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AP Computer Science A (Java)

relational and logical operators, if / else statements

1. Given the variable declarations int x = 4; int y = -3; int z = 4; what are results of the following relational expressions? Example: x == 4. Answer: true.
   1. x == y; false
   2. x + y > 0 true
   3. x – z != 0 false
   4. y \* y <= z false
   5. y / y == 1 true
   6. x \* (y + 2) > y – (y + z) \* 2 true
2. Translate each of the following English statements into logical tests for use in an if / else statement. Write the appropriate logical test associated with your if statement. Assume that three int variables x, y, and z, have been initialized. Example: statement: z is odd. Answer: z % 2 != 0.
   1. y is positive y > 0
   2. x is even x%2 == 0
   3. z is not greater than y’s square root z <= Math.sqrt(y)
   4. y is a multiple of z y%z == 0
   5. x and z are of opposite signs (x > 0) != (z > 0)
3. Consider the following method:

public static void ifElseMystery1(int x, int y) {

int z = 4;

if (z <= x) {

z = x + 1;

} else {

z = z + 9;

}

if (z <= y) {

y++;

}

System.out.println(z + “ “ + y);

}

What output is produced by each of the following calls?

1. ifElseMystery1(3, 20); 13 21
2. ifElseMystery1(4, 5); 5 6
3. ifElseMystery1(5, 5); 6 5
4. Consider the following method:

public static void if ElseMystery2(int a, int b) {

if (a\*2 < b) {

a = a \* 3;

} else if (a > b) {

b = b +3;

}

if (b < a) {

b++;

} else {

a--;

}

System.out.println(a + “ “ + b);

}

What output is produced by each of the following calls?

1. ifElseMystery2(10, 2); 10 6
2. ifElseMystery2(3, 8); 9 9
3. ifElseMystery2(4, 4); 3 4
4. What is the result of each of the following expressions when int x = 42; int y = 17; int z =25?
   1. y < x && y <= z true
   2. x % 2 == y % 2 || x % 2 == z % 2 false
   3. x <= y + z && x >= y + z true
   4. ! (x < y && x < z) true
   5. (x + y) % 2 == 0 || !((z – y) % 2 == 0) false
5. The following code contains a logic error:

Scanner console = new Scanner(System.in);

System.out.print(“Type a number: “);

int number = console.nextInt();

if (number % 2 == 0) {

if (number % 3 == 0) {

System.out.println(“Divisible by 6.”);

}

else {

System.out.println(“Odd.”);

}

}

Examine the code and describe a case in which the code would print something that is untrue about the number that was entered. Explain why. Then correct the logic error in the code.

If 4 is entered, “Odd” will be printed.

Scanner console = new Scanner(System.in);

System.out.print(“Type a number: “);

int number = console.nextInt();

if (number % 2 == 0) {

if (number % 3 == 0) {

System.out.println(“Divisible by 6.”);

}

}

else {

System.out.println(“Odd.”);

}