Assertions

- Assertions are a form of error checking designed for debugging (only)

- They are a simple statement that evaluates a boolean: if it's true nothing happens, if it's false, the program ends.

- In Java:

```
assert (x>0);

// or

assert (a==0) : “Some error message here”;
```

Assertions are NOT for Production Code!

- Assertions are there to help you check the logic of your code is correct i.e. when you're trying to get an algorithm working

- **They should be switched OFF** for code that gets released ("production code")

- In Java, the JVM takes a parameter that enables (-ea) or disables (-da) assertions. The default is for them to be disabled.

```
> java -ea SomeClass

> java -da SomeClass
```

As Oracle Puts It

"Assertions are meant to require that the program be consistent with itself, not that the user be consistent with the program"

Great for Postconditions

- Postconditions are things that must be true at the end of an algorithm/function if it is functioning correctly
- E.g.

```
public float sqrt(float x) {
   float result = ....
   // blah
   assert(result>=0.f);
}
```

Sometimes for Preconditions

- Preconditions are things that are assumed true at the start of an algorithm/function
- E.g.

```
private void method(SomeObject so) {
  assert (so!=null);
  //...
}
```

- **BUT you shouldn't** use assertions to check for **public** preconditions

```
public float method(float x) {
  assert (x>=0);
  //...
}
```

- (you should use exceptions for this)

Sqrt Example

```
public float method(float x) throws InvalidInputException {
   .// Input sanitisation (precondition)
   if (x<0.f) throw new InvalidInputException();

   float result=0.f;
   // compute sqrt and store in result

   // Postcondition
   assert (result>=0);

   return result;
}
```

Assertions can be Slow if you Like

```
public int[] sort(int[] arr) {
   Int[] result = ...
   // blah
   assert(isSorted(result));
}
```

- Here, isSorted() is presumably quite costly (at least O(n)).
- That's OK for debugging (it's checking the sort algorithm is working, so you can accept the slowdown)
- And will be turned off for production so that's OK

- *(but your assertion shouldn't have side effects)*

NOT for Checking your Compiler/Computer

```
public void method() {
   Int a=10;
   assert (a==10);
   //...
}
```

- If this isn't working, there is something much bigger wrong with your system!
- It's pointless putting in things like this

For the Last Word on Assertions...

http://www.oracle.com/technetwork/articles/javase/javapch06.pdf