Homework

More Selection

1. Evaluate the following boolean expressions to true or false
   a) `! (9 < 3)` `True`
   b) `(5 > 6) || (!(true))` `False`
   c) `("abc" != "ABC") && (3 <=3)` `True`
   d) `!(!(!(8 = = 8)))` `False`

2. Evaluate each expression assuming the following declarations have been made.

```
boolean p = true;
boolean q = false;
boolean r = false;
boolean s = true;
```

   a) `!(p || q)` false
   b) `!p && !q` false
   c) `p == (q || r)` false
   d) `s || (!q && r)` true

3. Assume that the following declarations and assignments have been made:

```
int  age = 16;
int height = 175;
int weight = 70;
char sex = 'M';
boolean healthy = true;
```

   Using these values, evaluate each expression.
   a) `age >= 16 && healthy` true
   b) `!(weight <= 75) && height >= 180` false
   c) `age > 10 || sex == 'F' && height < 170` false
   d) `!(height < 160) && ( weight < 60)` false

4. In this question, use the following variables when you answer the questions:

```
int age, qty_bought;
char gender;
double price, discount;
```

   Write down equivalent Java `if` statements for each of the following:

   a) If a person's age lies between 6 and 19, then display "What school do you go to?"

```
if (6 <= age <= 19) {
    System.out.println("What school do you go to?");
}
```

b) If a person is not teenager, then display "You won't like the music".

```
if (!(13 <= age <= 19)) {
    System.out.println("You won't like the music.");
}
```

c) If you buy more than 10 items and their total price is at least $50, then the discount is 12% of the total price, otherwise there is no discount.

```
if ((qty_bought > 10) && (price >= 50)) {
    discount = price * 0.12;
}
else {
    discount = 0;
}
```

d) If a woman is older than 60 or a man is older than 65, display "RETIRED!"

```
if ((gender == 'M' && age > 65) || (gender == 'F' && age > 60)) {
    System.out.println("RETIRED");
}
```

5. Simplify the following sequence using `if-else if` structure so that the effect is the same but fewer comparisons are required.

```
if (temperature > maxTemp) {
    System.out.println("Porridge too hot");
}
else if (temperature < minTemp) {
    System.out.println("Porridge too cold");
}
else {
    System.out.println("Porridge just right!");
```

6. Consider the following statements

```
if (age < minAge) {
    if (income > minIncome) {
        System.out.println("Accept");
    } else {
        System.out.println("Reject");
    }
}
```

What will the statement print if

a) `age > minAge` and `income < minIncome`?

b) `age < minAge` and `income < minIncome`? Reject

c) `age > minAge` and `income > minIncome`?
d) `age < minAge` and `income > minIncome`? Accept

7. **Test.java:** Write a program that asks teacher to enter a test mark, then outputs if the mark is above range (over 100), below range (under 0), passing, or failing. Assume passing mark is 50.

8. **Driving.java** A certain Traffic Department rules that people may only drive if they are 18 or older, but not more than 75 years old. Input a person's age. If they are less than 18, display the age and "Too young to drive". If they are over 75, display the age and "Sorry you are over the legal age limit for driving". If they fall in the correct range, display the age and a message stating "Age OK. Have you got a driver's licence?"

9. **Temperature.java** Write a program that asks the user to enter a temperature in degrees Celsius. The program prints a message based on the following:

below -18	very cold
-18 or up to 0	cold
0	freezing point of water
above 0 up to 10	very cool
above 10 up to 20	moderate
above 20 up to 30	warm
above 30 up to 40	hot
above 40 to below 100	extremely hot
100 or above	boiling point of water