Chapter 3 Test Review

Monday, November 05, 2012
7:55 AM

AP Computer Science Chapter 3 Test Review Name: _____

Free Response - Be prepared for:

1. Write a sentinel value, keyboard loop
2. Write a count for loop
3. Write a most-wanted-holder pattern
4. Write a accumulator pattern

The next two questions refer to this code segment

```
if (a != b && n / (a - b) > 90)
{
    /* statement 1 */
}
else
{
    /* statement 2 */
}
```

1. What will happen if `a == b` is true? it would short circuit → false
   a) `/* statement 2 */` will be executed
   b) `/* statement 1 */` will be executed
   c) Neither `/* statement 1 */` nor `/* statement 2 */` will be executed.
   d) A compile-time error will occur.
   e) An exception will be thrown.

2. What will happen if `a == b` is false?
   a) `/* statement 1 */` will be executed
   b) `/* statement 2 */` will be executed
   c) Either `/* statement 1 */` or `/* statement 2 */` will be executed.
   d) A compile-time error will occur.
   e) An exception will be thrown.

3. Look at the following poorly formatted program segment. If `a = 7` and `c = 6` before execution, which of the following represents the correct values of `c`, `d`, `p`, and `t` after execution? An undetermined value is represented with a question mark.

```
if (a == 6)
if (c == 6)
{
    c = 9;
    d = 9;
}
else
{
    t = 10;
    if (c == 6)
        c = 5;
}
else p = 9;
```

9 c d p t
9 6 — 9 —

   a) `c = 6, d = ?, p = 9, t = ?`
   b) `c = 5, d = ?, p = ?, t = 10`
   c) `c = 6, d = ?, p = ?, t = ?`
   d) `c = 5, d = 9, p = ?, t = 10`
   e) `c = 9, d = 9, p = ?, t = ?`

4. Consider the following outline of a nested if-else structure which has more if clauses than else clauses. Which of the statements below is true regarding this structure?

```
if (condition1)
   if (condition2)
      statement1;
else statement2;
```

a) syntactically it is invalid to have more if clauses than else clauses
b) `statement2` will only execute if `condition1` is false and `condition2` is false
c) `statement2` will only execute if `condition1` is true and `condition2` is false
d) `statement2` will only execute if `condition1` is false, it does not matter what `condition2` is
e) `statement2` will never execute

5. What values are stored in x and y after execution of the following program segment?

```
int x = 30, y = 40;
if (x >= 0)
{
   if (x <= 100)
   {
      y = x * 3;
      if (y < 50)
         x /= 10;
   }
   else
      y = x * 2;
}
else
   y = -x;
```

x 30 y 40 → y gets set to 90

a) `x = 30 y = 90`
b) `x = 30 y = -30`
c) `x = 30 y = 60`
d) `x = 3 y = -3`
e) `x = 30 y = 40`

6. Of the following if statements, which one correctly executes three instructions if the condition is true, and executes no instructions if it is false?

a)
```
if (x < 0)
    a = b * 2;
    y = x;
    z = a - y;
```

b)
```
if (x < 0)
    a = b * 2;
    y = x;
    z = a - y;
}
```

c)
```
if ((x < 0)
    a = b * 2;
    y = x;
    z = a - y;
}
```

d)
```
if (x < 0) {
    a = b * 2;
    y = x;
    z = a - y;
}
```

e) `b`, `c` and `d` are all correct, but not `a`

7. Consider the following code that will assign a letter grade of A, B, C, D, or F depending on a student's test score.

```
if (score >= 90)
     grade = "A";
if (score >= 80)
     grade = "B";
if (score >= 70)
     grade = "C";
if (score >= 60)
     grade = "D";
else
     grade = 'F';
```

92 → A B D

82 → D

72 → D

62 → D

52 → F

a) This code will work correctly in all cases
b) This code will work correctly only if `grade >= 60`
c) This code will work correctly only if `grade < 60`
d) This code will work correctly only if `grade < 70`
e) This code will not work correctly under any circumstances

8. What is wrong, logically, with the following code?

```
if (x > 10)
     System.out.println("Large");
else if (x > 6 && x <= 10)
     System.out.println("Medium");
else if (x > 3 && x <= 6)
     System.out.println("Small");
else
     System.out.println("Very small");
```

Redundant

a) There is no logic error, but there is no need to have `(x <= 10)` in the second conditional or `(x <= 6)` in the third conditional
b) There is no logic error, but there is no need to have `(x > 6)` in the second conditional or `(x > 3)` in the third conditional
c) The logic error is that no matter what value `x` is, "`Very small`" is always printed out
d) The logic error is that no matter what value `x` is, "`Large`" is always printed out
e) There is nothing wrong with the logic at all

9. Given that `a`, `b`, and `c` are integers, consider the boolean expression

```
(a < b) || !((c == a * b) && (c < a))
```

? || ! (T && T) - ? || ! F ? || T.

