

Practice Problems: Decision

1. Understanding code

Draw a representation of what the computer's memory and screen (if relevant) looks like at the end of each of these programs:

```
public class Boolean-Declarations {
    public static void main(String [] args) {
        boolean b;
        boolean c = true;
        boolean d = false;
        boolean e = c;
        c = false;
    }
}
```

b	c	d	e
?	false	false	true

```
public class Boolean-Expressions {
    public static void main(String [] args) {
        boolean b = true || false;
        boolean c = false && true;
        boolean d = !b || c;
        b = !b;
        d = !(b && (c || d));
    }
}
```

b	c	d
false	false	true

```
public class Relational-Expressions {
    public static void main(String [] args) {
        int x = 3;
        double y = 4.7;
        boolean b = x <= y && y <= 2 * x;
        boolean c = 2 * x == x + 3;
        boolean d = b && x != 3;
    }
}
```

b	c	d	x	y
true	true	false	3	4.7

```
public class Conditions-Basic {
    public static void main(String [] args) {
        boolean b = true;
        System.out.println(b);
        if(b) {
            System.out.println("reached here");
        }
        System.out.println("and here?");
    }
}
```

b	Screen
true	true reached here and here?

```

public class Complex-Conditions {
    public static void main(String [] args) {
        int x = 3;
        double y = 4.7;
        if(x <= y && 2 * x >= y + 1) {
            System.out.println("reached here?");
        }
        System.out.println("and here?");
    }
}

```

x	y	Screen
3	4.7	reached here? and here?

```

public class Conditions-IfElse {
    public static void main(String [] args) {
        int x = 3;
        double y = 4.7;
        if(x > y) {
            System.out.println("x = " + x);
        } else {
            System.out.println("y = " + y);
        }
        System.out.println("reached here?");
    }
}

```

x	y	Screen
3	4.7	y = 4.7 reached here?

```

public class Conditions-If-ElseIf {
    public static void main(String [] args) {
        int x = 3;
        double y = 4.7;
        if(x > y) {
            System.out.println("x = " + x);
        } else if(x > 3) {
            System.out.println("y = " + y);
        }
        System.out.println("reached here?");
    }
}

```

x	y	Screen
3	4.7	reached here?

```

public class Conditions-If-ElseIf-Else {
    public static void main(String [] args) {
        int x = 3;
        double y = 4.7;
        if(x > y) {
            System.out.println("x = " + x);
        } else if(x > 3) {
            System.out.println("y = " + y);
        } else {
            System.out.println("x <= 3");
        }
        System.out.println("reached here?");
    }
}

```

x	y	Screen
3	4.7	x <= 3 reached here?

2. Select the correct printout result of the following program

- 1) c 2) c 3) c 4) a 5) d
6) d 7) d 8) b 9) e 10) b

3. Writing Java Programs with Conditions

- a. Write a program that reads two ints from the keyboard, and prints a message saying whether the first one *divides* the second one evenly.

```

import java.util.Scanner;
public class DivisionReport {
    public static void main(String [] args) {
        Scanner keyboard = new Scanner(System.in);
        int val1 = keyboard.nextInt();
        int val2 = keyboard.nextInt();
        if(val2 % val1 == 0) {
            System.out.println(val1 + " divides " + val2 + " evenly.");
        }
        else {
            System.out.println(val1 + " does not divide " + val2 + " evenly.");
        }
    }
}

```

- b. Write a program that reads in an int from the keyboard, and prints a message saying whether it is positive or negative.

```
import java.util.Scanner;
public class PosNegReport {
    public static void main(String [] args) {
        Scanner keyboard = new Scanner(System.in);
        int posOrNeg = keyboard.nextInt();
        if(x>0) {
            System.out.println(posOrNeg + " is positive");
        }
        else if(x<0) {
            System.out.println(posOrNeg + " is negative");
        }
        else {
            System.out.println("you entered 0");
        }
    }
}
```

- c. Given the call number of a book via keyboard (stored in variable n), display the location of it in the library stacks according to the following table.

Call number	Location
100 to 199	basement
200 to 500 and over 900	main floor
510 to 900 except 700 to 750	upper floor
700 to 750	archives

```
import java.util.Scanner;
public class CallNumber {
    public static void main(String [] args) {
        Scanner keyboard = new Scanner(System.in);
        int val = keyboard.nextInt();
        if(100 <=val && val<= 199) {
            System.out.println("basement");
        }
        else if(200 <=val && val<= 500 || val> 900) {
            System.out.println("main floor");
        }
        else if(510 <=val && val< 700 || 750< val && val<= 900) {
            System.out.println("upper floor");
        }
        else if(700 <=val && val<= 750 {
            System.out.println("archives");
        }
        else
            System.out.println("Invalid data");
    }
}
```