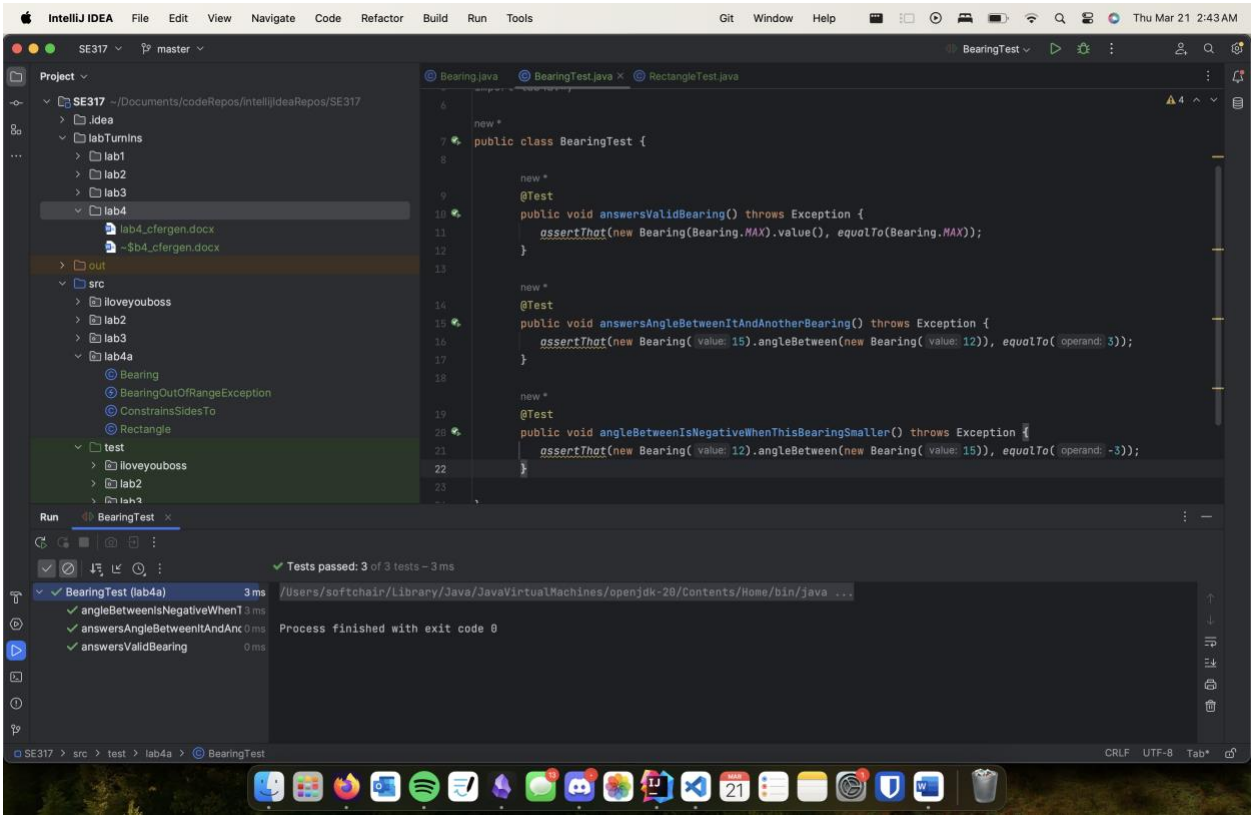
Lab4

cfergen

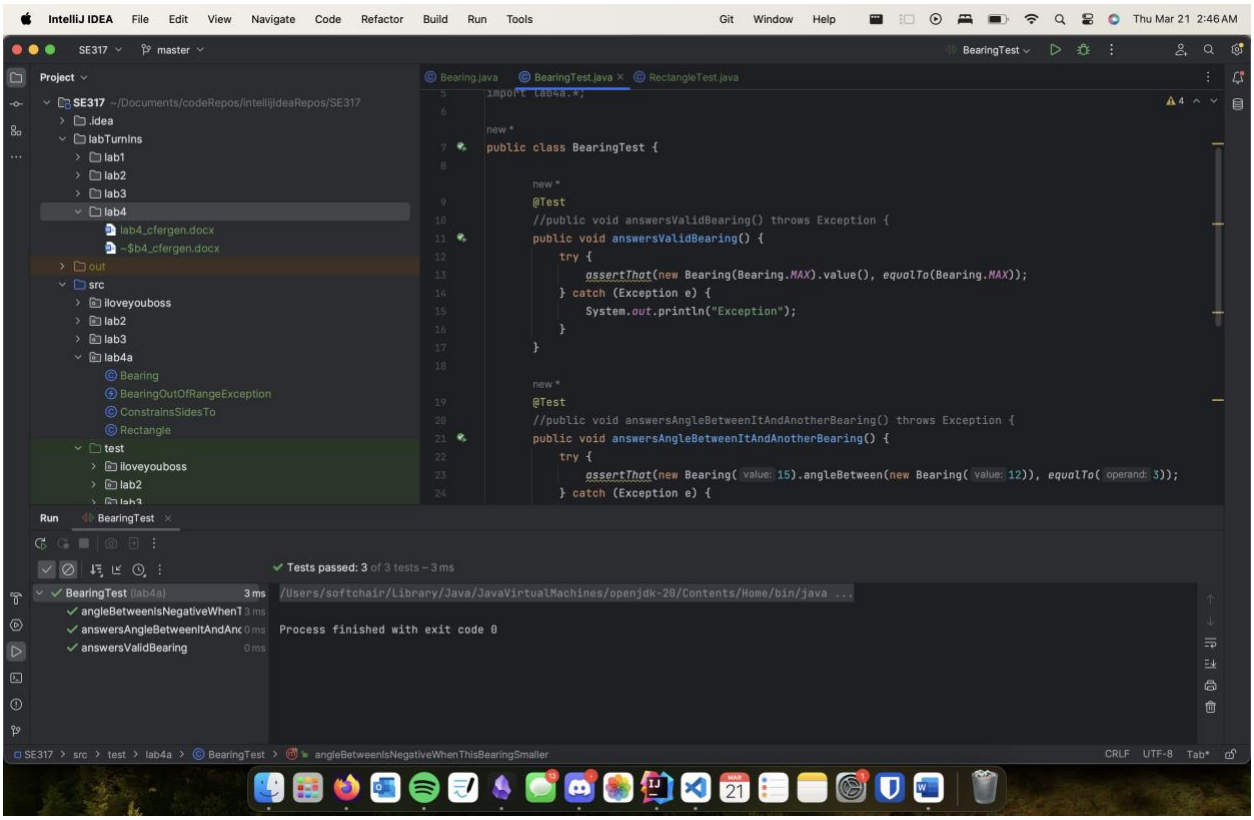
Part A

Part1:

