การทดลองที่ 6

Chapter 10 Object-Oriented Thinking

10.2 (The BMI class) Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters.

```
// Construct a BMI with the specified name, age, weight, feet, and inches
public BMI(String name, int age, double weight, double feet, double inches)
```

BMI	Interpretation
BMI < 18.5	Underweight
18.5 ≤ BMI < 25.0	Normal
25.0 ≤ BMI < 30.0	Overweight
30.0 ≤ BMI	Obese

Write a program that prompts the user to enter name, age, weight in pounds, and height in inches and displays the BMI together with the interpretation.

Note that one pound is 0.45359237 kilograms, and one inch is 0.0254 meters.

10.9 (The Course class) Revise the Course class as follows:

- The array size is fixed in Listing 10.6. Improve it to automatically increase the array size by creating a new larger array and copying the contents of the current array to it.
- Implement the `dropStudent` method.
- Add a new method named `clear()` that removes all students from the course.

Write a test program that creates a course, adds three students, removes one, and displays the students in the course.

10.10 (The Queue class) Section 10.6 gives a class for Stack. Design a class named Queue for storing integers. Like a stack, a queue holds elements. In a stack, the elements are retrieved in a last-in first-out fashion. In a queue, the elements are retrieved in a first-in first-out fashion. The class contains:

- An int[] data field named `elements` that stores the int values in the queue.
- A data field named `size` that stores the number of elements in the queue.
- A constructor that creates a Queue object with default capacity 8.
- The method `enqueue(int v)` that adds v into the queue.
- The method `dequeue()` that removes and returns the element from the queue.
- The method `empty()` that returns true if the queue is empty.
- The method `getSize()` that returns the size of the queue.

Draw an UML diagram for the class. Implement the class with the initial array size set to 8. The array size will be doubled once the number of the elements exceeds the size. After an element is removed from the beginning of the array, you need to shift all elements in the array one position the left. Write a test program that adds 20 numbers from 1 to 20 into the queue and removes these numbers and displays them.
