3. Debugging

Consider a static method called `dosageDays` that computes and returns the days’ worth of medication dosages possible in a prescription given the total amount prescribed, the dosage amount, the patient’s age, and dosage frequency:

- `double totalRx` - the amount of medication units prescribed to a patient (guaranteed to be at least 0.0)
- `double dosageAmt` - the measured amount of one single dosage of medication in units, assuming the patient is an adult. (guaranteed to be less than or equal to the `totalRx`)
- `boolean isAdult` - whether the patient is an adult or not. If the patient is not an adult, the actual dosage amount (i.e. defined by `dosageAmount`) should be further divided by two.
- `int dosageFreq` - the amount of times the prescribed medication dosage should be taken in one day. (guaranteed to be at least 1)

With this information, the method `dosageDays` will print and return the number of days’ worth of medication the prescription gives a patient.

For example, suppose the following call was made:

```java
double days = dosageDays(200, 20, true, 2);
```

This call to a correct implementation of the method might produce output like the following:

```
Prescription: 200.0 unit(s)
Adult Patient?: Yes
Adjusted Dosage Amount: 20.0 unit(s)
Dosage Frequency: 2 time(s) per day
==> Dosage Days: 5.0
```

Plus, `days` will have the value of 5.0.

Another similar correct call might be the following:

```java
double days = dosageDays(100, 10, false, 2);
```

This call to a correct implementation of the method might produce output like the following:

```
Prescription: 100.0 unit(s)
Adult Patient?: No
Adjusted Dosage Amount: 5.0 unit(s)
Dosage Frequency: 2 time(s) per day
==> Dosage Days: 10.0
```

Plus, `days` will have the value of 10.0.
Consider the following proposed buggy implementation of `dosageDays`:

```java
public static double dosageDays(double totalRx, double dosageAmt, boolean isAdult, int frequency) {
    String adultString = "maybe";
    if(isAdult.equals("true")) {
        adultString = "Yes";
    } else {
        adultString = "No";
    }
    System.out.println("Prescription: " + totalRx + " unit(s)");
    System.out.println("Adult Patient?: " + adultString);
    System.out.println("Adjusted Dosage Amount: " + dosageAmt + " unit(s)");
    System.out.println("Dosage Frequency: " + frequency + " time(s) per day");
    System.out.print("===> ");
    System.out.println("Dosage Days: " + totalRx / dosageAmt / frequency);
}
```

This implementation contains three bugs that are causing it to not work as intended!

**Your task:** Annotate (write on) the code below to indicate how you would fix the three bugs. You may add (using arrows to indicate where to insert), remove (by crossing out), or modify (with a combination) any code you choose. However, the fix should not require a lot of work.

You must correctly identify three of the lines with issues, or correctly identify and fix two of the bugs for an S grade.

You must correctly identify all three lines with the bugs and correctly fix all three of the bugs for an E grade.

```java
public static double dosageDays(double totalRx, double dosageAmt, boolean isAdult, int frequency) {
    String adultString = "maybe";
    // Bug #1 - wrong equals usage
    if(isAdult.equals("true")) {
        adultString = "Yes";
    } else {
        adultString = "No";
    }
    System.out.println("Prescription: " + totalRx + " unit(s)");
    System.out.println("Adult Patient?: " + adultString);
    System.out.println("Adjusted Dosage Amount: " + dosageAmt + " unit(s)");
    System.out.println("Dosage Frequency: " + frequency + " time(s) per day");
    System.out.print("===> ");
    System.out.println("Dosage Days: " + totalRx / dosageAmt / frequency); // Bug #0 (or 3) - missing return
    return totalRx / dosageAmt / frequency; // Bug #0 (or 3) - missing return
}
```
Overall game plan

Steps

1. Read spec!
   - Look for general behavior
   - Highlight key items

2. Check for compiler errors
   - Method header (parameters, return)
   - "Obvious" incorrect types, methods, ...

3. Trace through examples, compare output and returns

for this problem...

- For child, halve dosage
- Math to calculate dosage days
- 4 parameters, return double
- Method doesn't return anything! (big O)
- Invalid "isEquals()"
- Doesn't divide by 2 for children