CSE 5031 Operating Systems
2019/20 Fall Term

Project: Bonus #1

Topic: Low-level I/O API & ISAM

Date: 24.10 - 01.11.2019

Objectives:

- to experiment with varying length records using **low-level I/O API**
- to implement file update using **ISAM**

References:

- **The GNU C Library Reference Manual** (http://www.gnu.org/software/libc/manual/pdf/libc.pdf)
- **Linux System Programming 2d ed., Robert Love, O'Reilly 2013** (course web site, or http://pdf-ebooks-for-free.blogspot.com.tr/2015/01/oreilly-linux-system-programming.html)

Section I. Project Definition

I.1 Project Deliverables

In the bonus project I you are expected to:

- a) create "**passwd.srt**" file, the underlined sorted copy of the **"/etc/passwd"** file, using the "**prj1-part2.c**" program provided in "**Project 1 – part 2**";
- b) write a **C** program to create the **Index File** for the "**passwd.srt**" file;
- c) write a **C** program to update the comment field of the "**passwd.srt**" file records, using **ISAM**.

I.2 Creating the Index File

Develop the **C** program that creates the **Index File** for the "**passwd.srt**" taking into account that this file is already sorted in ascending order of **account field** of the records.

You are welcome to adopt the index creation programs you have used in previous projects.

I.3 Implementing the Update Program

The program updating the comment field of the "**passwd.srt**" file records has the same implementation requirements as the one you have developed in "**Project 2 – part 2**":

- ✓ load the index file in a **dynamically allocated** table;
- ✓ read from **standard input** an account name, until an **end of file** is entered;
- ✓ retrieve the account record corresponding to the key from the **"passwd.srt"** file;
- ✓ display the record, and the size of the comment field;
- ✓ if the size of the comment field == 0 proceed with the next query; otherwise,
  - o read from **stdin** the update text for the **comment** field;
  - o if update text length is **exactly** the **same** as the size of the comment field; update the record in **"passwd.srt"**;
  - o read and display the updated record.

This project requires that **read** and **write** operations from/to the "**passwd.srt**" file should be implemented with:

- ✓ **pread**, and
- ✓ **pwrite**

low-level I/O primitives that are documented in:

- ➢ **The GNU C Library Reference Manual** section "3.2 Input and Output Primitives", and
- ➢ **Linux System Programming 2d ed**, "Chapter 2 File I/O – Positional Reads Writes" section.

Section II. Project Report

Test the indexed update program with several accounts; copy the test sequence from terminal window and store them in the **test.txt** file.

If your **program** is **operational,** add a comment line consisting of your name and student-id**;** and store the **source code** and the **test.txt** files in the "**PrjBonus-1**" folder, located at the course web site under the tab **CSE5031-X/Assignment**; where "**X**" stands for (A,B,C,D) your laboratory session group you are registered.

Warning

You are encouraged to discuss the implementation procedures and general concepts behind the projects with your fellow students. However, **plagiarism is strictly forbidden**! Submitted report should be the result of **your personal work**!

Be advised that you are **accountable** of your submission not only for this project, but also for the mid-term, and final examinations. Your project grade may be reevaluated retrospectively, had you fail to answer correctly the same or a similar examination questions that you have solved with success in your submissions.