#### JUnit Testing with Eclipse

## Plan

- Write a code to output body mass index (BMI)
- Perform JUnit testing
- Use type.lib.ToolBox.getBMI as oracle
- Use type.lib.ToolBox.launch to run your code

## Start Eclipse

- EECS Lab:
  - Type "eclipse &" at terminal
  - Select CSE Menu > Development > Eclipse
- Personal computer:
  - Install <u>Eclipse IDE for Java Developers</u>
  - Double-click program icon in installation folder
- Use default "workspace" and click OK
- Close the "Welcome" tab

### Start Eclipse

🖨 Workspace Launcher							
Select a workspace							
Eclipse store Choose a wo	s your projects in a folder called a workspace. orkspace folder to use for this session.						
<u>W</u> orkspace:	/eecs/home/stevenc/workspace	✓ <u>B</u> rowse					
<mark> </mark>	s the default and do not ask again						
		OK Cancel					



## Create a Project

Must be done before creating a class
Select File > New > Java Project



## Create a Project

 Type "Chap7" as the project name, then click Finish (ignore all other options)



#### Create a Class

#### Select File > New > Class

😂 Java - Eclipse								
File	Edit Run	Source N	Vavigate	Search Proj	ect l	Refactor Window Help		
	New			Alt+Shift+N ▶	1	Java Project	Ø	
	Open File				1	Android Application Project		
	Close Ctrl Close All Ctrl+Shift		Ctrl+W	Ctrl+W Droject				
			Ctrl+Shift+W	<b>*</b>	Dackage			
	Save	Ctrl+S Ctrl+Shift+S		G	Class			
	Save As				U	intendCe		
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	Revert				@	Annotation		
					69	Source Folder		

#### **Create a Class**

Type "BMI" as the name and enable the main method stub

Na <u>m</u> e:	BMI	
Modifiers:	eaplic ◎ default ◎ private ◎ protected     abstract    final   static	
Superclass:	java.lang.Object	Brows <u>e</u>
Interfaces:		<u>A</u> dd
Which method stub	ould you like to create?     [☑] ptblic static <u>v</u> oid main(String[] args)	
Do you want to add	<ul> <li><u>C</u>enstructors from superclass</li> <li>Ir <u>n</u>erited abstract methods</li> <li>comments? (Configure templates and default value <u>here</u>)</li> <li>Generate comments</li> </ul>	

# Calculate BMI

- Prompt for:
  - Weight in lbs
  - Height in feet'inches (convert to inches)
- Calculation:

# Calculate BMI

```
final int INCHES_PER_FOOT = 12;
final int BMI_IMPERIAL_CONV = 703;
// Get input
output.print("Enter weight in lbs. ");
double weight = input.nextDouble();
output.print("Enter height in ft'in. ");
String height = input.next();
// Calculate BMI
String h1 = height.substring(0, 1); // "feet" part of height
String h2 = height.substring(2); // "inches" part of height
int inches = Integer.parseInt(h1) * INCHES_PER_FOOT +
       Integer.parseInt(h2);
double bmi = weight / (inches * inches) * BMI_IMPERIAL_CONV;
            // Output
           output.printf("BMI: %.2f%n", bmi);
```

## Import Type

- Download type.jar to your directory
- Add it to the project to help with testing
  - Project > Properties > Java Build Path > Libraries

Properties for Chapt7		
type filter text	Java Build Path	⇔ • ⇔ • •
Resource Builden	🕮 Source 😂 Projects 🛋 Libraries 🏷 Order and Export	
Java Build Path	JARs and class folders on the build path:	
Java Compiler	➡ JRE System Library [JavaSE-1.7]	Add JARs
Java Editor		Add External JARs
Project References		Add Variable
Run/Debug Settings		Add Library
Task Repository Task Tags		Add Class Folder
Validation		
WikiText		Add External Class Folder

### Create a JUnit Test

#### Select File > New > JUnit Test Case

😝 Java - Eclipse									
File	Edit Run Source	e Navigate Search Pro	ject	Refactor Window Help	_				
	New	Alt+Shift+N	• 😰	Java Project	e				
	Open File		2	Android Application Project	F				
	Close	Ctrl+W	2	Project	F				
	Close All	Ctrl+Shift+W	₿	Package	L				
	Save	Ctrl+S	G	Class	L				
	Save As		C	Interface	L				
R	Save All Ctrl+Shift+		G	Enum	L				
	Revert		@	Annotation	L				
	Move		-	Source Folder	L				
-2	Pename	E2	5	Java Working Set	L				
	Defeeth	12		Folder	L				
<u>«</u>	Kerresh	c1		File	L				
	Convert Line Delimi	ters To		Untitled Text File	L				
۵	Print	Ctrl+P	P	And Stat YML File	L				
	Switch Workspace			JUnit Test Case					
	Restart			10sH					

## Create a JUnit Test

- Enter the name "BMITest" and ensure that class under test is "BMI"
- Click "OK" to add JUnit to the build path

Na <u>m</u> e:	BMITest
<u>S</u> uperclass:	java.lang.Object Brows <u>e</u>
Which method	stubs would you like to create?
	setUpBeforeClass() 🔲 tearDown <u>A</u> fterClass()
	setUp()
	<u>c</u> onstructor
Do you want to	add comments? (Configure templates and default value here)
	<u>Generate comments</u>
Class under that	BMI B <u>r</u> owse

## Create a JUnit Test

```
@Test
public void test()
  final double WEIGHT = 160;
  final String HEIGHT = "5'9";
  double oracle = ToolBox.getBMI(WEIGHT, HEIGHT);
  String expected = "Enter weight in lbs." +
        "Enter height in ft'in. " +
  String.format("BMI: %.2f%n", oracle);
  String actual = ToolBox.launch("BMI",
          + WEIGHT + "n" + HEIGHT + "n"):
  assertEquals(expected, actual);
```

## Run a JUnit Test

Ensure the BMITest.java tab is selected and select Run > Run As > JUnit Test

😂 Java - Chapt7/src/BMITest.java - Eclipse													
<u>F</u> ile	<u>E</u> dit	Run	<u>S</u> ource	Refac <u>t</u> or	<u>N</u> avigate	Se <u>a</u> rch	<u>P</u> roject	<u>W</u> indow	/ <u>H</u> elp				
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	()))							To	alBox.				

### Pass a JUnit Test

If the test passes, then you should see a green bar in the JUnit pane



## Fail a JUnit Test

Change the following lines in BMI.java:

output.print("Enter weight in lbs. "); double weight = input.nextDouble(); output.print("Enter hieght in ft'in.");

Notice the missing space and spelling mistake

## Fail a JUnit Test

Run the test again and a red bar will appear



#### Double click on the test in the Failure Trace



## Fail a JUnit Test

The expected and actual output are shown, with differences highlighted in red

Result Comparison								
test(BMITest)								
Expected	Actual							
Enter weight in lbs.Enter height in ft'in.BMI: 2	Enter weight in los. Enter hieght in ft'in.							
?	ОК							
-								

#### In Practice

- Multiple tests would be created, each testing a different aspect of the program
- Discrepancies would be fixed and all the tests would be re-run
- Continue until all tests pass