

# Assertions

CS 272 Software Development

# Introduction

- Makes programming assumptions (hopes?) explicit
  - e.g. assuming input in private method is never null
- Can embed throughout code for debugging
  - No output produced if assertion is correct or disabled
- Can enable or disable assertions via a compiler flag
  - Add **-ea** flag as vm argument when running

<https://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Using Assertions

**Remember, assertions can be disabled!**

- Do not use for input validation in public methods
- Do not use assertions to perform actions necessary for functionality of program

<http://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Use for Internal Invariants

```
1. if (i % 3 == 0) {  
2.     ...  
3. } else if (i % 3 == 1) {  
4.     ...  
5. } else {  
6.     assert i % 3 == 2;  
7.     ...  
8. }
```

```
1. switch (value) {  
2.     case 0:  
3.         ...  
4.     case 1:  
5.         ...  
6.     default:  
7.         assert false;  
8. }
```

<http://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Use for Control Invariants

```
1. private void printFirst(List<String> items, String find) {
2.     for (String item : items) {
3.         if (item.equals(find)) {
4.             System.out.println("Found: " + item);
5.             return;
6.         }
7.     }
8.     assert false;
9. }
```

<http://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Use for Private Preconditions

```
1. public void addWord(String word) {
2.     if (word ≠ null) {
3.         words.add(convertString(word));
4.     }
5. }

6. private String convertString(String text) {
7.     assert text ≠ null;
8.     ...
9.     return text;
10. }
```

<http://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Use for Postconditions

```
1. public long copy(Path source, Path destination) {
2.     try {
3.         copyFile(source, destination);
4.     } catch (Exception ex) {
5.         return -1;
6.     }
7.     assert Files.size(source) == Files.size(destination);
8.     return Files.size(destination);
9. }
```

<http://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>



# Summary

- Do use for **assumptions** made by programmer
- Do use to verify input in **private** methods
- Do NOT use to validate user input in **public** methods
- Do NOT use to perform **necessary** operations

<https://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>





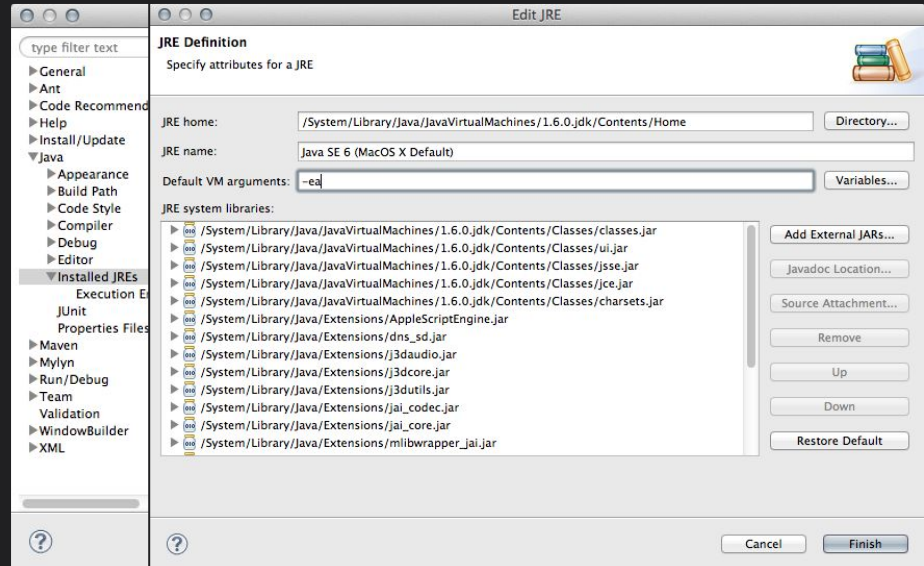
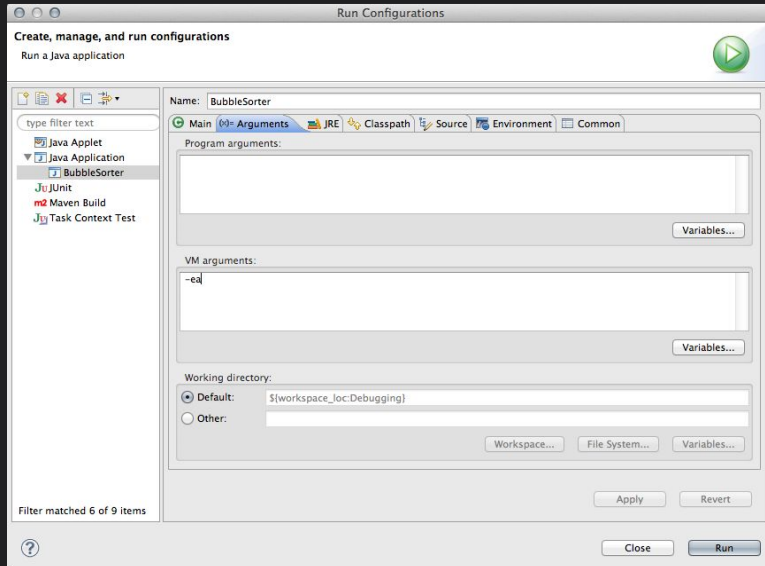
# Enabling Assertions

- Assertions are not enabled by default
  - Require **-ea** (enable assertions) flag when running
- Two methods for enabling in Eclipse
  - Always enable assertions for all Java projects
  - Only enable assertions for certain Java Projects

<https://tutoringcenter.cs.usfca.edu/resources/enabling-assertions-in-eclipse.html>



# Enabling Assertions



<https://tutoringcenter.cs.usfca.edu/resources/enabling-assertions-in-eclipse.html>

# Resources

Java Technotes

<https://docs.oracle.com/javase/8/docs/technotes/guides/language/assert.html>

Java SE 17 Language Specification

<https://docs.oracle.com/javase/specs/jls/se17/html/jls-14.html#jls-14.9.2-120-A>

