Class and Object Practice

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Section: B

Program: BCSE

1) You work for a car rental company and need to create a C++ class called "Car" to manage their fleet. The Car class should have attributes for make, model, year, and mileage. Implement member functions to:

1. **Get the car's information as a formatted string.**
2. **Update the car's mileage.**
3. **Check if the car is a luxury car.**

Create an instance of the Car class with make="Toyota", model="Camry", year=2021, and mileage=10000. Call the information function and print the result. Then, update the mileage by 500 and call the information function again. Finally, check if the car is a luxury car and print the result.

Your implementation should demonstrate the use of classes, member functions, and object instantiation in C++.

```
//*******************************
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//*******************************

#include <iostream>
#include <string>
using namespace std;

class car
{
private:
   string make;
   string model;
   int year;
   int mileage;

public:
   void cars(string mk, string mdl, int yr, int mil)
   {
      make = mk;
      model = mdl;
```

```
    year = yr;
    mileage = mil;
  }
  void getInfo()
  {
    cout << "Make:" << make << " - Model: " << model << " - Year: " << year << " - Mileage: " << mileage <<
endl;
  }

  void updateMillage(int addMileage)
  {
    mileage += addMileage;
  }
  int isLuxury()
  {
    if (mileage >= 1500)
    {
      return 1;
    }
    else
    {
      return 0;
    }
  }
};
int main()
{
  string make, model;
  int year, mileage, upMileage;

  cin >> make;
  cin >> model;
  cin >> year;
  cin >> mileage;
```

```
    cout << "Enter your Update mileage" << endl;
    cin >> upMileage;
    car myCar;
    myCar.cars(make, model, year, mileage);
    myCar.getInfo();

    myCar.updateMillage(upMileage);
    cout << endl
         << "Update mileage\n"
         << endl;
    myCar.getInfo();

    if (myCar.isLuxury())
    {
        cout << "This is a luxury car." << endl;
    }
    else
    {
        cout << "This is not a luxury car." << endl;
    }
    return 0;
}
```

2) You are building a banking application and need to create a class called "Account" in C++. The Account class should have attributes for account number, account holder name, and balance. Implement member functions to:

1. **Deposit funds into the account.**
2. **Withdraw funds from the account.**
3. **Get the current balance of the account.**

Create an instance of the Account class with account number="123456", account holder name="John Doe", and initial balance=1000. Perform a deposit of 500, followed by a withdrawal of 200. Finally, retrieve the current balance and print the result.

```
//******************************
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//******************************

#include <iostream>
#include <string>
using namespace std;

class Account
{
private:
   string accountNumber;
   string accountHolderName;
   double balance;

public:
   void inputAccount()
   {

      cin >> accountNumber;
      cin.ignore();
      getline(cin, accountHolderName);
      cin >> balance;
   }

   double deposit(double amount)
   {
      if (amount > 0)
      {
         balance += amount;
      }
      else
      {
         cout << "Invalid deposit amount." << endl;
```

```
        }
        return balance;
    }

    double withdraw(double amount)
    {
        if (amount > 0 && amount <= balance)
        {
            balance -= amount;
        }
        else
        {
            cout << "Invalid or insufficient funds for withdrawal." << endl;
        }
        return balance;
    }

    void displayAccount()
    {
        cout << "\nAccount Number: " << accountNumber << endl;
        cout << "Account Holder: " << accountHolderName << endl;
        cout << "Current Balance: " << balance << "/-" << endl;
    }
};

int main()
{
    Account myAccount;

    myAccount.inputAccount();

    double depositAmount, withdrawAmount;
    char ch;
    cin >> ch;
    if (ch == 'D' || ch == 'd')
```

```
    {
        cout << "Enter amount to deposit: ";
        cin >> depositAmount;
        myAccount.deposit(depositAmount);
    }
    else if (ch == 'W' || ch == 'w')
    {
        cout << "Enter amount to withdraw: ";

        cin >> withdrawAmount;
        myAccount.withdraw(withdrawAmount);
    }
    else
    {
        cout << "your valid character is w or d" << endl;
    }
    myAccount.displayAccount();

    return 0;
}
```

3) You are designing a game and need to create a class called "Player" in C++. The Player class should have attributes for player name, level, and score. Implement member functions to:

1. **Increase the player's score by a given amount.**
2. **Level up the player.**