Which of the following will *guarantee* that the expression is `true`?

a) `c < a` is `false`. (T)
b) `c < a` is `true`. We don't know
c) `a < b` is `false`. ?
d) `c == a * b` is `true`. ?
e) `c == a * b` is `true`, and `c < a` is `true`. ?

10. Which of the following will evaluate to true only if boolean expressions `A`, `B`, and `C` are all false?

a) `!A && !(B && !C)` → T there are other values A,B,C, that would make this true
b) `!A || !B || !C` → T, ||
c) `!(A || B || C)` → T, and A/B/C all false is the only way this can be true
d) `!(A && B && C)` → T, but there are other ways
e) `!A || !(B || !C)` → T, but there are other ways....

11. Assume that `x` and `y` are `int` variables with `x = 5, y = 3`, and `a` and `d` are String variables with `a = "a"` and `d = "A"`, and examine the following conditions:

    Condition 1: `(x < y && x > 0)`
    Condition 2: `(!a.equals(d) || x != 5)`
    Condition 3: `!(true && false)`
    Condition 4: `(x > y || a.equals("A") || !d.equals("A"))`

    a) All 4 Conditions are true
    b) Only Condition 2 is true
    c) Condition 2 and Condition 4 are true only
    d) Conditions 2, 3 and 4 are all true, Condition 1 is not
    e) All 4 Conditions are false

12. Assume that `x` and `y` have been declared and initialized with `int` values. Consider the following Java expression

```
(y > 10000) || (x > 1000 && x < 1500)
```

    Which of the following is equivalent to the expression given above?

    a) `(y > 10000 || x > 1000) && (y > 10000 || x < 1500)`
    b) `(y > 10000 || x > 1000) || (y > 10000 || x < 1500)`
    c) `(y > 10000) && (x > 1000 || x < 1500)`
    d) `(y > 10000 && x > 1000) || (y > 10000 && x < 1500)`
    e) `(y > 10000 && x > 1000) && (y > 10000 && x < 1500)`

13. Consider the following code segment

```
int newNum = 0, temp;
int num = k;
while (num > 10)
{
    temp = num % 10;
    num /= 10;
    newNum = newNum * 10 + temp;
}
System.out.print(newNum);
```

num: 512 → 51 → 5
temp: 2, 1
newNum: 0 → 2 → 20 + 1 = 21

Reverses number but drops last digit

512 → 21
6352 → 253
1000 → 0

Which is a true statement about the segment?

I. If $100 \le num \le 1000$ initially, the final value of `newNum` must be in the range $10 \le num \le 100$
II. There is no initial value of `num` that will cause an infinite `while` loop.
III. If $num \le 10$ initially, `newNum` will have a final value of 0.

a) I only
b) II only
c) III only
d) II and III only
e) I, II, and III

14. Consider the following loop, where `n` is some positive integer.

```
for (int i = 0; i < n; i += 2)
{
    if (/* test */)
        /* perform some action */
}
```

In terms of `n`, which Java expression represents the maximum number of times that `/* perform some action */` could be executed?

