substring of another.
6. Write a program to find the minimum number of characters to be appended to a word to make it a palindrome.
7. Write a program to print the reverse of a string entered by the user using recursion.
8. Given a roman numeral string in upper-case (upto 80), print the integer form of the numbers.

Submission Guidelines

The submitted code should be properly indented and commented. Make a separate file for each of the problems above. You should have 8 .c files. For problem number X, the associated file should be named `rollNo_pX.c` (all in lower case only), where rollNo should be replaced by your roll number and X should be replaced by the problem number. All the files should be put inside a folder named `rollNo_lab0`. Compress this folder and submit a tar ball that is named `rollNo.tar.gz`

Please make sure you have removed all the temporary files and executables before you make your submission on Moodle.

The directory hierarchy should look like the following. Assuming your roll number is CS10B037:

```
cs10b037.tar.gz [Compressed tar ball]
.     cs10b037_lab0 [Tar ball should contain this folder/directory]
.          cs10b037_p1.c [The folder should contain these files.]
.          cs10b037_p2.c
.          cs10b037_p3.c
.          cs10b037_p4.c
.          cs10b037_p5.c
.          cs10b037_p6.c
.          cs10b037_p7.c
.          cs10b037_p8.c
```