Practice with if/else

1. Given an `int day` that stores the day of the week (Sunday=1, Monday=2,..., Saturday=7) print "COSC-111 meets today!" if it's Monday, Wednesday, or Friday, and "No COSC-111 today" otherwise. If it's Saturday or Sunday, your program also should print "It's the weekend!"

Solution:

```
if(day == 1) {
   System.out.println("No COSC-111 today.");
   System.out.println("It's the weekend!");
}
else if(day == 2) {
   System.out.println("COSC-111 meets today!");
}
else if(day == 3) {
   System.out.println("No COSC-111 today.");
}
else if(day == 4) {
   System.out.println("COSC-111 meets today!");
}
else if(day == 5) {
   System.out.println("No COSC-111 today.");
}
else if(day == 6) {
   System.out.println("COSC-111 meets today!");
}
else {
   System.out.println("No COSC-111 today.");
   System.out.println("It's the weekend!");
}
```

Alternative solution (better):

```
if(day % 2 == 0) {
   System.out.println("COSC-111 meets today!");
}
else {
   System.out.println("No COSC-111 today.");
   if(day == 1) {
      System.out.println("It's the weekend!");
   }
   else if(day == 7) {
      System.out.println("It's the weekend!");
   }
}
```

Alternative solution (even better):

```java
if(day % 2 == 0) {
   System.out.println("COSC-111 meets today!");
}
else {
   System.out.println("No COSC-111 today.");
   if(day % 6 == 1) {
      System.out.println("It's the weekend!");
   }
}
```

Why do we prefer the latter two solutions to the first one? Because the first solution requires us to repeat code a lot. We write the line `System.out.println("No COSC-111 today.");` four separate times in the first solution. The second and third solutions do exactly the same thing, but the code is more concise.

2. Given the following:

- The capacity of a gas tank, in gallons (`int capacity`)

- The current gas gauge indicator, in percent (`int gauge`, where 100 means full and 0 means empty)

- The mileage of the car, in miles per gallon (`int mpg`)

print "Get gas" or "Safe to drive" depending on whether the car can drive 50 miles without running out of gas.

Solution:

```java
int milesLeft = capacity * gauge * mpg / 100;
if(milesLeft >= 50) {
   System.out.println("Safe to drive.");
}
else {
   System.out.println("Get gas");
}
```

Alternative solution:

```java
if(capacity * gauge * mpg / 100 >= 50) {
    System.out.println("Safe to drive.");
}
else {
    System.out.println("Get gas");
}
```

These are both good solutions. In the first solution, we declare a variable to store the number of miles we can drive, then compare the value stored in this variable to 50. In the second solution, we do the computation directly in the condition of the if statement.

3. To ride the Super Awesome Roller Coaster at the amusement park, you must be within 6 inches of 5 feet tall (there are 12 inches in a foot). Given an `int feet` and an `int inches` storing a person's height, set a boolean variable `allowed` to `true` or `false` depending on whether they can ride the coaster.

Solution:

```java
boolean allowed;
double height = feet + inches / 12.0;
if(height + 0.5 < 5) {
    allowed = false;
}
else if(height - 0.5 > 5) {
    allowed = false;
}
else {
    allowed = true;
}
```

Alternative solution:

```java
boolean allowed = true;
double height = feet + inches / 12.0;
if(height + 0.5 < 5) {
    allowed = false;
}
else if(height - 0.5 > 5) {
    allowed = false;
}
```

These two solutions are very similar. The only difference is that in the second solution, we set `allowed` to `true` as its initial value, and then change the value to `false` if needed. This allows us to remove the final `else` block from the first solution.
Alternative solution:

```
boolean allowed = false;
if(feet == 4) {
   if(inches >= 6) {
      allowed = true;
   }
}
else if(feet == 5) {
   if(inches <= 6) {
      allowed = true;
   }
}
```

Like in the second solution, in this solution we give `allowed` an initial value and then change it if necessary. The difference between this solution and the previous two is that here we do not do an initial computation to convert the height to be a single number in inches.