

Relational Operators, Logical Operators, and If-Statements

Consider the following code that initializes variables:

```
int a=7, b=2, f=10, g=5, h=2;  
boolean c = 12%5==12-2*5;  
String d = "hello";  
boolean e=true, k=true, m=false, n=true, x=(a!=b);
```

Use the above code (always return to the code above for each new problem) to determine whether each of the following statements evaluates to true or false:

1. $a - b < b \ || \ a/b == 3$
2. $2 + 3 == 5 \ \&\& \ 2*3 != 6$
3. c
4. $d == \text{"hello"}$
5. $f*g/h == (\text{int})\text{Math.pow}(g,h) \ \&\& \ e$
6. $!k \ || \ m \ || \ !n$
7. $!k \ || \ !m \ \&\& \ !n$
8. $x \ \&\& \ e \ \&\& \ !m$
9. $d.\text{equals}(\text{"hello"}) \ \&\& \ g < a$
10. $a == b*a/b$
11. $!(!e \ || \ m \ || \ !k)$
12. $!m \ \&\& \ (!n \ || \ k)$

Consider the following code that initializes variables:

```
int a=1, b=2, e=3, f=4;  
String d = "dog", c = "cat";
```

Use the above code (always return to the code above for each new problem) to determine the output for each example:

13.

```
if (++b == e)  
    System.out.print(Math.ceil((double)e/b) != b)  
else  
    System.out.print("\Nope!\");
```
14.

```
if (d.equals("cat"))  
    System.out.print(a+b == e);  
else if (c.equals("cat"))  
    System.out.print(a+b != e);  
else  
    System.out.print("What happened?");
```
15.

```
if (a+b == b*e)  
    System.out.print("\equals\");  
else if (a>b)  
    System.out.print("\ maybe \");  
else if (a<b)  
    System.out.print("\ sure \");  
else  
    System.out.print("\ not \ sure \");
```
16.

```
f -= 3;  
if (f == e)  
    System.out.print("I have a " + d + " \ " + (2*b == f));  
else  
    System.out.print("I have a " + c + " \ " + (3*a == f));
```
17.

```
if (f%e >= b)  
    System.out.print(++f * --e);  
else  
    System.out.print(--f * ++b);
```

```
18. if (a+b != e || Math.pow(f,b) >= e*5 || a==10/0 )
    System.out.print(!d.equals("dog"));
else
    System.out.print("\nHere we go\nagain!");
```

```
19. if (a<b)
    if(b<e)
        System.out.print("nothing");
    else
        System.out.print("something");
else if (a == b)
    if(b<e)
        System.out.print("somebody");
    else
        System.out.print("nobody")
else
    System.out.print("winner");
```

```
20. if (e+f > b*e)
{
    if (e-b < f-a)
    {
        b+=10;
        if (b>=12)
        {
            ++a;
            System.out.print(b*a);
        }
    }
    else
        System.out.print(b - a);
else
    System.out.print(b+a);
}
else
    System.out.print(b*e);
```