

Solutions to Quick Check Questions

6

Repetition Statements

6.1 The while Statement

1. Write a while statement to add numbers 11 through 20. Is this a count-controlled or sentinel-controlled loop?

```
int sum = 0, i = 11;

while ( i <= 20 ) { //this is a
    sum += i;      //count-controlled
    i++;
}
```

2. Write a while statement to read in real numbers, using JOptionPane, and stop when a negative number is entered. Is this a count-controlled or sentinel-controlled loop?

```
String str;
int num;

str = JOptionPane.showInputDialog(null,
    "Enter number:");

num = Double.parseDouble(str);

while ( num >= 0 ) { //this is a
```

```

//sentinel-controlled

//do some operation using num

str = JOptionPane.showInputDialog(null,
    "Enter number:");

num = Double.parseDouble(str);
}

```

3. Modify the `Ch6SleepStatistics` class so the invalid negative numbers are ignored.

```

sleepHour =
    getDouble("Enter sleep hours (0 - to stop:");

while (sleepHour != 0) {

    if (sleepHour >= 0) {
        sum += sleepHour;
        cnt++;
    }

    sleepHour
    = getDouble("Enter sleep hours (0 - to stop:");
}

```

6.2 Pitfalls in Writing Repetition Statements



Quick Check

1. Which of the following is an infinite loop?

a.

```
int sum = 0, i = 0;
while ( i >= 0 ) {
    sum += i;
    i++;
}
```

Infinite Loop
i gets larger inside the loop.

b.

```
int sum = 0, i = 100;
while ( i != 0 ) {
    sum += i;
    i--;
}
```

Finite Loop
i gets smaller inside the loop and will become zero.

2. For each of the following loop statements, determine the value of sum after the loop is executed.

a.

```
int count = 0, sum = 0;
while ( count < 10 ) {
    sum += count;
    count++;
}
```

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b.

```
int count = 1, sum = 0;
while ( count <= 30 ) {
    sum += count;
    count += 3;
}
```

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c.

```
int count = 0, sum = 0;
while ( count < 20 ) {
    sum += 3*count;
    count += 2;
}
```

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6.3 The do-while Statement

1. Write a do-while loop to compute the sum of the first 30 positive odd integers.

```
int num, sum = 0, i = 1;    /* A */

do {

    num = 2*i - 1; //get the i'th odd number

    sum += num;

    i++;

} while ( i <= 30);
```

```
-----

int num = 1, sum = 0, i = 1;    /* B */

do {

    sum += num;

    num += 2; //get the next odd number
```

```
        i++;  
    } while ( i <= 30);
```

2. Rewrite the following while loops as do-while loops.

a.

```
int count = 0, sum = 0;  
while ( count < 10 ) {  
    sum += count;  
    count++;  
}
```

Answer:

```
int count = 0, sum = 0;  
do {  
    sum += count;  
    count++;  
} while ( count < 10);
```

b.

```
int count = 1, sum = 0;  
while ( count <= 30 ) {  
    sum += count;  
    count += 3;  
}
```

Answer:

```
int count = 1, sum = 0;  
do {  
    sum += count;  
    count += 3;  
} while ( count <= 30);
```

6.4 Loop-and-a-Half Repetition Control

1. Translate the following while loop to a loop-and-a-half format.

```
int sum = 0, num = 1;  
while (num <= 50) {  
    sum += num;  
    num++;  
}
```

Answer:

```
int sum = 0, num = 1;

while (true) {

    if (num > 50) break;

    sum += num;
    num++;
}
```

2. Translate the following do-while loop to a loop-and-a-half format.

```
int sum = 0, num = 1;
do {
    sum += num;
    num++;
} while (sum <= 5000);
```

Answer:

```
int sum = 0, num = 1;

while (true) {

    sum += num;
    num++;

    if (sum > 5000) break;

}
```

6.5 Confirmation Dialog

1. What would be the title of the dialog if the following code is executed?

```
JOptionPane.showConfirmDialog(null,
    "hello",
    "world",
```

```
JOptionPane.YES_NO_OPTION);
```

world

2. Write a code to prompt the user with the message “Are you a minor?” and display “Go to Theater 3” using a message dialog if the user clicks the Yes button. If the user clicks the No button, then display “Go to Theater 8” instead.