a) `n / 2`
b) `(n + 1) / 2`
c) `n`
d) `n - 1`
e) `(n - 1) / 2`

Pick some n's
7
8

What i's go into the loop
0, 2, 4, 6 — 4 times
0, 2, 4, 6 — 4 times

15. If `x` is an `int` where `x = 0`, what will `x` be after the following loop terminates?

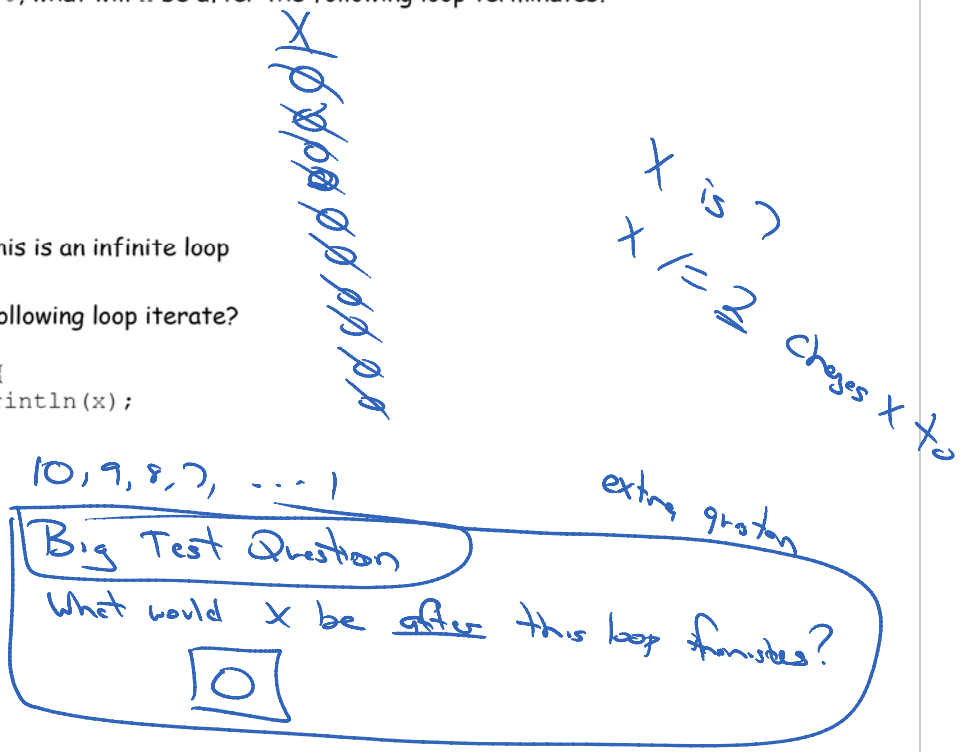
```
while (x < 100)
    x *= 2;
```

a) 2
b) 64
c) 100
d) 128
e) None of the above, this is an infinite loop

16. How many times will the following loop iterate?

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

a) 0 times
b) 1 time
c) 9 times
d) 10 times
e) 11 times



The next two questions refer to the following code segment:

```
int n = Keyboard.readInt();
int x = 1;
int y = 1;

// Point A

while (n > 2)
{
    x = x + y;

    // Point B

    y = x - y;
    n--;
}

// Point C

System.out.println(x);
```

17. What is printed if the user types in a 6 for `n`?
    a) 1
    b) 5
    c) 6
    d) 8
    e) 13

18. What is true about the code?
    a) `x` will sometimes be `1` at `// Point B`
    b) `x` will never be `1` at `// Point C`
    c) `n` will never be greater than `2` at `// Point A`
    d) `n` will sometimes be greater than `2` at `// Point C`
    e) `n` will always be greater than `2` at `// Point B`

19. Given two `String` variables, `s1` and `s2`, to determine if they are the same length, which of the following conditions would you use?

    a) `(s1.equals(s2))`
    b) `(s1.length( ).equals(s2))`
    c) `(s1.length( ).equals(s2.length( ))`
    d) `(s1.length( ) == s2.length( ))`
    e) `length(s1) == length(s2)`

20. Given a `String, s`, which is assumed to have at least one character in it, which of the following conditions would determine if the first character of the String is the same as the last character?

a) `(s.substring(0,1).equals(s.substring(s.length(),s.length()+1)))`
b) `(s.substring(1,2).equals(s.substring(s.length(), s.length()+1)))`
c) `(s.substring(0,1).equals(s.substring(s.length()-1, s.length())))`
d) `(s.substring(0,1).equals(s.substring(s.length()+1, s.length()+2)))`
e) `(s.substring(0,1).equals(s.substring(last)))`

21. Consider the following code segment

```
int x = 1;
while ( /* missing code */ )
{
    System.out.print(x + " ");
    x = x + 2;
}
```

Consider the following possible replacements for `/* missing code */`

I. `x < 6`
II. `x != 6` → infinite loop
III. `x < 7`

Which of the proposed replacements for `/* missing code */` will cause the code segment to print only the values `1 3 5`?

a) I only
b) II only
c) I and II only
d) I and III only
e) I, II, and III

1
3
5
7
9
11

22.Consider the following code segment

```
int x = 10, y = 0;
while (x > 5)
{
    y = 3;
    while (y < x)
    {
        y *= 2;
        if (y % x == 1)
            y += x;
    }
    x -= 3;
}
System.out.println(x + " " + y);
```

What will be output after execution of this code segment?

a) 1 6
b) 7 14
c) -3 14
d) 4 14
e) -3 6

The answer is not listed

4 12

23. What will be output by this code segment?

```
for (int i = 5; i > 0; i--)
{
    for (int j = 1; j <= i; j++)
        System.out.print(j*j + " " );
    System.out.println();
}
```

a)
```
1
1 4
1 4 9
1 4 9 16
1 4 9 16 25
```

b)
```
1 4 9 16 25
1 4 9 16
1 4 9
1 4
1
```

c)
```
9  7  5  3  1
25 16 9 4
25 16 9
25 16
25
```

d)
```
25
25 16
25 16 9
25 16 9 4
25 16 9 4 1
```

e)
```
1 4 9 16 25
1 4 9 16 25
1 4 9 16 25
1 4 9 16 25
1 4 9 16 25
```

24. 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