3.6.3 Are the following statements correct? Which one is better?

```
if (age < 16)
  System.out.println
    ("Cannot get a driver's license");
if (age >= 16)
  System.out.println
    ("Can get a driver's license");
```

(a)

```
if (age < 16)
  System.out.println
    ("Cannot get a driver's license");
else
  System.out.println
    ("Can get a driver's license");
```

(b)

3.6.4 What is the output of the following code if `number` is `14`, `15`, or `30`?

```
if (number % 2 == 0)
  System.out.println
    (number +  " is even");
if (number % 5 == 0)
  System.out.println
    (number +  " is multiple of 5");
```

(a)

```
if (number % 2 == 0)
  System.out.println
    (number +  " is even");
else if (number % 5 == 0)
  System.out.println
    (number +  " is multiple of 5");
```

(b)

3.7 Generating Random Numbers

You can use `Math.random()` *to obtain a random double value between* `0.0` *and* `1.0`*, excluding* `1.0`.

Key Point

Suppose you want to develop a program for a first-grader to practice subtraction. The program randomly generates two single-digit integers, `number1` and `number2`, with `number1 >= number2`, and it displays to the student a question such as "What is 9 − 2?" After the student enters the answer, the program displays a message indicating whether it is correct.

VideoNote
Program subtraction quiz

The previous programs generate random numbers using `System.currentTimeMillis()`. A better approach is to use the `random()` method in the `Math` class. Invoking this method returns a random double value `d` such that $0.0 \leq d < 1.0$. Thus, `(int)(Math.random() * 10)` returns a random single-digit integer (i.e., a number between `0` and `9`).

`random()` method

The program can work as follows:

1. Generate two single-digit integers into `number1` and `number2`.
2. If `number1 < number2`, swap `number1` with `number2`.
3. Prompt the student to answer, `"What is number1 - number2?"`
4. Check the student's answer and display whether the answer is correct.

The complete program is given in Listing 3.3.

LISTING 3.3 SubtractionQuiz.java

```
1 import java.util.Scanner;
2
3 public class SubtractionQuiz {
4   public static void main(String[] args) {
5     // 1. Generate two random single-digit integers
6     int number1 = (int)(Math.random() * 10);
7     int number2 = (int)(Math.random() * 10);
8
9     // 2. If number1 < number2, swap number1 with number2
10    if (number1 < number2) {
11      int temp = number1;
```

random number

```
12        number1 = number2;
13        number2 = temp;
14      }
15
16      // 3. Prompt the student to answer "What is number1 - number2?"
17      System.out.print
18        ("What is " + number1 + " - " + number2 + "? ");
19      Scanner input = new Scanner(System.in);
20      int answer = input.nextInt();
21
22      // 4. Grade the answer and display the result
23      if (number1 - number2 == answer)
24        System.out.println("You are correct!");
25      else {
26        System.out.println("Your answer is wrong.");
27        System.out.println(number1 + " - " + number2 +
28          " should be " + (number1 - number2));
29      }
30    }
31  }
```

get answer

check the answer

```
What is 6 - 6? 0 Enter
You are correct!
```

```
What is 9 - 2? 5 Enter
Your answer is wrong
9 - 2 is 7
```

line#	number1	number2	temp	answer	output
6	2				
7		9			
11			2		
12	9				
13		2			
20				5	
26					Your answer is wrong 9 - 2 should be 7

To swap two variables `number1` and `number2`, a temporary variable temp (line 11) is used to first hold the value in `number1`. The value in `number2` is assigned to `number1` (line 12), and the value in `temp` is assigned to `number2` (line 13).

3.7.1 Which of the following is a possible output from invoking `Math.random()`?

`323.4`, `0.5`, `34`, `1.0`, `0.0`, `0.234`

3.7.2 a. How do you generate a random integer `i` such that $0 \le i < 20$?

b. How do you generate a random integer `i` such that $10 \le i < 20$?

c. How do you generate a random integer `i` such that $10 \le i \le 50$?

d. Write an expression that returns `0` or `1` randomly.