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CS360

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HW#2

1.

Source code:

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

class GradeBook{
 public:
  explicit  GradeBook(  std::string,  std::string);    //  constructor  initialize
courseName
  void setCourseName( std::string );  // sets the course name
  void setInstructorName( std::string );  // sets the instructor name
  std::string getCourseName() const;  // gets the course name
  std::string getInstructorName() const;  // gets the course name
  void displayMessage() const;    // displays a welcome message

 private:
  std::string courseName; // course name for this GradeBook
  std::string instructorName; // name of the instructor
}; // end class GradeBook

GradeBook::GradeBook( std::string name, std::string instructor ):courseName( name
), instructorName(instructor){}

//get & set CourseName
void GradeBook::setCourseName( string name ){
  courseName = name;
}
string GradeBook::getCourseName() const{return courseName;}
```

```
//get & set instructorName
void GradeBook::setInstructorName( string name ){
  instructorName = name;
}
string GradeBook::getInstructorName() const{return instructorName;}

void GradeBook::displayMessage() const{
    cout << "Welcome to class " << getCourseName() << "!" << endl;
    cout << "This course is presented by " << getInstructorName() << "." << endl;
}

int main(){
    GradeBook gradeBook("CS123", "John");
    gradeBook.displayMessage();
    cout << endl;
    gradeBook.setCourseName("CS291"); //change the course name
    gradeBook.setInstructorName("Olivia"); //change the instructor name
    gradeBook.displayMessage();
    return 0;
}
```

Run program & result:

```
PS D:\VS CODE\C C++\CS360\HW#2> cd "d
Welcome to class CS123!
This course is presented by John.

Welcome to class CS291!
This course is presented by Olivia.
PS D:\VS CODE\C C++\CS360\HW#2>
```

2.

Source code:

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

class Date{
```

```
    private:
        int month;
        int day;
        int year;

    public:
        Date(int m, int d, int y): month(m), day(d), year(y){
            if(m < 1 || m > 12){
                cout << "Invalid month! Set the month to 1." << endl;
                month = 1;
            }
        }  // constructor

        // get & set month for each data member
        void setDate(int d){day = d;}
        void setMonth(int m){
            if (m < 1 || m > 12){
                cout << "Invalid month! Set the month to 1." << endl;
                month = 1;
            }
            else{
                month = m;
            }
        }
        void setYear(int y){year = y;}

        int getDate() const{return day;}
        int getMonth() const{return month;}
        int getYear() const{return year;}

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

int main(){
    Date date(1, 29, 2003);
    date.displayDate();
    date.setMonth(2);
    date.setDate(6);
    date.setYear(1999);
    date.displayDate();
    Date date2(15, 30, 2022);
```

```
    date2.displayDate();
    return 0;
}
```

Run program & result:

```
PS D:\VS CODE\C C++\CS360\HW#2> cd "d
The date is: 1/29/2003
The date is: 2/6/1999
Invalid month! Set the month to 1.
The date is: 1/30/2022
PS D:\VS CODE\C C++\CS360\HW#2>
```

3.

Source code:

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

class HeartRates{
    private:
        string firstName;
        string lastName;
        int birthMonth;
        int birthDay;
        int birthYear;
        int age;
        int currentMonth, currentDay, currentYear;
        int targetHeartRate_low, targetHeartRate_high;

    public:
        HeartRates(string f, string l, int m, int d, int y): firstName(f),
lastName(l), birthMonth(m), birthDay(d), birthYear(y){
            if(m < 1 || m > 12){
                cout << "Invalid month! Set the month to 1." << endl;
                birthMonth = 1;
            }
        }  // constructor

        // get & set for each data member
```

```
        void setFirstName(string f){firstName = f;}
        void setLastName(string l){lastName = l;}
        void setBirthMonth(int m){
            if (m < 1 || m > 12){
                cout << "Invalid month! Set the month to 1." << endl;
                birthMonth = 1;
            }
            else{
                birthMonth = m;
            }
        }
        void setBirthDay(int d){birthDay = d;}
        void setBirthYear(int y){birthYear = y;}

        string getFirstName() const{return firstName;}
        string getLastName() const{return lastName;}
        int getBirthMonth() const{return birthMonth;}
        int getBirthDay() const{return birthDay;}
        int getBirthYear() const{return birthYear;}

        // Prompt the user to enter the current month, day, and year.
        void getCurrentDate(){
            cout << "Enter the current month, day, and year: ";
            cin >> currentMonth >> currentDay >> currentYear;
        }

        // function getAge() that calculates and returns the person's age (in years)
        void getAge(){
            (*this).getCurrentDate();
            // Calculate the person's age and assign it to variable age.
            age = currentYear - birthYear;
            if (currentMonth < birthMonth){
                age--;
            }
            else if (currentMonth == birthMonth && currentDay < birthDay){
                age--;
            }
        }

        // function getMaximumHeartRate() that calculates and returns the maximum
heart rate (in beats per minute)
        int getMaximumHeartRate() const{
            int maxHeartRate = 220 - age;
            return maxHeartRate;
        }
```

```
        // function getTargetHeartRate() that calculates and returns the target
heart rate (in beats per minute)
        void getTargetHeartRate(){
            targetHeartRate_low = getMaximumHeartRate() * 0.5;
            targetHeartRate_high = getMaximumHeartRate() * 0.85;
        }

        // function display() that displays the person's name, age, maximum heart
rate, and target heart rate
        void display() const{
            cout << "Name: " << firstName << " " << lastName << endl;
            cout << "Age: " << age << endl;
            cout << "Maximum heart rate: " << getMaximumHeartRate() << endl;
            cout << "Target heart rate (range): " << targetHeartRate_low << " - "
<< targetHeartRate_high << endl;
        }
};

int main(){
    HeartRates person1("John", "Doe", 17, 29, 2003);
    person1.getAge();
    person1.getTargetHeartRate();
    cout << "Person1 information: " << endl;
    person1.display();
    cout << endl;
    HeartRates person2("Michael", "Davidson", 4, 16, 1973);
    person2.getAge();
    person2.getTargetHeartRate();
    person2.display();
    cout << endl;
    person2.setBirthMonth(12);
    person2.setBirthDay(24);
    person2.setBirthYear(1970);
    person2.getAge();
    person2.getTargetHeartRate();
    person2.display();

    return 0;
}
```

Run program & result:

```
                                > cd "d:\VS CODE\C C+
Invalid month! Set the month to 1.
Enter the current month, day, and year: 6 19 2022
Person1 information:
Name: John Doe
Age: 19
Maximum heart rate: 201
Target heart rate (range): 100 - 170

Enter the current month, day, and year: 6 19 2022
Name: Michael Davidson
Age: 49
Maximum heart rate: 171
Target heart rate (range): 85 - 145

Enter the current month, day, and year: 6 19 2022
Name: Michael Davidson
Age: 51
Maximum heart rate: 169
Target heart rate (range): 84 - 143
PS D:\VS CODE\C C++\CS360\HW#2>
```