Create an instance of the Player class with name="Alice", level=1, and score=100. Increase the score by 50 and level up the player. Print the updated player details.

```
//*******************************
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//*******************************

#include <iostream>
#include <string>
```

```
using namespace std;

class Player
{
private:
    string name;
    int level;
    int score;

public:
    void inputPlayer()
    {
        getline(cin, name);
        cin >> level;
        cin >> score;
    }

    void increaseScore(int points)
    {
        if (points > 0)
        {
            score += points;
        }
        else
        {
            cout << "Score must be a positive number." << endl;
        }
    }

    void levelUp()
    {
        level++;
    }

    void displayPlayer()
```

```
    {
        cout << "\nPlayer Name: " << name << endl;
        cout << "Level: " << level << endl;
        cout << "Score: " << score << endl;
    }
};

int main()
{
    Player p;

    p.inputPlayer();

    int scoreToAdd;
    cin >> scoreToAdd;
    p.increaseScore(scoreToAdd);

    p.levelUp();

    cout << "\nUpdated Player Details:" << endl;

    p.displayPlayer();

    return 0;
}
```

4) You are developing a restaurant ordering system and need to create a class called "MenuItem" in C++. The MenuItem class should have attributes for item name, price, and description.

Implement a member function to:

1. **Display the details of the menu item.**

Create an instance of the MenuItem class with name="Cheeseburger", price=10.99, and description="Juicy beef patty with melted cheese." Call the display function to print the menu item details.

```
//******************************
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//******************************

#include <iostream>
#include <string>
using namespace std;

class MenuItem
{
private:
   string name;
   double price;
   string description;

public:
   void inputItem()
   {
      getline(cin, name);
      cin >> price;
      cin.ignore();
      getline(cin, description);
   }

   void displayItem()
   {
      cout << "\nMenu Item Details:" << endl;
      cout << "Item: " << name << endl;
      cout << "Price: " << price << "/-" << endl;
      cout << "Description: " << description << endl;
   }
};

int main()
```

```
{
    MenuItem item;

    item.inputItem();

    item.displayItem();

    return 0;
}
```

5) You are building a social media platform and need to create a class called "Post" in C++. The Post class should have attributes for post ID, author name, and content. Implement member functions to:

1. **Edit the content of the post.**
2. **Display the post details.**

Create an instance of the Post class with ID=1, author name="Jane", and content="Hello, world!" Edit the post content to "Welcome to my profile!" and display the updated post details.

```
//*******************************
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//*******************************

#include <iostream>
#include <string>
using namespace std;

class Post
{
private:
    int postID;
    string authorName;
    string content;
```

```
public:
    void inputPost()
    {
        cin >> postID;
        cin >> authorName;
        cin >> content;
    }

    void editContent(string newContent)
    {
        content = newContent;
    }

    void displayPost()
    {
        cout << "\nPost ID: " << postID << endl;
        cout << "Author: " << authorName << endl;
        cout << "Content: " << content << endl;
    }
};

int main()
{
    Post myPost;

    myPost.inputPost();

    string updatedContent;
    cout << "\nEnter new content to update the post: ";
    cin >> updatedContent;
    myPost.editContent(updatedContent);

    cout << "\nUpdated Post Details:\n";
    myPost.displayPost();
```

```
    return 0;
}
```

6) You are working on a student management system and need to create a class called "Student" in C++. The Student class should have attributes for student ID, name, and grades. Implement member functions to:

1. Add a grade to the student's record.

2. Calculate the average grade for the student.

Create an instance of the Student class with ID="S001", name="John Smith", and grades=[85, 90, 78]. Add a grade of 95 to the student's record and calculate the average grade. Print the average grade.

```
//*******************************
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//*******************************

#include <iostream>
#include <string>
using namespace std;

class Student
{
private:
    string studentID;
    string name;
    int grades[100];
    int gradeCount;

public:
    void setStudent()
    {
        cin >> studentID;
        cin.ignore();
```

```
    getline(cin, name);
    cin >> gradeCount;
    for (int i = 0; i < gradeCount; i++)
    {
        cin >> grades[i];
    }
}

void addGrade(int grade)
{
    if (gradeCount < 100)
    {
        grades[gradeCount] = grade;
        gradeCount++;
    }
}

double calculateAverage()
{
    if (gradeCount == 0)
        return 0;

    int sum = 0;
    for (int i = 0; i < gradeCount; i++)
    {
        sum += grades[i];
    }
    return (sum * 1.0) / gradeCount;
}

void displayAverage()
{
    cout << "Average Grade for " << name << " (ID: " << studentID << "): ";
    cout << calculateAverage() << endl;
}
```

```
};

int main()
{
   Student s;

   s.setStudent();

   int extraCount;
   cin >> extraCount;
   for (int i = 0; i < extraCount; i++)
   {
      int newGrade;
      cin >> newGrade;

      s.addGrade(newGrade);
   }

   s.displayAverage();

   return 0;
}
```

7) You are developing a music player application and need to create a class called "Song" in C++. The Song class should have attributes for song title, artist name, and duration. Implement a member function to:

