

## CH7

1. Define a class called *RainbowColor* that is an abstract data type for a color in the Visible spectrum of light. Your class will have a member variable of type `int` to represent a color. Include all the following member functions: a constructor to set the color using the first letter in the name of the color as an argument, a constructor to set the color using an integer as an argument, a default constructor, an input function that reads the color as an integer, an input function that outputs the color as an integer, an output function that outputs the name of the color, and a member function that returns the next color in the spectrum as a value of type *RainbowColor*. Embed your class definition in a test program.

5. In an ancient land, the beautiful princess Eve had many suitors. She decided on the following procedure to determine which suitor she would marry. First, all of the suitors would be lined up one after the other and assigned numbers. The first suitor would be number 1, the second number 2, and so on up to the last suitor, number  $n$ .

Starting at the first suitor she would then count three suitors down the line (because of the three letters in her name) and the third suitor would be eliminated from Winning her hand and removed from the line. Eve would then continue counting three more suitors, eliminating every third suitor. When she reached the end of the line she would continue counting from the beginning. For example, if there were six suitors then the elimination process would proceed as follows:

```
123456  initial list of suitors, start counting from 1
12456   suitor 3 eliminated, continue counting from 4
1245    suitor 6 eliminated, continue counting from 1
125     suitor 4 eliminated, continue counting from 5
15      suitor 2 eliminated, continue counting from 5
1       suitor 5 eliminated, 1 is the lucky winner .
```

Write a program that uses a vector to determine which position you should stand in to marry the princess if there are  $n$  suitors. You will find the following function from the *Vector* class useful:

```
v.erase(iter); //Removes element at position iter
```

For example, to use this function to erase the fourth element from the beginning of a vector variable named *theVector*, use

```
theVector.erase(theVector.begin() + 3);
```

The number 3 is used because the first element in the vector is at index position

0.

6. This Programming Project requires you to first complete Programming Project 6.7 from Chapter 6, which is an implementation. Of a *Pizza* class. Add an *Order* class that contains a private vector of type *Pizza*. This class represents a customer's entire order, where the order may consist of multiple pizzas. Include appropriate functions so that a user of the *Order* class can add pizzas to the order (type is deep dish, hand tossed, or pan; size is small, medium, or large; number of pepperoni or cheese toppings). You can use constants to represent the type and size. Also write a function that outputs everything in the order along with the total price. Write a suitable test program that adds multiple pizzas to an order(s).
8. Write a program that outputs a histogram of grades for an assignment given to a class of Students. The program should input each student's grade as an integer and store the grade in a vector. Grades should be entered until the user enters -1 for a grade. The program should then scan through the vector and compute the histogram. In computing the histogram, the minimum value of a grade is 0, but your program should determine the maximum value entered by the user. Output the histogram to the console. See Programming Project 5.7 for information on how to compute a histogram.
11. Do Programming Project 5.19, but this time use a class named *Player* to store a player's name and score. Be sure to include a constructor with this class that sets the name and score. Then use a vector of the *Player* class to store the ten players.