

#Question-no(1):

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

class GradeBook {
public:
    explicit GradeBook(string courseName, string instructorName)
        : courseName(courseName), instructorName(instructorName) {}

    void setCourseName(string name) {
        courseName = name;
    }

    string getCourseName() const {
        return courseName;
    }

    void setInstructorName(string name) {
        instructorName = name;
    }

    string getInstructorName() const {
        return instructorName;
    }

    void displayMessage() const {
        cout << "Welcome to the grade book for\n" << getCourseName() << "!"
            << endl;
        cout << "This course is presented by: " << getInstructorName() << endl;
    }

private:
    string courseName;
    string instructorName;
}; // end class GradeBook

int main() {
    GradeBook myGradeBook("CS101 Introduction to C++ Programming", "Professor Smith");
    myGradeBook.displayMessage();

    // Demonstrating changing the instructor's name
    myGradeBook.setInstructorName("Professor Johnson");
    cout << "\nChanging course instructor.\n";
    myGradeBook.displayMessage();
    return 0;
}
```

}

The screenshot shows a Replit IDE window with the URL `replit.com/@RonishStha/Assignment`. The editor displays a C++ file named `main.cpp` with the following code:

```
1 #include <iostream>
2 #include <string>
3 using namespace std;
4
5 class GradeBook {
6 public:
7     explicit GradeBook(string courseName, string instructorName)
8         : courseName(courseName), instructorName(instructorName) {}
9
10    void setCourseName(string name) {
11        courseName = name;
12    }
13
14    string getCourseName() const {
15        return courseName;
16    }
17
18    void setInstructorName(string name) {
19        instructorName = name;
20    }
21
22    string getInstructorName() const {
23        return instructorName;
24    }
25
26    void displayMessage() const {
27        cout << "Welcome to the grade book for\n" << getCourseName() << "!"
28            << endl;
29        cout << "This course is presented by: " << getInstructorName() << endl;
30    }
31
32 private:
```

The console output shows the program's execution:

```
> Run Target Heart Rate Range: 99 - ... 3m on 22:18:27, 02/29
Run
4s on 22:28:16, 02/29

Welcome to the grade book for
CS101 Introduction to C++ Programming!
This course is presented by: Professor Smith

Changing course instructor.
Welcome to the grade book for
CS101 Introduction to C++ Programming!
This course is presented by: Professor Johnson
```

```
30 }
31
32 private:
33     string courseName;
34     string instructorName;
35 }; // end class GradeBook
36
37 int main() {
38     GradeBook myGradeBook("CS101 Introduction to C++ Programming", "Professor
Smith");
39     myGradeBook.displayMessage();
40
41     // Demonstrating changing the instructor's name
42     myGradeBook.setInstructorName("Professor Johnson");
43     cout << "\nChanging course instructor.\n";
44     myGradeBook.displayMessage();
45     return 0;
46 }
47
```

Generate

#Question-no(2):

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

class Date {
private:
    int month;
    int day;
    int year;

public:
    // Constructor with parameter validation for month
    Date(int m, int d, int y) : day(d), year(y) {
        if(m >= 1 && m <= 12) {
            month = m;
        } else {
            month = 1; // Set month to 1 if out of range
        }
    }

    // Set functions
    void setMonth(int m) {
        month = (m >= 1 && m <= 12) ? m : 1; // Validate month
    }

    void setDay(int d) {
        day = d;
    }

    void setYear(int y) {
        year = y;
    }

    // Get functions
    int getMonth() const {
        return month;
    }

    int getDay() const {
        return day;
    }

    int getYear() const {
        return year;
    }
}
```

```

// displayDate function
void displayDate() const {
    cout << month << "/" << day << "/" << year << endl;
}

};

int main() {
    // Create a Date object
    Date today(13, 25, 2024); // This will set the month to 1 because 13 is out of range

    // Display the date
    cout << "Today's date is: ";
    today.displayDate();

    // Modify the date using set functions
    today.setMonth(12);
    today.setDay(24);
    today.setYear(2024);

    // Display the modified date
    cout << "Modified date is: ";
    today.displayDate();

    return 0;
}

