1. Modify class *GradeBook* as follows:
   a. Include a second-string data member that represents the course instructor's name.
   b. Provide a *set* function to change the instructor's name and a *get* function to retrieve it.
   c. Modify the constructor to specify course name and instructor name parameters.
   d. Modify function *displayMessage* to output the welcome message and course name, then the *string "This course is presented by: "* followed by the instructor's name.

   Use your modified class in main function that demonstrates the class's new capabilities.

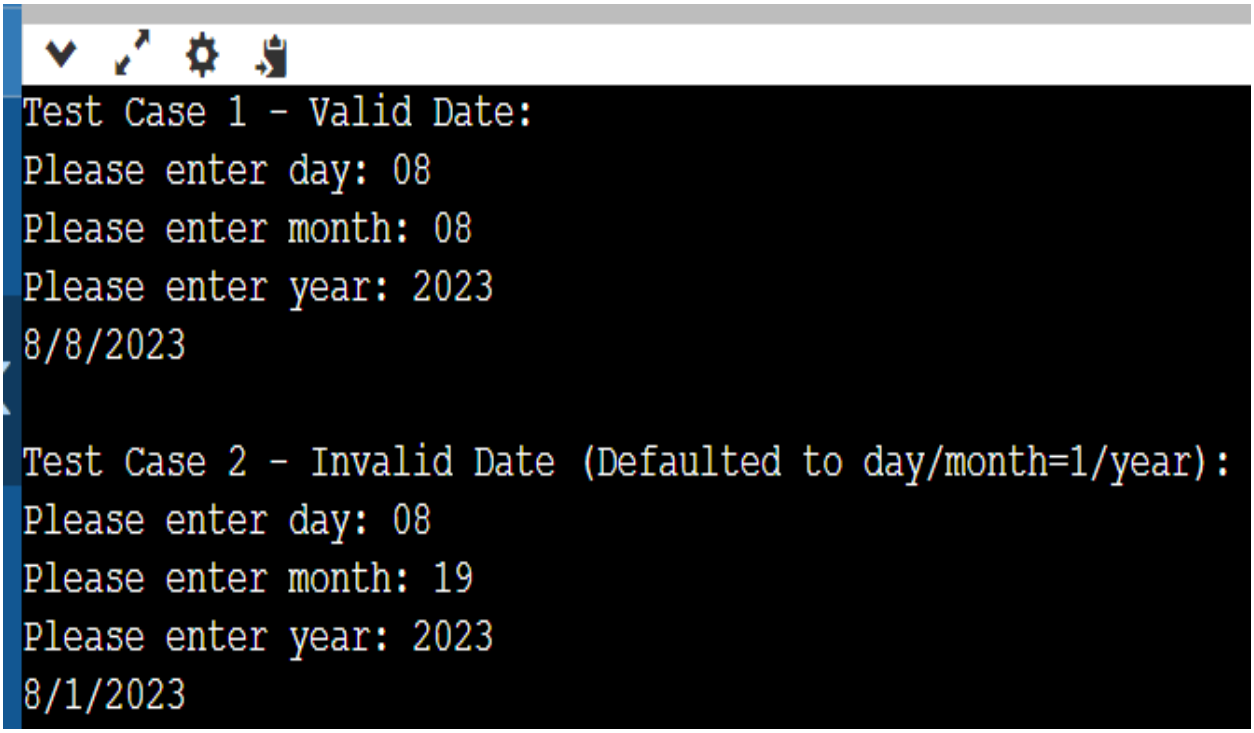
```
#include <string>


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

 private:
  std::string courseName; // course name for this GradeBook
}; // end class GradeBook


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

Output is:

```
Welcome to the grade book for
C and C++ Programming!
This course is presented by: Professor Alex Yang
Welcome to the grade book for
Java Programming!
This course is presented by: Professor Henry Chang
```

2. Create a class called *Date* that includes three pieces of information as data members--a month (type *int*), a day (type *int*) and a year (type *int*). Your class should have a constructor with three parameters that uses the parameters to initialize the three data members. Assume that the values provided for the year and day are correct but ensure that the month value is in the range *1-12*; if it isn't, set the month to *1*. Provide a *set* and a *get* function for each data member. Provide a member function *displayDate* that displays the month, day and year separated by forward slashes (/). Write a test program that demonstrates class *Date's* capabilities.

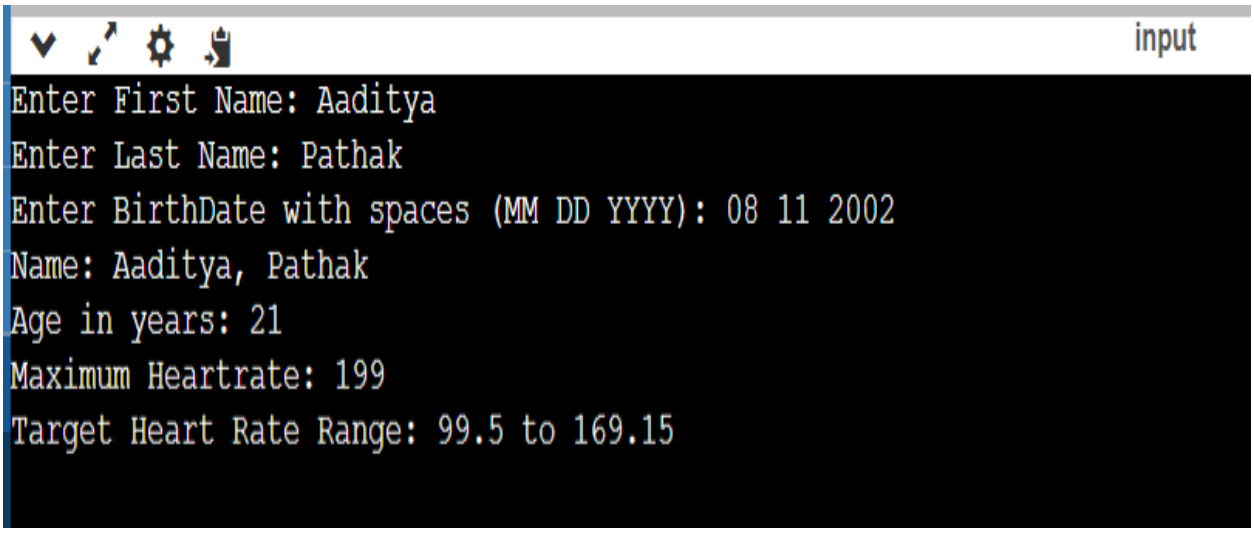
Output is:



3. While exercising, you can use a heart rate monitor to see that your heart rate stays within a safe range suggested by your trainers and doctors. According to the American Heart Association (AHA) *(www.americanheart.org/presenter.jhtml?identifier=4736)*, the formula for calculating your *maximum heart rate* in beats per minute is *220* minus your age in years. Your *target heart rate* is a range that is *50-85%* of your maximum heart rate. [Note: *These formulas are estimates provided by the AHA. Maximum and target heart rates may vary based on the health, fitness and gender of the individual. Always consult a physician or qualified health care professional before beginning or modifying an exercise program.*]. Create a class called *HeartRates*. The class attributes should include the person's first name, last name and date of birth (consisting of separate attributes for the month, day and year of birth). Your class should have a constructor that receives this data as parameters. For each attribute provide *set* and *get* functions. The class also should include a function *getAge* that calculates and returns the person's age (in years), a function *getMaxiumumHeartRate* that calculates and returns the person's maximum heart rate and a function *getTargetHeartRate* that calculates and returns the person's target heart rate. Since you do not yet know how to obtain the current date from the computer, function *getAge* should prompt the user to enter the current month, day and year before calculating the person's age. Write an application

that prompts for the person's information, instantiates an object of class *HeartRates* and prints the information from that object—including the person's first name, last name and date of birth—then calculates and prints the person's age in (years), maximum heart rate and target-heart-rate range.

Output is:


input
Enter First Name: Aaditya
Enter Last Name: Pathak
Enter BirthDate with spaces (MM DD YYYY): 08 11 2002
Name: Aaditya, Pathak
Age in years: 21
Maximum Heartrate: 199
Target Heart Rate Range: 99.5 to 169.15