Answer:

```
int selection = JOptionPane.showConfirmDialog(null,
    "Are you a minor?",
    "Confirmation",
    JOptionPane.YES_NO_OPTION);

if (selection == JOptionPane.YES_OPTION) {

    JOptionPane.showMessageDialog(null,
        "Go to Theater 3");
} else {

    JOptionPane.showMessageDialog(null,
        "Go to Theater 8");
}
```

6.6 The for Statement

1. Write a for loop to compute
 - a. the sum of 1, 2, . . . , 100.
 - b. the sum of 2, 4, . . . , 500.
 - c. the product of 5, 10, . . . , 50.

a.

```
sum = 0;
for (int i = 1; i <= 100; i++) {
    sum += i;
}
```

b.

```
sum = 0;
for (int i = 2; i <= 500; i+=2) {
    sum += i;
}
```

```

    }
c.   sum = 0;
     for (int i = 5; i <= 50; i+=5) {
         sum += i;
     }

```

2. Rewrite the following while loops as for statements.

```

a.   int count = 0, sum = 0;
     while ( count < 10 ) {
         sum += count;
         count++;
     }

```

Answer:

```

sum = 0;
for (int count = 0; count < 10; count++) {
    sum += count;
}

```

```

b.   int count = 1, sum = 0;
     while ( count <= 30 ) {
         sum  += count;
         count += 3;
     }

```

Answer:

```

sum = 0;
for (int count = 1; count <= 30; count+=3) {
    sum += count;
}

```

6.7 Nested-for Statements

1. What will be the value of sum after the following nested-for loops are executed?

```

a.   int sum = 0;
     for (int i = 0; i < 5; i++) {
         sum = sum + i;
         for (int j = 0; j < 5; j++) {

```

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```

        sum = sum + j;
    }
}

b. int sum = 0;
   for (int i = 0; i < 5; i++) {
       sum = sum + i;
       for (int j = i; j < 5; j++) {
           sum = sum + j;
       }
   }

```

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2. What is wrong with the following nested-for loop?

```

int sum = 0;
for (int i = 0; i < 5; i++) {
    sum = sum + i;
    for (int i = 5; i > 0; i--) {
        sum = sum + j;
    }
}

```

The same variable i is used in both loops. The variable j is not declared nor assigned an initial value.

6.8 Formatting Output

1. Determine the output of the following code:

```

output.print(Ch6Format.pad(4) + "J");
output.print(Ch6Format.pad(2, "A") + "A");
output.print(Ch6Format.pad(6) + "V");
output.print(Ch6Format.pad(1, "xxx") + "A");

```

Answer: Blank space is indicated by a character s

```

ssssJAAAssssssVxxxA

```

2. What's wrong with the following code?

```

int number;
output.print(Ch6Format.pad(number.length()
    + number));

```

The pad method takes two arguments. The pad method in the given code includes only one argument.

6.9 Loan Tables

No Quick Check Questions.

6.10 Random Number Generation

1. Write a Java statement to generate a random number between 20 and 50.

```
int randomNumber
    = (int) (Math.floor(Math.random * (50-20+1))
            + 20);
```

or

```
int randomNumber
    = (int) (Math.floor(Math.random * (31))
            + 20);
```

2. Based on the outputs from the sample execution of the Ch6TestRandomGenerator program, give your estimate of the running time when the input N is 10 billion.

Answer: estimate is 5251 seconds

6.11 Sample Program: Hi-Lo Game

No Quick Check Questions.

6.12 (Optional) Recursive Methods

No Quick Check Questions.