```

The screenshot shows a Replit environment with a C++ file named `main.cpp`. The code defines a `Date` class with private members `month`, `day`, and `year`. The constructor `Date(int m, int d, int y)` includes validation for the month, setting it to 1 if it's out of range (1-12). The `setMonth` method also includes validation. The `displayDate` method prints the date in MM/DD/YYYY format. In `main`, a `Date` object is created with `(13, 25, 2024)`, which is corrected to `(1, 25, 2024)`. The date is displayed, then modified to `(12, 24, 2024)` using `setMonth`, `setDay`, and `setYear`, and displayed again.

```

1  #include <iostream>
2  using namespace std;
3
4  class Date {
5  private:
6      int month;
7      int day;
8      int year;
9
10 public:
11     // Constructor with parameter validation for month
12     Date(int m, int d, int y) : day(d), year(y) {
13         if(m >= 1 && m <= 12) {
14             month = m;
15         } else {
16             month = 1; // Set month to 1 if out of range
17         }
18     }
19
20     // Set functions
21     void setMonth(int m) {
22         month = (m >= 1 && m <= 12) ? m : 1; // Validate month
23     }
24
25     void setDay(int d) {
26         day = d;
27     }
28
29     void displayDate() const {
30         cout << month << "/" << day << "/" << year << endl;
31     }
32 };
33
34 int main() {
35     Date today(13, 25, 2024); // This will set the month to 1 because 13 is out of range
36
37     // Display the date
38     cout << "Today's date is: ";
39     today.displayDate();
40
41     // Modify the date using set functions
42     today.setMonth(12);
43     today.setDay(24);
44     today.setYear(2024);
45
46     // Display the modified date
47     cout << "Modified date is: ";
48     today.displayDate();
49
50     return 0;
51 }

```

The console output shows:

```

Today's date is: 1/25/2024
Modified date is: 12/24/2024

```

```
replit.com/@RonishStha/Assignment#main.cpp

assignment  Run

main.cpp  main
26      day = u;
27    }
28    void setYear(int y) {
29        year = y;
30    }
31    int getMonth() const {
32        return month;
33    }
34    int getDay() const {
35        return day;
36    }
37    int getYear() const {
38        return year;
39    }
40    void displayDate() const {
41        cout << month << "/" << day << "/" << year << endl;
42    }
43 };
44 int main() {
45     // Create a Date object
46     Date today(13, 25, 2024); // This will set the month to 1 because
13 is out of range
47     cout << "Today's date is: ";
48     today.displayDate();
49     today.setMonth(12);
50     today.setDay(24);
51     today.setYear(2024);
52     cout << "Modified date is: "; // Display the modified date
53     today.displayDate();
54
55     return 0;
56 }
```

Console

Today's date is: 1/25/2024
Modified date is: 12/24/2024

Ln 51, Col 25 • Spaces: 2 History

#Solution-3:

```
#include <iostream>
#include <string>
using namespace std;
class HeartRates {
private:
    string firstName;
    string lastName;
    int birthMonth;
    int birthDay;
    int birthYear;

public:
    // Constructor
    HeartRates(string firstName, string lastName, int month, int day, int year)
        : firstName(firstName), lastName(lastName), birthMonth(month), birthDay(day),
        birthYear(year) {}
```

```

// Set and Get functions
void setFirstName(string fName) {
    firstName = fName;
}

string getFirstName() const {
    return firstName;
}

void setLastName(string lName) {
    lastName = lName;
}

string getLastName() const {
    return lastName;
}

void setBirthMonth(int month) {
    birthMonth = month;
}

int getBirthMonth() const {
    return birthMonth;
}

void setBirthDay(int day) {
    birthDay = day;
}

int getBirthDay() const {
    return birthDay;
}

void setBirthYear(int year) {
    birthYear = year;
}

int getBirthYear() const {
    return birthYear;
}

// Calculate age
int getAge() const {
    int currentYear, currentMonth, currentDay;
    cout << "Enter the current year: ";
    cin >> currentYear;
    cout << "Enter the current month: ";