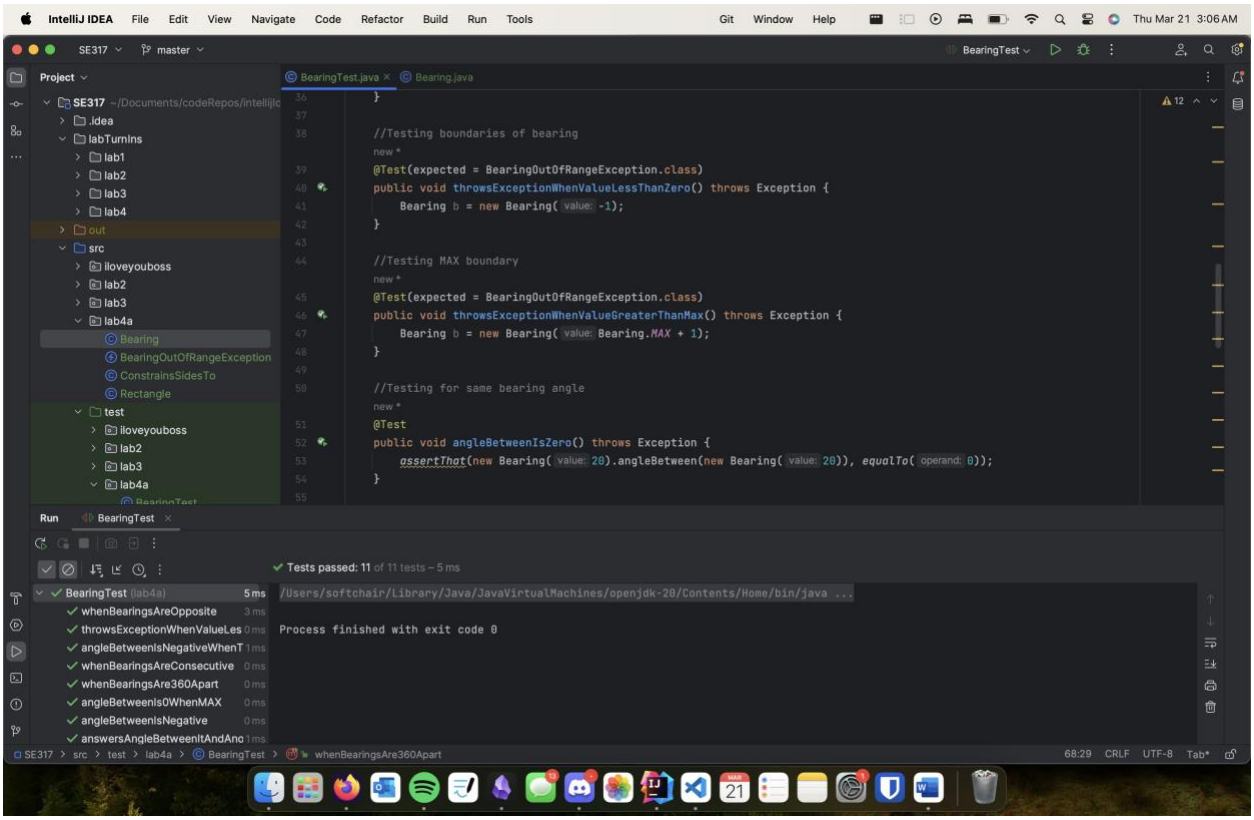
Throw

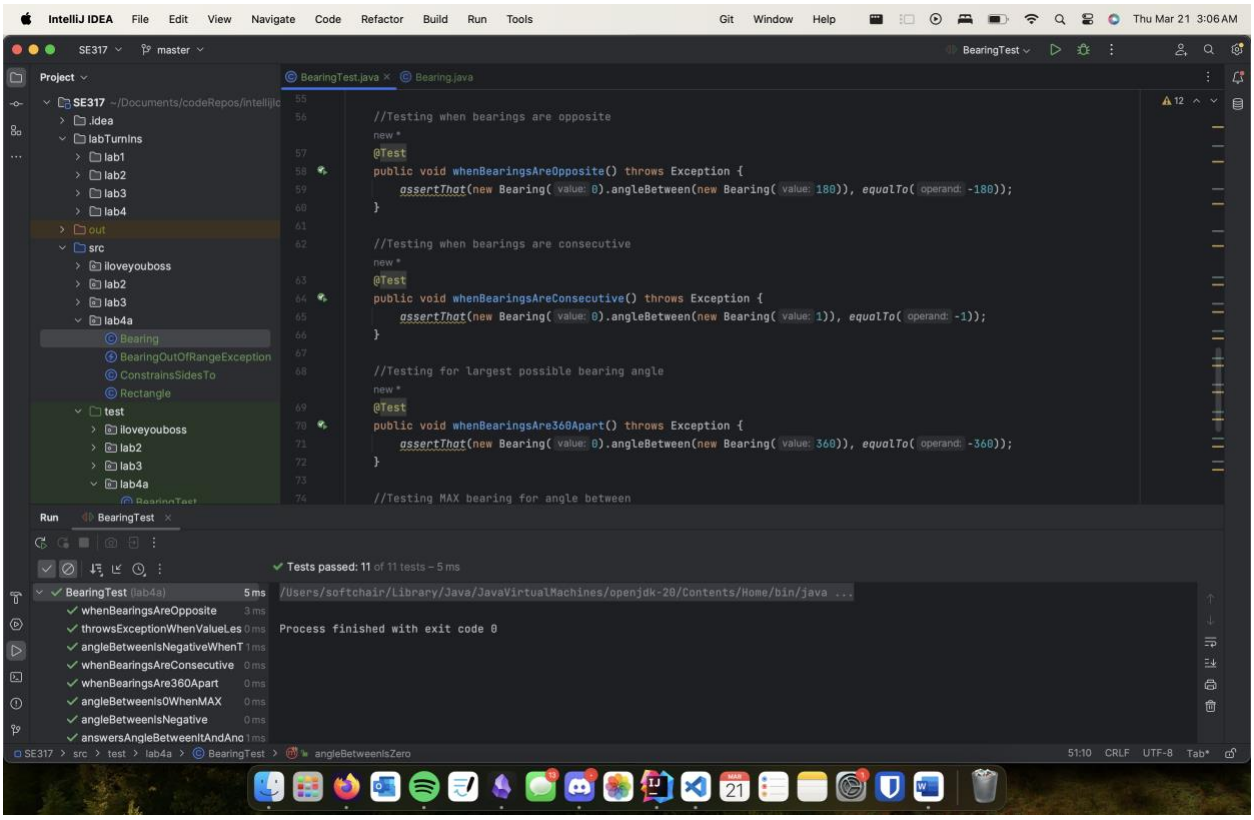


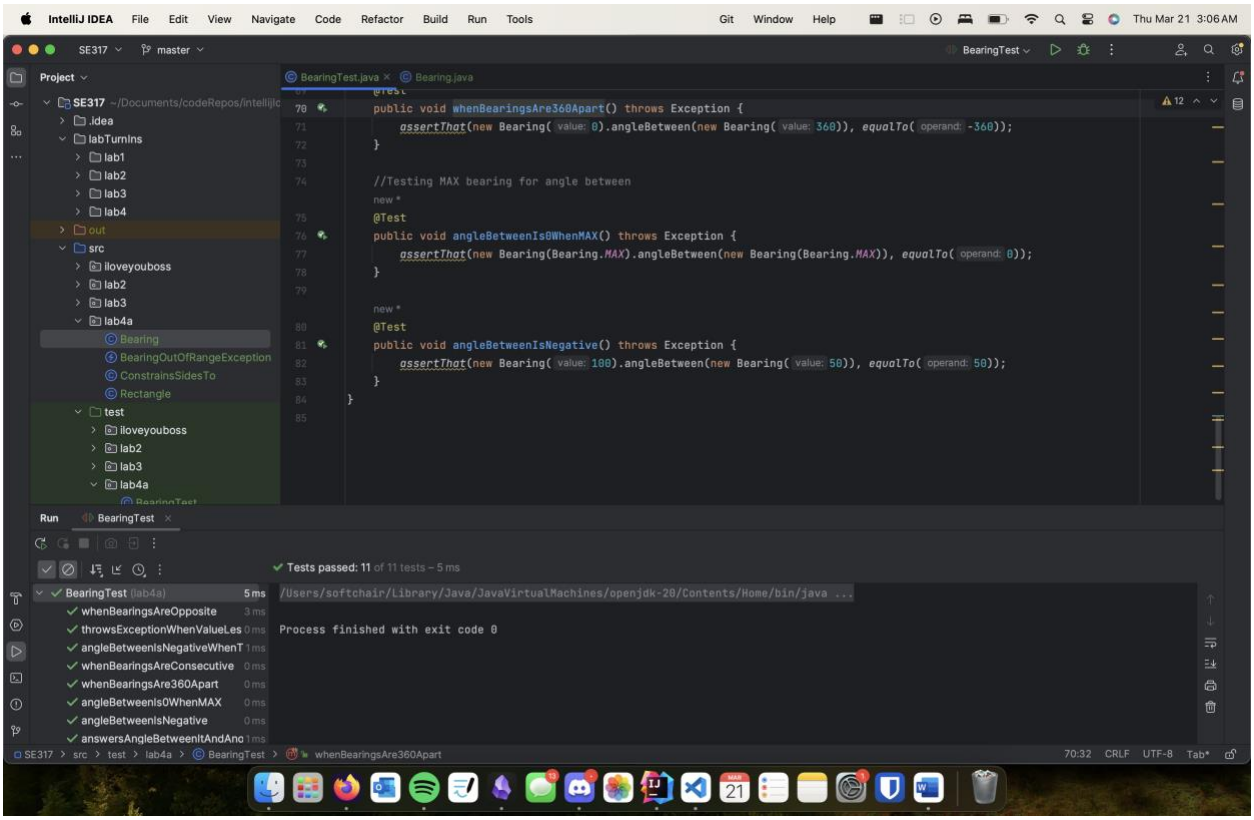
Try/Catch


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 2:46 AM
SE317 master BearingTest
Project
SE317 ~/Documents/codeRepos/intellijIdeaRepos/SE317
.idea
labTurnIns
lab1
lab2
lab3
lab4
lab4_cfergen.docx
~$b4_cfergen.docx
out
src
iloveyouboss
lab2
lab3
lab4a
Bearing
BearingOutOfRangeException
ConstrainsSidesTo
Rectangle
test
