Shiv Nadar Institution of Eminence, Delhi, NCR

Project sheet for CSD101 (Introduction to computing and Programming)

Semester of Implementation: Monsoon, 2024

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Instructions:

1. It is compulsory to participate in the project.
2. You can participate as a team (a maximum of two students is allowed per team)
3. **Project titles are** Student Management System, Library Management System, Health Management System, Hospital Management System, Flight reservation system**, Others (You can also choose by own but discuss with me for feasibility of the proposed title)**
4. We have floated a Google form to fill the details of group & project title.
5. We will ensure **plagiarism check** and if caught all the team members will be penalized.
6. Project will be based on the usage of structure data type, array, loops, pointers, functions, recursion, etc.
7. Each team will have to submit a **report of 1-to-2-page** with your observations along with your code.
8. If you have any query in the project, then meet us on Monday lab (1pm to 3pm) and Monday office hours (3pm to 4pm). Same timings on Wednesday (1 to 3 in Lab) and 3 to 4pm in my office C219L.
9. Once you complete the project, submit it via Blackboard.
10. Submission **deadline for the project is Sunday midnight; (24th Nov 2024, 11:59pm)**

Problem 1: Student Management System

Student Management maintained by the university is the way they can find data about every single student such as their *Name, roll No. address, Phone number, ICP_marks,* etc. Write a basic C application we can manage the data of the university.

Your task is to write a C application that:

1. **Add Student Details** (make a structure with Student Name, roll No., Address, Phone Number & ICP_marks)

2. **Find the student by the given roll number or Find the ICP marks of a particular student**
3. **Count the number of Students**
4. **Delete a student (**No need to shift the entire entry; apply some trick here to improve the code)
5. **Update the entry of a student**

Problem 2: Library Management System

The library is the place where we find a collection of books organized in a particular order. In the library, we can collect book read them, and then return it. But, Managing a particular library is not an easy task. So, we can create a C language-based application using if-else statements, arrays, strings, switch cases, structure, etc. Using this application we can easily manage the books in the library, we can get information about books, etc.

Your task is to write a C application that:

1. Add the new book information to the library. (Consider 5 types of ICP books, Physics, Mechanical books needs to be added)

2. To display book information. Such as name of the book, Author of the book & publisher of the book (Use Structure)

3. To list all books of a given author.

4. To list the count of books in the library

5. Remove some books from library if it gets damaged or issued by some student

Problem 3: Health Management System

A health management system that focuses on BMI (Body Mass Index), BFP (Body Fat Percentage), BMR (Basal Metabolic Rate), and RMR (Resting Metabolic Rate) calculation. Below is an outline of the project,

- The program will take a user's height, weight, age, and gender as input.
- It will calculate the BMI, BFP, BMR, and RMR using the below provided formulas,

=> BMI = weight [in kg]/ (height*height) [in m]
Normal Range: 18.5 - 25

=> BFP

For Male: BFP = 1.20 × BMI + (0.23 × age in years) - 16.2
For Female: BFP = 1.20 × BMI + (0.23 × age in years) - 5.4
Normal Range: 21-24% (for Women) and 14-17% (for Men)

=> BMR (Harris-Benedict Equation Based Formula)

For Male: BMR = 88.362 + (13.397 x weight in kg) + (4.799 x height in cm) - (5.677 x age in years).
For Female: BMR = 447.593 + (9.247 x weight in kg) + (3.098 x height in cm) - (4.330 x age in years).
Normal Range: 1000 - 2000

=> RMR (Harris-Benedict Equation Based Formula)

For Male: 88.362 + (13.397 × weight in kg) + (4.799 × height in cm) - (5.677 × age in years)
For Female: 447.593 + (9.247 × weight in kg) + (3.098 × height in cm) - (4.330 × age in years)
Normal Range: 1,000-to-1,200 for female and 1,200-to-1,600 for male.

- Based on these health metrics the program will categorize the user's health status into Red (only one metric is normal), Orange (two metrics are normal), Yellow (three metrics are normal), and Green (all metrics are normal) categories respectively.
- Based on the category, provide some personalized health-related suggestions to the users.

Your task is to write a C program that,

1. Use a structure to hold user data (name, weight, height, gender, BMI, BFP, BMR, and RMR).
2. Store multiple users' data in an array.
3. Utilize functions to manage data and calculations.
4. Use function pointers to call the calculation functions dynamically.

5. Data Validation: Enhance user input validation to ensure user inputs are within realistic limits (age > 0, height > 0, weight > 0, etc.).
6. File I/O: Implement file storage to save users' data for persistent storage.
7. *Optional*: Graphical User Interface (GUI): Use libraries such as GTK or create a web-based interface for better usability.
8. *Optional*: Advanced Metrics: Include additional health metrics and health suggestions based on user inputs.

Problem 4: Hospital Management System

A **Hospital Management System (HMS)** is a comprehensive software solution designed to manage and streamline the various functions and operations of a hospital. This system helps automate administrative tasks, manage patient information, schedule appointments, available beds, prices, etc.

Your task is to write a C application that:

1. **Patient Management**: Registration and record maintenance for new patients. View existing patient details, and update information. (use structure & strings to store the various information of the patient such as name, phone number, diseases, etc)
2. **Doctor Information**: List of doctors, their specialties, and availability. (consider 6 specialties)
3. **Available beds and prices**
4. Store and show the review of the doctor & hospital

Problem 5: Flight Reservation System

A **Flight Reservation System (HMS)** is a real-time problem of a person relatable getting the tension to book the flight tickets at the cheapest price to book tickets for their journey.

Your task is to write a C application that:

1. **Store the Flight Details:** such as Flight name, from where to where its flying, no. of seats etc.
2. **Book the flight ticket:**
3. **Cancel the flight ticket**
4. **Update the passenger information on Booking (**such as name, age, phone number, etc)
5. **View the passengers that are travelling in the flight**