```

```

    cin >> currentMonth;
    cout << "Enter the current day: ";
    cin >> currentDay;

    int age = currentYear - birthYear;
    if (birthMonth > currentMonth || (birthMonth == currentMonth && birthDay >
currentDay)) {
        age--;
    }
    return age;
}

// Calculate maximum heart rate
int getMaximumHeartRate(int age) const {
    return 220 - age;
}

// Calculate target heart rate
void getTargetHeartRate(int& targetLow, int& targetHigh, int age) const {
    int maxHeartRate = getMaximumHeartRate(age);
    targetLow = static_cast<int>(maxHeartRate * 0.5);
    targetHigh = static_cast<int>(maxHeartRate * 0.85);
}
};

int main() {
    string firstName, lastName;
    int month, day, year;

    cout << "Enter your first name: ";
    cin >> firstName;
    cout << "Enter your last name: ";
    cin >> lastName;
    cout << "Enter your birth month (MM): ";
    cin >> month;
    cout << "Enter your birth day (DD): ";
    cin >> day;
    cout << "Enter your birth year (YYYY): ";
    cin >> year;

    HeartRates person(firstName, lastName, month, day, year);
    int age = person.getAge();
    int maxHeartRate = person.getMaximumHeartRate(age);
    int targetLow, targetHigh;
    person.getTargetHeartRate(targetLow, targetHigh, age);

    cout << "\nFirst Name: " << person.getFirstName() << "\nLast Name: " <<
person.getLastName()

```

```
replit.com/@RonishStha/Assignment

main ▾ 📄 ▶ Run

main.cpp x +
main.cpp > f main Format
1 #include <iostream>
2 #include <string>
3 using namespace std;
4 class HeartRates {
5 private:
6     string firstName;
7     string lastName;
8     int birthMonth;
9     int birthDay;
10    int birthYear;
11
12 public:
13     // Constructor
14     HeartRates(string firstName, string lastName, int month, int day,
15 int year)
16         : firstName(firstName), lastName(lastName),
17 birthMonth(month), birthDay(day), birthYear(year) {}
18
19     // Set and Get functions
20 void setFirstName(string fName) {
21     firstName = fName;
22 }
23
24 string getFirstName() const {
25     return firstName;
26 }
27
28 void setLastName(string lName) {
29     lastName = lName;
30 }
31
32 string getLastName() const {
```

Console

Run

Enter your first name: Ronish
Enter your last name: Shrestha
Enter your birth month (MM): 01
Enter your birth day (DD): 26
Enter your birth year (YYYY): 2002
Enter the current year: 2024
Enter the current month: 03
Enter the current day: 27

First Name: Ronish
Last Name: Shrestha
Date of Birth: 1/26/2002
Age: 22
Maximum Heart Rate: 198
Target Heart Rate Range: 99 - 168 bpm

```
replit.com/@RonishStha/Assignment
```

Run

```
#include <iostream>
#include <string>
using namespace std;
class HeartRates {
private:
    string firstName;
    string lastName;
    int birthMonth;
    int birthDay;
    int birthYear;
public:
    // Constructor
    HeartRates(string firstName, string lastName, int month, int day,
    int year)
        : firstName(firstName), lastName(lastName),
        birthMonth(month), birthDay(day), birthYear(year) {}

    // Set and Get functions
    void setFirstName(string fName) {
        firstName = fName;
    }

    string getFirstName() const {
        return firstName;
    }

    void setLastName(string lName) {
        lastName = lName;
    }

    string getLastName() const {
```