iloveyouboss
lab2
Bearing.java
BearingTest.java
RectangleTest.java
import lab4a.*;
public class BearingTest {
@Test
//public void answersValidBearing() throws Exception {
public void answersValidBearing() {
try {
assertThat(new Bearing(Bearing.MAX).value(), equalTo(Bearing.MAX));
} catch (Exception e) {
System.out.println("Exception");
}
}
@Test
//public void answersAngleBetweenItAndAnotherBearing() throws Exception {
public void answersAngleBetweenItAndAnotherBearing() {
try {
assertThat(new Bearing(value: 15).angleBetween(new Bearing(value: 12)), equalTo(operand: 3));
} catch (Exception e) {
Run BearingTest
Tests passed: 3 of 3 tests – 3 ms
BearingTest (lab4a) 3 ms
angleBetweenIsNegativeWhenT 3 ms
answersAngleBetweenItAndAnc 0 ms
answersValidBearing 0 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4a > BearingTest > angleBetweenIsNegativeWhenThisBearingSmaller
CRLF UTF-8 Tab*

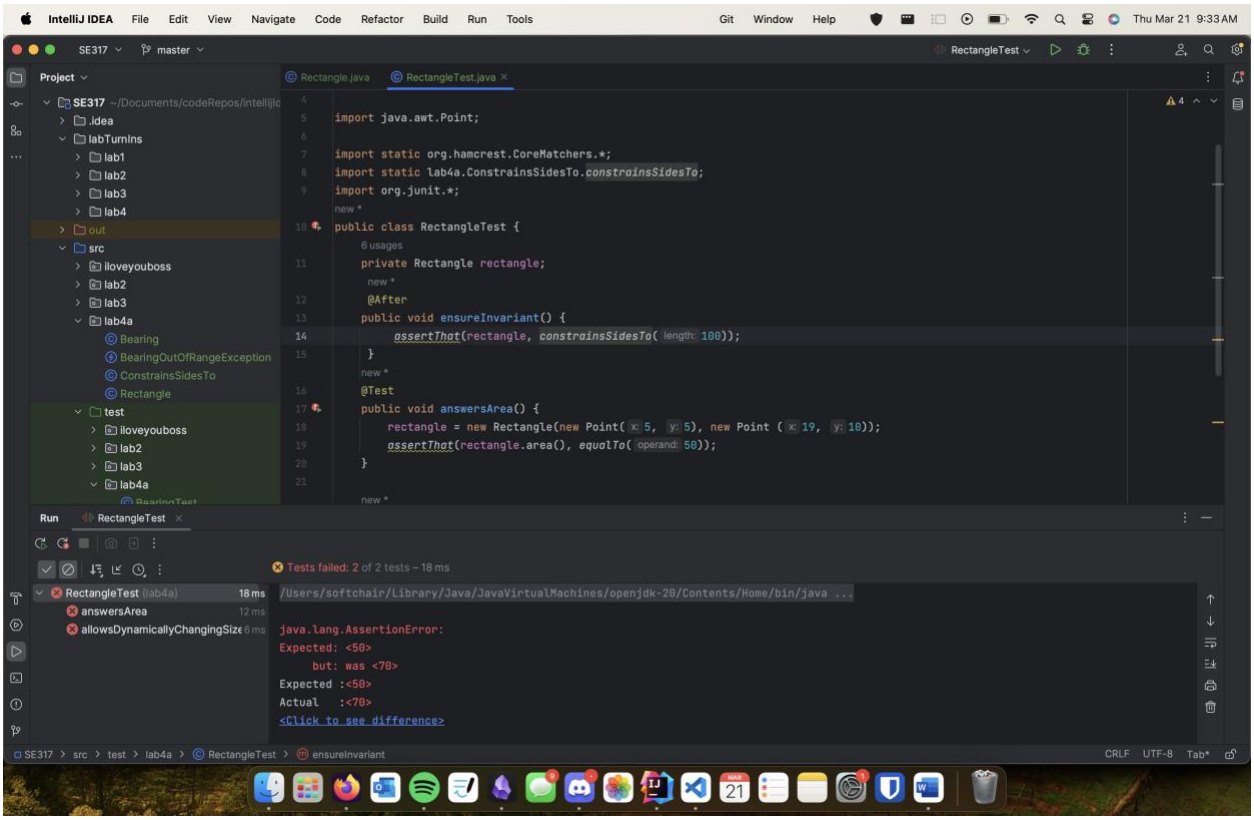
Part2:

