Name: MUHAMMAD HARIS

Reg No: 2023

غلام اسحٰق خان انسٹیٹیوٹ آف انجینئرنگ سائنس و ٹیکنالوجی

Ghulam ishaq khan institute of engineering sciences and technology

Faculty of Computer Science & Engineering (FCSE)

Mid Term Exam Spring-2024

Course Code: CS-112L

Course Title: Object Oriented Programming language

Program: BS

Vetted Faculty Name: Dr. Muhammad Hasif

Vetted Faculty Signature:

Vetted Faculty Designation Assist. Prof

Name of Course Instructor: Dr. Zahid Halim

Signature of Course Instructor:

Date: 15-03-2024

Course Instructor Designation: HOD (CS & AI)

Instructor: Lab Engineer Hifza Umer

Maximum time allowed: 1.5 hours

Total Marks: 30

Instructions:

- Mobile phones, any storage device and internet are not allowed in the exam hall.
- No questions will be entertained during the exam.
- If caught cheating by any means, an F grade will be awarded.
- Any disturbance during exam submission will not be acceptable.

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Question No 01: **[10]Problem**

Statement: Food Item Calorie Calculator

1. The program should define a class named **FoodItem** that have attributes for name, calories, grams of fat, grams of carbohydrates, and grams of protein.
2. The class should provide different constructors to create FoodItem objects with different levels of detail (name only, name and calories, or all details).
3. Implement getter and setter methods for each attribute to control access and validate input (e.g., calories cannot be negative).
4. Include a **friend function** named calculateCalories that calculates the total calories based on the provided protein and carb content using the formula: calories = (4 * carbs) + (4 * proteins).
5. In main function that interacts with the user to:
    a. Get user input for food item name, protein content, and carbohydrate content.
    b. Display the detailed information of the food item including name, protein content, and carbohydrate content and calculated calories.
    c. The program should continue prompting for input until the user enters "exit" to quit.

Bonus:

- Implement error handling for invalid user input (e.g., nonnumeric input for protein or carbs).
- Allow the user to set fat content as well and modify the calorie calculation formula to include fat (1 gram of fat = 9 calories).

Sample Run: You can add more statements for display on console

(13.7)

