

AP Computer Science

Chapter 6 Test Review

1 Multiple-Choice Questions

- 1) You might choose to use a switch statement instead of nested if-else statements if
- A) the variable being tested might equal one of several hundred int values
 - B) the variable being tested might equal one of only a few int values
 - C) there are two or more int variables being tested, each of which could be one of several hundred values
 - D) there are two or more int variables being tested, each of which could be one of only a few values
 - E) none of the above, you would never choose to use a switch statement in place of nested if-else statements under any circumstance

Answer: B

- 2) If a switch statement is written that contains no break statements whatsoever,
- A) this is a syntax error and an appropriate error message will be generated
 - B) each of the case clauses will be executed every time the switch statement is encountered
 - C) this is equivalent to having the switch statement always take the default clause, if one is present
 - D) this is not an error, but nothing within the switch statement ever will be executed
 - E) none of the above

Answer: E

- 3) A continue statement
- A) may be used within a while or a do-while loop, but not a for loop
 - B) is identical to a break statement within Java loops
 - C) may be used within any Java loop statement
 - D) may be used within a for loop, but not within a while or a do-while loop
 - E) none of the above

Answer: C

Given the following switch statement where x is an int, answer the questions #4 ~ 6 below

```
switch (x)
{
    case 3 : x += 1;
    case 4 : x += 2;
    case 5 : x += 3;
    case 6 : x++;
    case 7 : x += 2;
    case 8 : x--;
    case 9 : x++
}
```

- 4) If x is currently equal to 5, what will the value of x be after the switch statement executes?
- A) 8
 - B) 6
 - C) 11
 - D) 5
 - E) 10

Answer: C

5) If x is currently equal to 3, what will the value of x be after the switch statement executes?

- A) 5
- B) 6
- C) 11
- D) 10
- E) 12

Answer: E

6) The statement `if (x < 0) y = x; else y = 0;` can be rewritten using a conditional operator as

- A) `y = (x < 0) ? x : 0;`
- B) `x = (x < 0) ? y : 0;`
- C) `(x < 0) ? y = x : y = 0;`
- D) `y = (x < 0);`
- E) `y = if (x < 0) x : 0;`

Answer: A

7) Given the following code, where x = 0, what is the resulting value of x after the for-loop terminates?

```
for (int i=0; i<5; i++)  
    x += i;
```

- A) 0
- B) 4
- C) 5
- D) 10
- E) 15

Answer: D

8) The do loop differs from the while loop in that

- A) the while loop will always execute the body of the loop at least once
- B) the do loop will always execute the body of the loop at least once
- C) the do loop will continue to loop while condition in the while statement is false and the while loop will continue to loop while the condition in the while statement is true
- D) the while loop will continue to loop while condition in the while statement is false and the do loop will continue to loop while the condition in the while statement is true
- E) none of the above, there is absolutely no difference between the two types of loops

Answer: B

9) How many times will the following loop iterate?

```
int x = 10;  
do {  
    System.out.println(x);  
    x--;  
} while (x > 0);
```

- A) 0 times
- B) 1 time
- C) 9 times
- D) 10 times
- E) 11 times

Answer: E

10) Given that s is a String, what does the following loop do?

```
for (int j = s.length( ); j > 0; j--)  
    System.out.print(s.charAt(j-1));
```

- A) it prints s out backwards
- B) it prints s out forwards
- C) it prints s out backwards after skipping the last character
- D) it prints s out backwards but does not print the 0th character
- E) it yields a run-time error because there is no character at s.charAt(j-1) for j = 0

Answer: A

11) The following nested loop structure will execute the inner most statement (x++) how many times?

```
for (int j = 0; j < 100; j++)  
    for (int k = 100; k > 0; k--)  
        x++;
```

- A) 100
- B) 200
- C) 10,000
- D) 20,000
- E) 1,000,000

Answer: C

Consider the following paint method to answer the questions #12 ~ 13 below:

```
public void paint(Graphics page)  
{  
    int x, y = 200;  
    page.setColor(Color.blue);  
    for (x = 100; x < 200; x += 20)  
        page.fillRect(x, y, 10, y-x);  
}
```

12) This paint method will draw several bars (sort of like a bar graph). How many bars will be displayed?

- A) 4
- B) 5
- C) 6
- D) 10
- E) 20

Answer: B

13) The size of each rectangle (bar)

- A) increases in height while staying the same width
- B) increases in width while staying the same height
- C) increases in both width and height
- D) stays the same size
- E) decreases in height while staying the same width

Answer: E

14) What will the following code do? Assume s is a String, x is an int initialized to 10, page is a Graphics object, and this is part of a paint method for an applet.

```
boolean isVowel = false;
String vowels = "aeiou";
for (int j = 0; j < s.length( ); j++)
{
    for (int k = 0; k < 5; k++)
        if (s.charAt(j) == vowels.charAt(k)) isVowel = true;
    if (isVowel) page.drawString(""+s.charAt(j), 10, 15*x++);
    else page.drawString(""+s.charAt(j), 110, 15*x++);
    isVowel = false;
}
```

- A) The String s is printed down the applet in two columns, alternating each letter
- B) The String s is printed across the applet with vowels printed in one row and all other characters printed in a row above the vowels
- C) The String s is printed across the applet with vowels printed in one row and all other characters printed in a row below the vowels
- D) The String s is printed down the applet in two columns with vowels appearing in the left column and all other characters in the right column
- E) The String s is printed down the applet in two columns with vowels appearing in the right column and all other characters in the left column

Answer: D

15) Which of the following statements are true about Java loops?