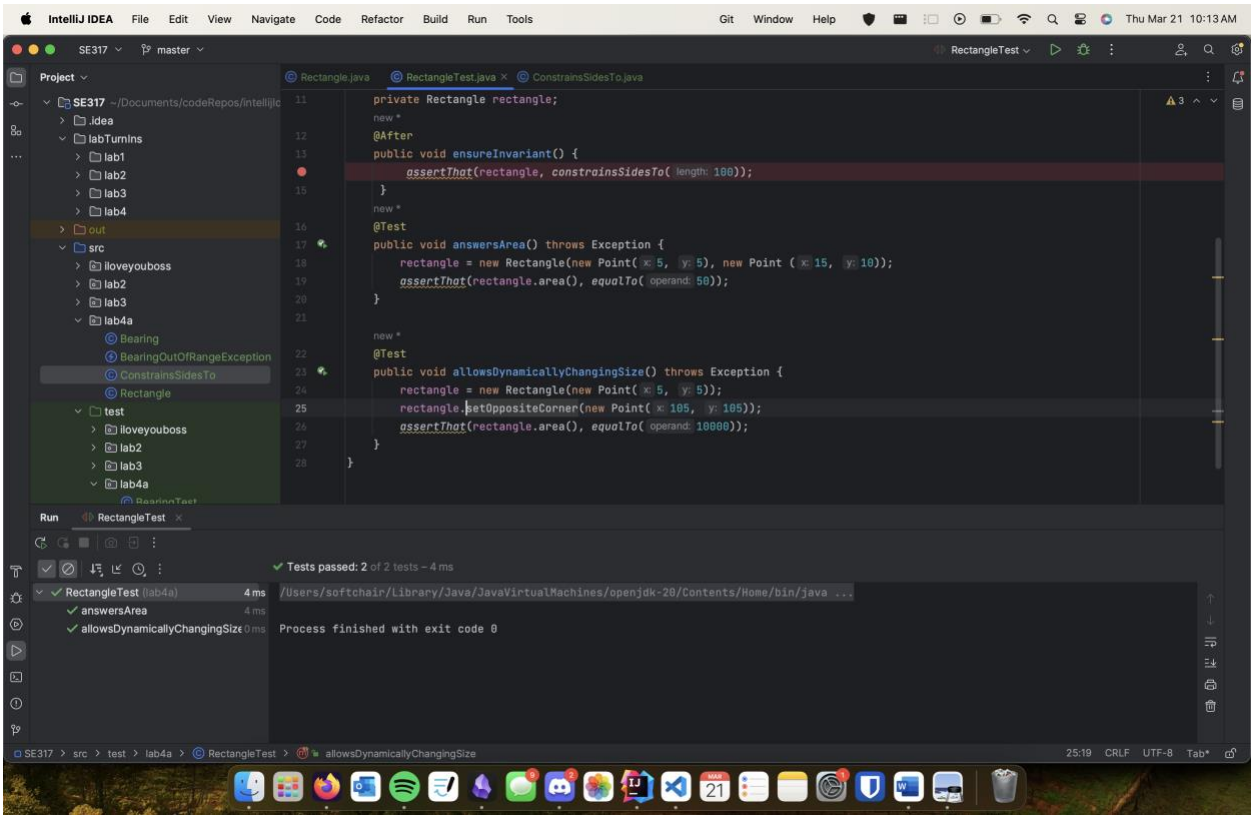

IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:06 AM
SE317 master BearingTest
Project
BearingTest.java Bearing.java
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a
Bearing
BearingOutOfRangeException
ConstrainsSidesTo
Rectangle
test
iloveyouboss
lab2
lab3
lab4a
36 }
37
38 //Testing boundaries of bearing
new *
39 @Test(expected = BearingOutOfRangeException.class)
40 public void throwsExceptionWhenValueLessThanZero() throws Exception {
41 Bearing b = new Bearing(value: -1);
42 }
43
44 //Testing MAX boundary
new *
45 @Test(expected = BearingOutOfRangeException.class)
46 public void throwsExceptionWhenValueGreaterThanMax() throws Exception {
47 Bearing b = new Bearing(value: Bearing.MAX + 1);
48 }
49
50 //Testing for same bearing angle
new *
51 @Test
52 public void angleBetweenIsZero() throws Exception {
53 assertThat(new Bearing(value: 20).angleBetween(new Bearing(value: 20)), equalTo(operand: 0));
54 }
55
Run BearingTest
Tests passed: 11 of 11 tests – 5 ms
BearingTest (lab4a) 5 ms
whenBearingsAreOpposite 3 ms
throwsExceptionWhenValueLes 0 ms
angleBetweenIsNegativeWhenT 1 ms
whenBearingsAreConsecutive 0 ms
whenBearingsAre360Apart 0 ms
angleBetweenIs0WhenMAX 0 ms
angleBetweenIsNegative 0 ms
answersAngleBetweenItAndAnc 1 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4a > BearingTest > whenBearingsAre360Apart
68:29 CRLF UTF-8 Tab*