F 12.3

(4x15.6) + (4x

62.4 137.2

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PS C:\Users\HP\Desktop\Lab07> cd "c:\Users\HP\Desktop\Lab07\" ; if ($?) { g++ nutrition.cpp -o nutr
ion } ; if ($?) { .\nutrition }
Enter name of food item (or type 'exit' to quit): apple
Enter proteins (in grams): 22
Enter carbs (in grams): 22
Detailed Item:
  NAME: apple
Calories: 176
 Proteins: 22
Carbs: 22
Enter name of food item (or type 'exit' to quit): banna
Enter proteins (in grams): 33
Enter carbs (in grams): 44
Detailed Item:
  NAME: banna
Calories: 308
 Proteins: 33
Carbs: 44
Enter name of food item (or type 'exit' to quit): exit
PS C:\Users\HP\Desktop\Lab07>
```

Ln 89, Col 20 Spaces: 4 UTF-8 CRLF {} C++ Win32 3:05 PM

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Question No 02:

Scenario: Facebook Friend Requests

1. Designing the User Class:

- The User class will have properties like name, ID, and a dynamic array named "friends_list" to store friends/connections.
- Additionally, the User class will have methods to add friends and display the friend list.

2. Adding Friends:

When a user accepts a friend request:

- Memory is allocated for a new User object representing the friend.
- The friend object is added to the current user's "friends_list" array.

3. Displaying Friend List:

- Users can view their friend list on their profile page.
- The system iterates through the "friends_list" array and displays details of each friend, such as name and ID.

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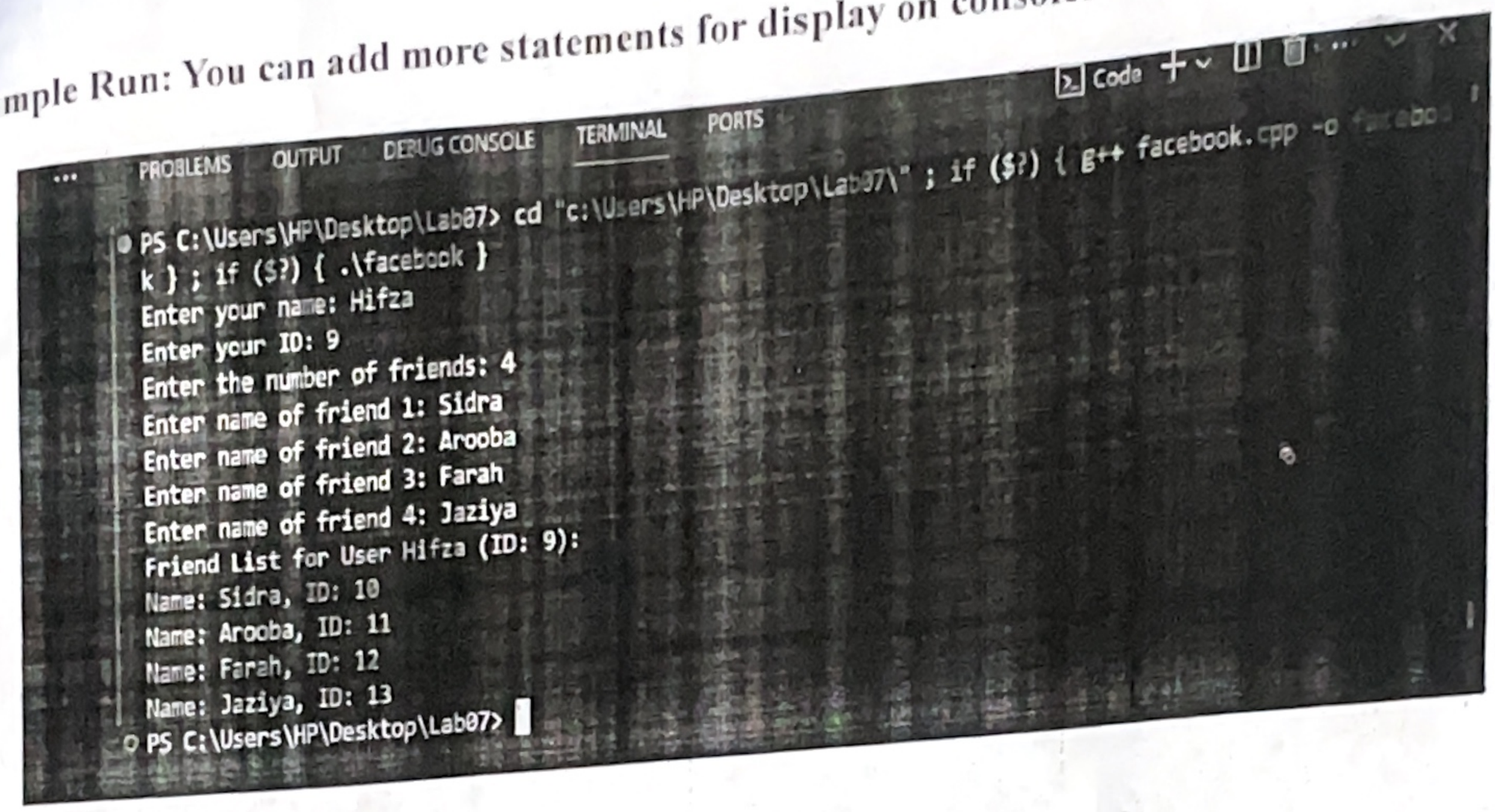
Sample Run: You can add more statements for display on console.



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Question No 03:

Scenario 1: Library Management System

1. Design Book Class: Create a class named Book with the following properties:

- (Title: Title of the book, author: Author of the book, genre: Genre of the book, availability status: Indicates whether the book is available or not.)
- Implement appropriate getter and setter methods for each property to ensure encapsulation.

2. Implement Library Class:

- Create a class named Library to manage the collection of books.
- Define a dynamic array of Book pointers to store the books.(Composition)
- Include an integer variable to keep track of the current number of books in the library.
- Implement a constructor to initialize the array and the count of books.
- Implement a destructor to deallocate memory when the library object is destroyed.

3. Add Book Functionality:

- Implement a member function in the Library class to add a book to the library's collection.
- This function should take input parameters for the title, author, genre, and availability status of the book. Allocate memory for a new Book object and add it to the array of books.

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- Prompt the user to enter a genre and Print details of the available books that match the specified genre.

Sample Run: You can add more statements for display on console.