Faculty of Engineering and Applied Science

SOFE 3200U Systems Programming

Background

A system call is a request for service that a program makes of the kernel. The term "system call" is for the operating system native functions, such as pipe, fork etc. The service is generally something that only the kernel has the privilege to do such as I/O.

There is a standard ANSI(American National Standard Institute) libraries for C (or C++), such as <assert.h>, <cytpe.h>, <error.h> <float.h>, <limits.h>,<math.h>, <signal.h>, <stdlib.h>, <string.h>,<time.h>, <locale.h> etc.

Objectives

The objectives of this experiment are to understand how to read a file, modify the contents, and then write to another file in C programming language. The concept of being able to read from a plain text file and the ability to manipulate the contents utilizing standard C libraries should be understood.

Lab Tasks

Task 0

Keep in mind that you will need to create a Makefile for the subsequent programs you are going to write.

Task 1

Write a C program to do the following.

1. Open and read the "Input.txt" file into C. You can choose the method in which to read the file.
2. Change every instance of "a" to "b". For example, in the phrase "Systems Programming", the output should be "Systems Progrbmming".
3. After having changed all instances of "a" to "b", write to file "Heaven.txt" the changes.
4. Comment your code and make sure the code handles error conditions.

Task 2

Write a C program to do the following.

1. Open and read the "Input.txt" file into C. You can choose the method in which to read the file.
2. Replace the target phrases in the table below with the corresponding output.

Target	Output
Inferno	Paradisio
In dark woods	using Windows 8.1
those woods	Windows 8.1
to enter	to use 8.1
crest	screen
Below a hill	Before a monitor

shoulders	GUI
planet	UNIX
dante	Shakespeare

3. After having replaced all target phrases, write to file "Dante.txt" the changes.
4. Comment your code and make sure the code handles error conditions.

Task 3

Write a C program to perform Task 2 (but read "AliceInWonderland.txt" instead of "Input.txt") using the parent-child "pipe" inter-process communication and show the processing time differences compared with the Task 2 implementation.

Deliverable

Submit the code and the report. This lab consists of 10 points. The marking details are:

1. 70% for the report and code

The report should contain following things:
·   A title page that includes the title of the lab, date and group members
·   Objectives of the Lab
·   Verification, steps, and guideline of the code implementation
·   Individual roles, responsibilities, and contributions
·   Submission of code

2. 30% for answering the questions

In every lab, one random person from each group will be asked random questions from the previous lab and the person changes in every week. Based on that students answer the whole group's marks will be given.