Console

```
Enter your first name: Ronish
Enter your last name: Shrestha
Enter your birth month (MM): 01
Enter your birth day (DD): 26
Enter your birth year (YYYY): 2002
Enter the current year: 2024
Enter the current month: 03
Enter the current day: 27

First Name: Ronish
Last Name: Shrestha
Date of Birth: 1/26/2002
Age: 22
Maximum Heart Rate: 198
Target Heart Rate Range: 99 - 168 bpm
```



```
replit.com/@RonishStha/Assignment#main.cpp

ment ▾  ▶ Run

C++ main.cpp x + ...
C++ main.cpp > Date > HeartRates > f getAge  Format

30 ▾ string getLastName() const {
31     return lastName;
32 }
33 ▾ void setBirthMonth(int month) {
34     birthMonth = month;
35 }
36 ▾ int getBirthMonth() const {
37     return birthMonth;
38 }
39 ▾ void setBirthDay(int day) {
40     birthDay = day;
41 }
42 ▾ int getBirthDay() const {
43     return birthDay;
44 }
45 ▾ void setBirthYear(int year) {
46     birthYear = year;
47 }
48 ▾ int getBirthYear() const {
49     return birthYear;
50 }
51 ▾ int getAge() const {
52     int currentYear, currentMonth, currentDay;
53     cout << "Enter the current year: ";
54     cin >> currentYear;
55     cout << "Enter the current month: ";
56     cin >> currentMonth;
57     cout << "Enter the current day: ";
58     cin >> currentDay;
59     int age = currentYear - birthYear;
60     if (birthMonth > currentMonth || (birthMonth == currentMonth
    && birthDay > currentDay)) {
```

```
replit.com/@RonishStha/Assignment#main.cpp

ment ▾  ▶ Run

C++ main.cpp x + ...
C++ main.cpp > Date > f main  Format

62 }
63     return age;
64 }
65 ▾ int getMaximumHeartRate(int age) const { // Calculate maximum heart rate
66     return 220 - age;
67 }
68 ▾ void getTargetHeartRate(int& targetLow, int& targetHigh, int age) const {
69     int maxHeartRate = getMaximumHeartRate(age);
70     targetLow = static_cast<int>(maxHeartRate * 0.5);
71     targetHigh = static_cast<int>(maxHeartRate * 0.85);
72 }
73 };
74 ▾ int main() {
75     string firstName, lastName;
76     int month, day, year;
77     cout << "Enter your first name: ";
78     cin >> firstName;
79     cout << "Enter your last name: ";
80     cin >> lastName;
81     cout << "Enter your birth month (MM): ";
82     cin >> month;
83     cout << "Enter your birth day (DD): ";
84     cin >> day;
85     cout << "Enter your birth year (YYYY): ";
86     cin >> year;
87     HeartRates person(firstName, lastName, month, day, year);
88     int age = person.getAge();
89     int maxHeartRate = person.getMaximumHeartRate(age);
90     int targetLow, targetHigh;
91     person.getTargetHeartRate(targetLow, targetHigh, age);
92     cout << "\nFirst Name: " << person.getFirstName() << "\nLast Name: " <<
    person.getLastName()
```

```
int age = person.getAge();
int maxHeartRate = person.getMaximumHeartRate(age);
int targetLow, targetHigh;
person.getTargetHeartRate(targetLow, targetHigh, age);
cout << "\nFirst Name: " << person.getFirstName() << "\nLast Name: " <<
person.getLastName()
    << "\nDate of Birth: " << person.getBirthMonth() << "/" <<
person.getBirthDay() << "/" << person.getBirthYear()
    << "\nAge: " << age << "\nMaximum Heart Rate: " << maxHeartRate
    << "\nTarget Heart Rate Range: " << targetLow << " - " << targetHigh
<< " bpm" << endl;
return 0;
}
```