Quiz Preparation for Week 2

Concepts

- Variables/Types
- Operations
- Conditional Expressions/Statements

Warm-up problems

1. What variable type would you (most likely) use if you want to store a student's midterm grade?
    - what about GPA?
2. Think about how to add 1 point extra credit to an existing variable named *midterm_grade*.
    - Now, think about how to apply a 10% penalty to an existing variable named *hw1*.
3. How would you check if *final_score* passes an A cutoff of 90?
4. How do you know if a student gets As on all homework assignments (e.g. *hw1*, *hw2*,...)?

Combine them altogether!

You are taking a course taught by Dr. Evil.

People call him Dr. Evil for a reason: he is unmerciful on grading, and you will be thrown into a dungeon for 3 days if you fail his course. What's worse, he asks you -- yes YOU -- to do the grading for him, including your own (of course, he will definitely know if you make any, "unintentional" changes).

You wrote 3 homework assignments and took one midterm exam. On homework 1, you got 87 out of 100; on homework 2, you got lucky and hit 93; on homework 3, you slacked a bit and sadly swallowed a score of 82. Fortunately, your midterm grade is fair, which is 90.5.

```
1. How would you store these score?
```

▶ Spoiler!

```
// If you like percentage more
//int hw1 = 87;
//int hw2 = 93;
//int hw3 = 82;
//double midterm_score = 90.5;

// or if you like fraction more
double hw1 = 0.87;
double hw2 = 0.93;
double hw3 = 0.82;
double midterm_score = 0.905;
```

Now Dr. Evil announced that each of your homework weighs 10% of your total grade, and your midterm weighs 30%. That means your final will contribute 40% to your grade, phew! Supposedly you got 93 on your final exam.

```
2. What's your total grade, numerically?
```

▶ Spoiler!

```
// using fraction
double final_score = 0.93;
double hw_avg = (hw1 + hw2 + hw3) / 3;
double total_grade = 0.3 * hw_avg + 0.3 * midterm_score + 0.4 * final_score;
```

Numerically `total_grade = 0.9015`.

While now is the tricky part. You somehow actually got 93 on your final. You are glad because you think your total is roughly at the A cutoff.

```
3. If the A cutoff is 0.90 (greater than or equal to 0.90 and you get an A), will
you get it?
```

▶ Spoiler!

```
// store the information in a boolean
boolean get_A = total_grade >= 0.90;
if (get_A) {
  System.out.println("Haha! I get A!");
} else {
  System.out.println("Oops a B. At least I didn't fail.");
}
```

Yes, you get an A!

Come on, you know Dr. Evil won't let you easily walk away from his course! Dr. Evil asserts that in his course, there will be only A or F. In addition, you have to get at least 0.85 on *hw3*, or you get a 2% penalty from your final score (not total!). What's even more, your final score itself needs to be at least 0.90 to get an A. However, Dr. Evil shows a tiny bit of mercy, saying that

> "If your homework average is at least 0.85, then even if your final is not at least 0.90, you can still get an A."

```
4. What's your total grade now? Will you be thrown into the dungeon for failing
the course, despite all the efforts?
```

▶ Spoiler!

```
// get updated final
if (hw3 < 0.85) {
  final_score *= 0.99;
}
total_grade = 0.3 * hw_avg + 0.3 * midterm + 0.4 * final_score;
```

```
// see if you will be thrown to the dungeon
if (total_grade >= 0.90) {
  if (final_score >= 0.90 || hw_avg >= 0.85) {
    System.out.println("Finally, an A!");
  } else {
    System.out.println("It's. Just. Brutal...");
  }
} else {
  System.out.println("Well, maybe I can do better.");
}
```

Since your *hw3* is 0.82, you suffer a 2% penalty on final. Hence, you `final_score = 0.9114`. However, now your `total_grade = 0.89806`. Dungeon you go!