- A) all three loop statements are functionally equivalent
- B) while loops and do loops are essentially the same; but while loops always execute at least once
- C) if you know the number of times that a loop is to be performed, the best loop statement to use is a while loop
- D) loops may be replaced by an appropriate combination of if-else and switch statements
- E) none of the above

Answer: A

2 True/False Questions

1) A switch statement must have a default clause.

Answer: FALSE

2) Control in a switch statement jumps to the first matching case.

Answer: TRUE

3) Each case in a switch statement must terminate with a break statement.

Answer: FALSE

4) The following for-loop is an infinite loop.

```
for (int j = 0; j < 1000; ) i++;
```

Answer: TRUE

5) It is possible to convert any type of loop (while, do, or for) into any other.

Answer: TRUE

6) The following loop is syntactically valid.

```
for (int j = 0; j < 1000; j++) j--;
```

Answer: TRUE

7) In Java, it is possible to create an infinite loop out of while and do loops, but not for-loops.

Answer: FALSE

3. Free-Form/Short Answer Questions

1) Rewrite the following nested if-else statement as an equivalent switch statement.

```
if (letter == 'A' || letter == 'a') System.out.println("Excellent");
else if (letter == 'B' || letter == 'b') System.out.println("You can do
better");
else if (letter == 'C' || letter == 'c') System.out.println("Try
harder");
else if (letter == 'D' || letter == 'd') System.out.println("Try much
harder");
else System.out.println("Try another major! ");
```

Answer:

```
switch (letter)
{
    case 'A', 'a' : System.out.println("Excellent"); break;
    case 'B', 'b' : System.out.println("You can do better"); break;
    case 'C', 'c' : System.out.println("Try harder"); break;
    case 'D', 'd' : System.out.println("Try much harder"); break;
    default : System.out.println("Try another major! ");
}
```

2) Given the following tax table information, write Java code to assign the double taxRate appropriately given the double pay. Select the selection statement (if, if-else, switch) that makes the most sense.

If pay is more than 100,000, tax rate is 40%

If pay is more than 60,000 and less than or equal to 100,000, tax rate is 30%

If pay is more than 30,000 and less than or equal to 60,000, tax rate is 20%

If pay is more than 15,000 and less than or equal to 30,000, tax rate is 10%

If pay is more than 5,000 and less than or equal to 15,000, tax rate is 5%

If pay is less than or equal to 5,000, tax rate is 0%

Answer: Use a nested if-else structure as it requires the least amount of code. A switch statement is not possible because pay is a double and the switch statement can only be used for integral types.

```
if (pay > 100000)
    taxRate = 0.40;
else if (pay > 60000)
    taxRate = 0.30;
else if (pay > 30000)
    taxRate = 0.20;
else if (pay > 15000)
    taxRate = 0.10;
else
    taxRate = 0.00;
```

```

        taxRate = 0.10;
    else if (pay > 5000)
        taxRate = 0.05;
    else
        taxRate = 0.0;

```

3) Show the output that would occur from the following code, including proper spacing.

```

for (j = 0; j < 5; j++)
{
    for (k = 0; k < 5; k++)
        if (j!=k)
            System.out.print(' ');
        else
            System.out.print('*');
        System.out.println( );
}

```

Answer:

```

*
 *
  *
   *
    *

```

The outer loop iterates from 0 to 4, and for each iteration, the inner loop also iterates from 0 to 4. For iteration of the inner loop, if j and k are not the same, a blank is output, otherwise an *. So, if j = 0 and k = 2, then two blanks are output before an *, followed by two more blanks. At the end of each iteration of the inner loop, the cursor is returned to start a new line.

4) How many times will the System.out.println(*); statement execute inside of the following nested for-loops?

```

for (j=0; j<10; j++)
    for (k=10; k>j; k--)
        System.out.println("*");

```

Answer: 55

The first iteration of the outer loop has j = 0, so the inner loop iterates from 10 down to 1, or 10 times. The next iteration of the outer loop has j = 1, so the inner loop iterates from 10 down to 2, or 9 times. This continues until the outer loop has j = 9, in which case the inner loop iterates for k = 10 only, or 1 time. Thus, the System.out.println statement executes a total of $10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55$ times.

5) Write a "query-controlled" loop that will continue to input int values from the user, adding each to the int value sum, and then ask if the user has another value to input, until the user says that there are no more values. Assume that cs1.Keyboard has been imported.

```

Answer: int x, sum = 0;
String query;
do {
    System.out.println("Enter an int value to be summed");
    x = Keyboard.readInt( );
    sum += x;
    System.out.println("Do you have any more ints to input? (Yes or No) ");
    query = Keyboard.readString( );
} while (query.equalsIgnoreCase("Yes"));

```

6) Write some code that inputs a set of int values and computes its average. Ask the user first how many int values will be input. Make sure that your code cannot produce a division by zero error. Assume that `cs1.Keyboard` has been imported.

```
Answer: int numberOfValues, j, current, sum = 0;
System.out.println("Enter the number of ints you will be inputting");
numberOfValues = Keyboard.readInt( );
for (j = 0; j < numberOfValues; j++)
{
    System.out.println("Enter your next int value");
    current = Keyboard.readInt( );
    sum += current;
}
if (numberOfValues != 0) double average = sum / numberOfValues;
    else System.out.println("Cannot compute the average of 0 values");
```

7) The following code has a syntax error immediately before the word `else`. What is the error and why does it arise? Fix the code so that this statement is a legal if-else statement.

```
if (x < 0) ; x++;
    else x--;
```

Answer: The error is "else without if" and it arises because of the ";" after the condition but before `x++`. The Java compiler determines that the if clause is in fact ; (no statement) and that `x++`; is a statement that follows the if statement. Therefore, since `x++`; is not part of the if statement, the "else" is felt to be an else without an if, and that is why the error has arise. The statement should be

```
if (x < 0) x++;
    else x--;
```