1. Display the details of the song.

Create an instance of the Song class with title="Bohemian Rhapsody", artist name="Queen", and duration="5:55". Call the display function to print the song details.

```
//*******************************
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//******** - 24103031 -  ********
//*******************************
```

```
#include <iostream>
#include <string>
using namespace std;

class Song
{
private:
    string title;
    string artist;
    string duration;

public:
    void inputSong()
    {
        getline(cin, title);
        getline(cin, artist);
        getline(cin, duration);
    }

    void displayDetails()
    {
        cout << "\n--- Song Details ---\n";
        cout << "Song Title: " << title << endl;
        cout << "Artist: " << artist << endl;
        cout << "Duration: " << duration << endl;
    }
};

int main()
{
    Song mySong;

    mySong.inputSong();
    mySong.displayDetails();
```

```
    return 0;
}
```

8) You are building an online shopping system and need to create a class called "Product" in C++. The Product class should have attributes for product ID, name, price, and quantity. Implement member functions to:

1. Update the quantity of the product.

2. Display the product details.

Create an instance of the Product class with ID="P001", name="Smartphone", price=499.99, and quantity=10. Update the quantity to 5 and display the product details.

```
//*******************************
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//******** - 24103031 -  ********
//*******************************

#include <iostream>
#include <string>
using namespace std;

class Product
{
private:
    string productID;
    string name;
    float price;
    int quantity;

public:
    void inputProduct()
    {
        getline(cin, productID);
        getline(cin, name);
```

```
        cin >> price;
        cin >> quantity;
    }
    void updateQuantity(int newQty)
    {
        quantity = newQty;
    }

    void displayDetails()
    {
        cout << "\n--- Product Details ---\n";
        cout << "Product ID: " << productID << endl;
        cout << "Name: " << name << endl;
        cout << "Price: $" << price << endl;
        cout << "Quantity: " << quantity << endl;
    }
};

int main()
{
    Product prod;

    prod.inputProduct();

    int newQty;
    cin >> newQty;

    prod.updateQuantity(newQty);

    prod.displayDetails();

    return 0;
}
```

9) You are developing a calendar application and need to create a class called "Event" in C++. The Event class should have attributes for event name, date, and location. Implement a member function to:

1. Display the details of the event.

Create an instance of the Event class with name="Birthday Party", date="2023-08-15", and location="Park Plaza". Call the display function to print the event details.

```
//*******************************
//***** - RIdoy karmakar - ******
//******** - 24103031 -  ********
//*******************************

#include <iostream>
#include <string>
using namespace std;

class Event
{
private:
   string name;
   string date;
   string location;

public:
   void inputEvent()
   {
      getline(cin, name);
      getline(cin, date);
      getline(cin, location);
   }

   void displayDetails()
   {
      cout << "\n--- Event Details ---\n";
      cout << "Name: " << name << endl;
```

```
        cout << "Date: " << date << endl;
        cout << "Location: " << location << endl;
    }
};

int main()
{
    Event myEvent;

    myEvent.inputEvent();
    myEvent.displayDetails();

    return 0;
}
```

10) You are working on a library management system and need to create a class called "Book" in C++. The Book class should have attributes for book ID, title, author, and availability status. Implement member functions to:

1. Check out the book.

2. Return the book.

3. Display the book details.

Create an instance of the Book class with ID="B001", title="To Kill a Mockingbird", author="Harper Lee", and availability status="available". Check out the book, return it, and display the updated book details.

```
//******************************
//***** - RIdoy karmakar - ******
//******** - 24103031 -  ********
//******************************

#include <iostream>
#include <string>
using namespace std;

class Book
```

```
{
private:
   string bookID;
   string title;
   string author;

public:
   void inputBook()
   {
      getline(cin, bookID);
      getline(cin, title);
      getline(cin, author);
   }
   void checkOut(char checkoutA)
   {
      if (checkoutA == 'Y' || checkoutA == 'y')
      {
         cout << "The book has been checked out.\n";
      }
      else
      {
         cout << "The book is already checked out.\n";
      }
   }
   void returnBook(char checkoutB)
   {
      if (checkoutB == 'Y' || checkoutB == 'y')
      {
         cout << "The book has been returned.\n";
      }
      else
      {
         cout << "The book is Not return.\n";
      }
   }
```

```
    void displayDetails()
    {
        cout << "\n--- Book Details ---\n";
        cout << "Book ID: " << bookID << endl;
        cout << "Title: " << title << endl;
        cout << "Author: " << author << endl;
    }
};

int main()
{
    Book myBook;

    myBook.inputBook();
    char checkoutA;
    cin >> checkoutA;
    myBook.checkOut(checkoutA);
    char checkoutB;
    cin >> checkoutB;
    myBook.returnBook(checkoutB);
    myBook.displayDetails();

    return 0;
}
```