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:06 AM
SE317 master BearingTest
Project
BearingTest.java Bearing.java
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a
Bearing
BearingOutOfRangeException
ConstrainsSidesTo
Rectangle
test
iloveyouboss
lab2
lab3
lab4a
55
56 //Testing when bearings are opposite
new *
57 @Test
58 public void whenBearingsAreOpposite() throws Exception {
59 assertThat(new Bearing(value: 0).angleBetween(new Bearing(value: 180)), equalTo(operand: -180));
60 }
61
62 //Testing when bearings are consecutive
new *
63 @Test
64 public void whenBearingsAreConsecutive() throws Exception {
65 assertThat(new Bearing(value: 0).angleBetween(new Bearing(value: 1)), equalTo(operand: -1));
66 }
67
68 //Testing for largest possible bearing angle
new *
69 @Test
70 public void whenBearingsAre360Apart() throws Exception {
71 assertThat(new Bearing(value: 0).angleBetween(new Bearing(value: 360)), equalTo(operand: -360));
72 }
73
74 //Testing MAX bearing for angle between
Run BearingTest
Tests passed: 11 of 11 tests – 5 ms
BearingTest (lab4a) 5 ms
whenBearingsAreOpposite 3 ms
throwsExceptionWhenValueLes 0 ms
angleBetweenIsNegativeWhenT 1 ms
whenBearingsAreConsecutive 0 ms
whenBearingsAre360Apart 0 ms
angleBetweenIs0WhenMAX 0 ms
angleBetweenIsNegative 0 ms
answersAngleBetweenItAndAnc 1 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4a > BearingTest > angleBetweenIsZero
51:10 CRLF UTF-8 Tab*


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:06 AM
SE317 master BearingTest
Project
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a
Bearing
BearingOutOfRangeException
ConstrainsSidesTo
Rectangle
test
iloveyouboss
lab2
lab3
lab4a
BearingTest.java
Bearing.java
public void whenBearingsAre360Apart() throws Exception {
assertThat(new Bearing(value: 0).angleBetween(new Bearing(value: 360)), equalTo(operand: -360));
}
//Testing MAX bearing for angle between
new *
@Test
public void angleBetweenIs0WhenMAX() throws Exception {
assertThat(new Bearing(Bearing.MAX).angleBetween(new Bearing(Bearing.MAX)), equalTo(operand: 0));
}
new *
@Test
public void angleBetweenIsNegative() throws Exception {
assertThat(new Bearing(value: 100).angleBetween(new Bearing(value: 50)), equalTo(operand: 50));
}
}
Run BearingTest
Tests passed: 11 of 11 tests – 5 ms
BearingTest (lab4a) 5 ms
whenBearingsAreOpposite 3 ms
throwsExceptionWhenValueLes 0 ms
angleBetweenIsNegativeWhenT 1 ms
whenBearingsAreConsecutive 0 ms
whenBearingsAre360Apart 0 ms
angleBetweenIs0WhenMAX 0 ms
angleBetweenIsNegative 0 ms
answersAngleBetweenItAndAno 1 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4a > BearingTest > whenBearingsAre360Apart
70:32 CRLF UTF-8 Tab*

Part3:


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 9:33 AM
SE317 master RectangleTest
Project
Rectangle.java RectangleTest.java
import java.awt.Point;
import static org.hamcrest.CoreMatchers.*;
import static lab4a.ConstrainsSidesTo.constrainsSidesTo;
import org.junit.*;
public class RectangleTest {
6 usages
private Rectangle rectangle;
@After
public void ensureInvariant() {
assertThat(rectangle, constrainsSidesTo(length: 100));
}
@Test
public void answersArea() {
rectangle = new Rectangle(new Point(x: 5, y: 5), new Point (x: 19, y: 10));
assertThat(rectangle.area(), equalTo(operand: 50));
}
Run RectangleTest
Tests failed: 2 of 2 tests – 18 ms
RectangleTest (lab4a) 18 ms
answersArea 12 ms
allowsDynamicallyChangingSize 6 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
java.lang.AssertionError:
Expected: <50>
but: was <70>
Expected :<50>
Actual :<70>
<Click to see difference>
SE317 > src > test > lab4a > RectangleTest > ensureInvariant
CRLF UTF-8 Tab*


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 10:13 AM
SE317 master RectangleTest
Project
Rectangle.java RectangleTest.java ConstrainsSidesTo.java
private Rectangle rectangle;
@After
public void ensureInvariant() {
assertThat(rectangle, constrainsSidesTo(length: 100));
}
@Test
public void answersArea() throws Exception {
rectangle = new Rectangle(new Point(x: 5, y: 5), new Point (x: 15, y: 10));
assertThat(rectangle.area(), equalTo(operand: 50));
}
@Test
public void allowsDynamicallyChangingSize() throws Exception {
rectangle = new Rectangle(new Point(x: 5, y: 5));
rectangle.setOppositeCorner(new Point(x: 105, y: 105));
assertThat(rectangle.area(), equalTo(operand: 10000));
}
}
Run RectangleTest
Tests passed: 2 of 2 tests – 4 ms
RectangleTest (lab4a) 4 ms
answersArea 4 ms
allowsDynamicallyChangingSize 0 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4a > RectangleTest > allowsDynamicallyChangingSize
25:19 CRLF UTF-8 Tab*

I really had no clue what the lab was asking for this as it was very confusing and the book was not helpful in trying to understand what needed to be done.

