

## Assignment 1

### File System Storage and Manipulation

**Purpose of this assignment is to understand the complexity of file system storage and the manipulation of data using various search queries.**

**Requirements:** This assignment requires the knowledge of File I/O and Structure concepts of C programming.

The assignment should be implemented using C/C++ language. The details of the assignment are as follows:

1. Create a file students (.txt or .dat) to store information of students of a university. The file should store student ID, NAME, and BRANCH. The following constraints should be satisfied to store the information in student table
  - Each student should have a unique student ID.
  - Insertion of a student with existing student ID should not be allowed.

Perform the following operation on the created student records. (NOTE: Create a menu driven program for better understanding)

- i. Insert 10 students in the student database.
  - ii. Modify the NAME or BRANCH (CSE, EE, and ECE) of the student. Note that the modification of Student ID should not be allowed.
  - iii. Delete the student using the Student ID.
  - iv. Search the list of students using BRANCH.
  - v. Search the student by their NAME.
2. Create a file marks (.txt or .dat) to store marks (assuming same subjects for all branch students) of registered students of a university. The file should store student ID, marks of DBMS, DS, C, TOTAL, and PERCENTAGE. The following constraints should be satisfied to store the information in student table
  - Marks of only the registered students are allowed to store in the table.
  - The maximum marks of each subject cannot exceed 100.

Perform the following query operation using the student and marks information.  
(NOTE: Create a menu driven program for better understanding)

- i. Insert marks of all the registered students.
- ii. Updating marks of one subject should also update TOTAL and PERCENTAGE marks.
- iii. Deletion of a student record from the student file should also delete his marks records from the marks file as the student is no longer a registered student.
- iv. Show the marks list (Marks of all subjects, TOTAL, and PERCENTAGE) of a student using his student ID.
- v. Search the students with PERCENTAGE above a threshold.
- vi. Search the students of a particular BRANCH with PERCENTAGE above a threshold.

Reference Material:-

1. <https://www.geeksforgeeks.org/readwrite-structure-file-c/>
2. <https://www.tutorialspoint.com/read-write-structure-to-a-file-using-c>
3. <http://findnerd.com/list/view/Read-and-Write-the-Structure-in-File-using-C--File-Handling-/3784/>
4. <https://www.dreamincode.net/forums/topic/189646-readwrite-structures-to-dat-file/>