Q: What is throw exception

Throw exception will throw an exception when the program hits an error, instead of causing the program to fail and not finish the tests. It allows the user to understand the error better.

Q: What is try-catch

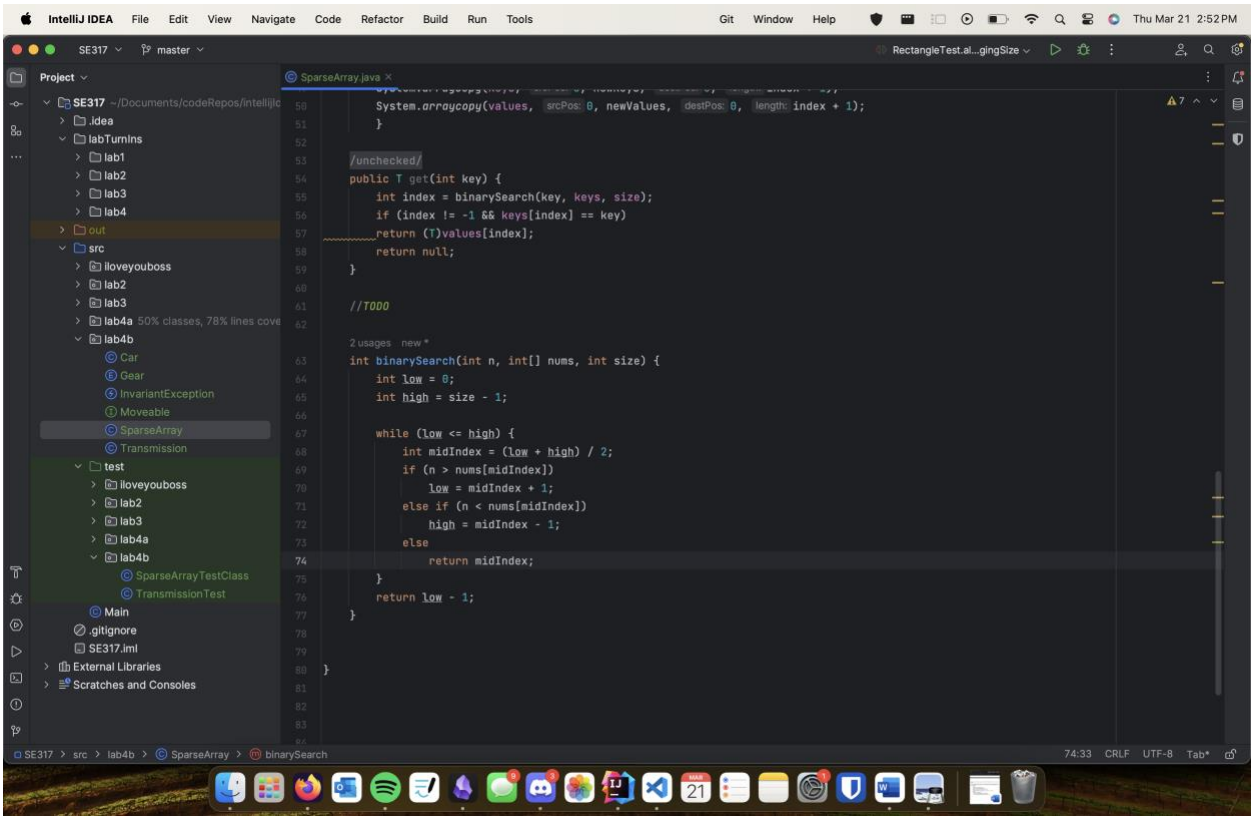
Try catch methods are exactly as they sound. First they will try to execute some commands, which may or may not lead to an exception. If it runs into an exceptions, instead of quitting the program the code catches it and either you can attempt to fix it, or return some error or something of the likes.

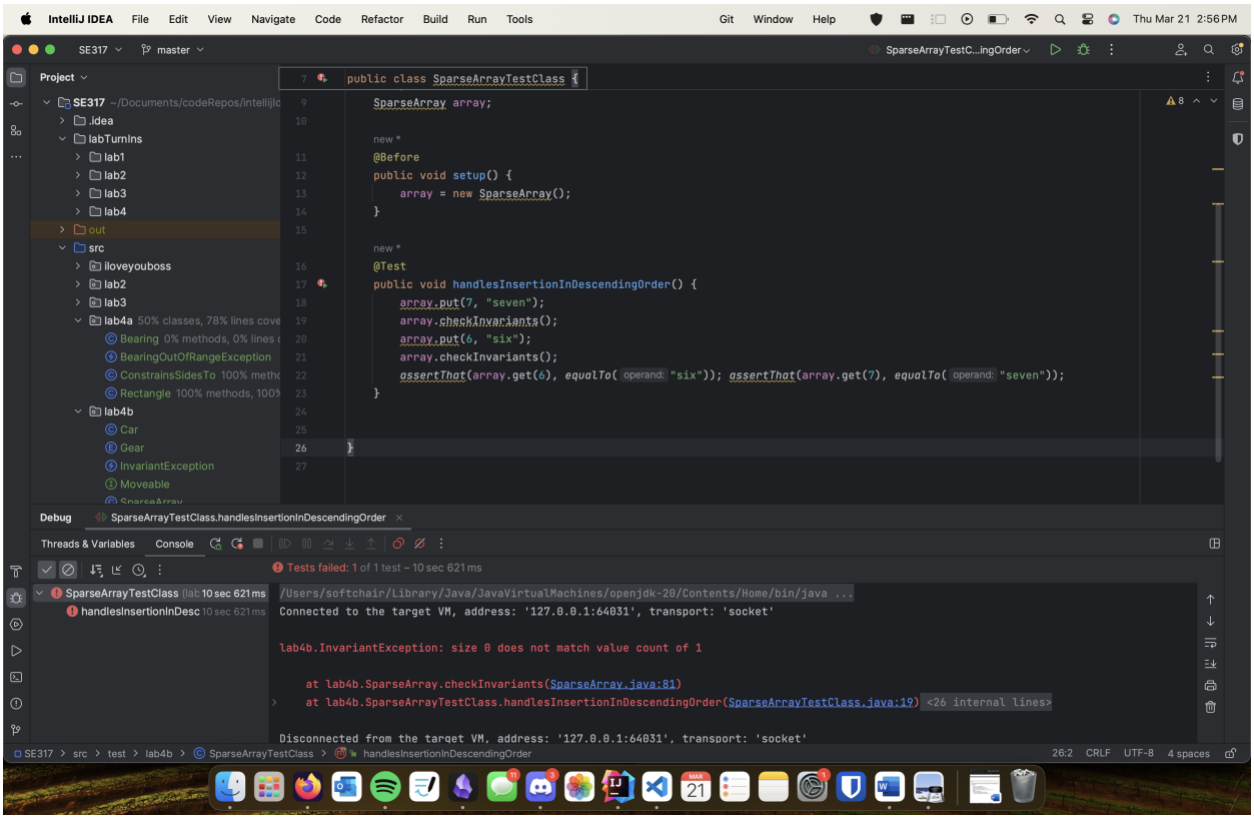
Q: Any difference?

The difference is with try catch you can try and fix the error and also don't have to declare in the method function that itll throw an exception and with just throwing the exception something else will have to eventually catch it.

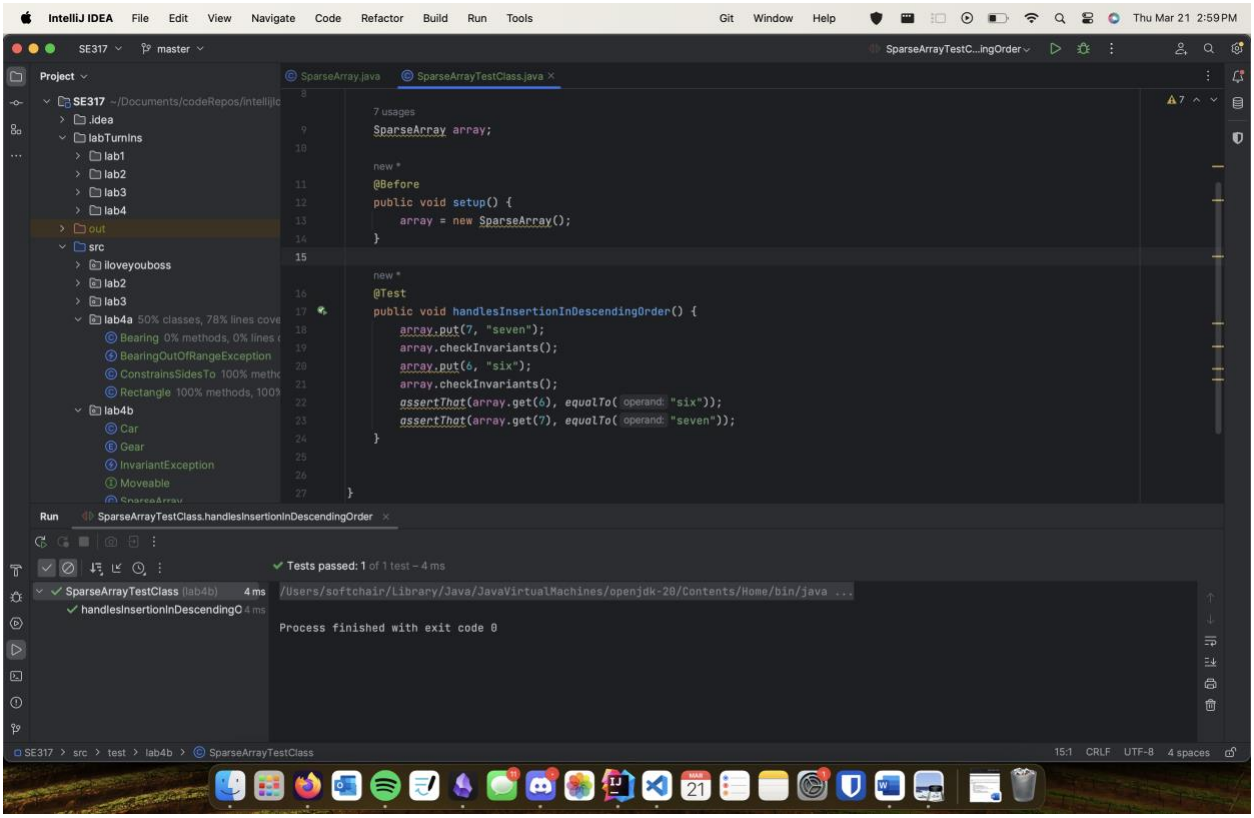
Part B

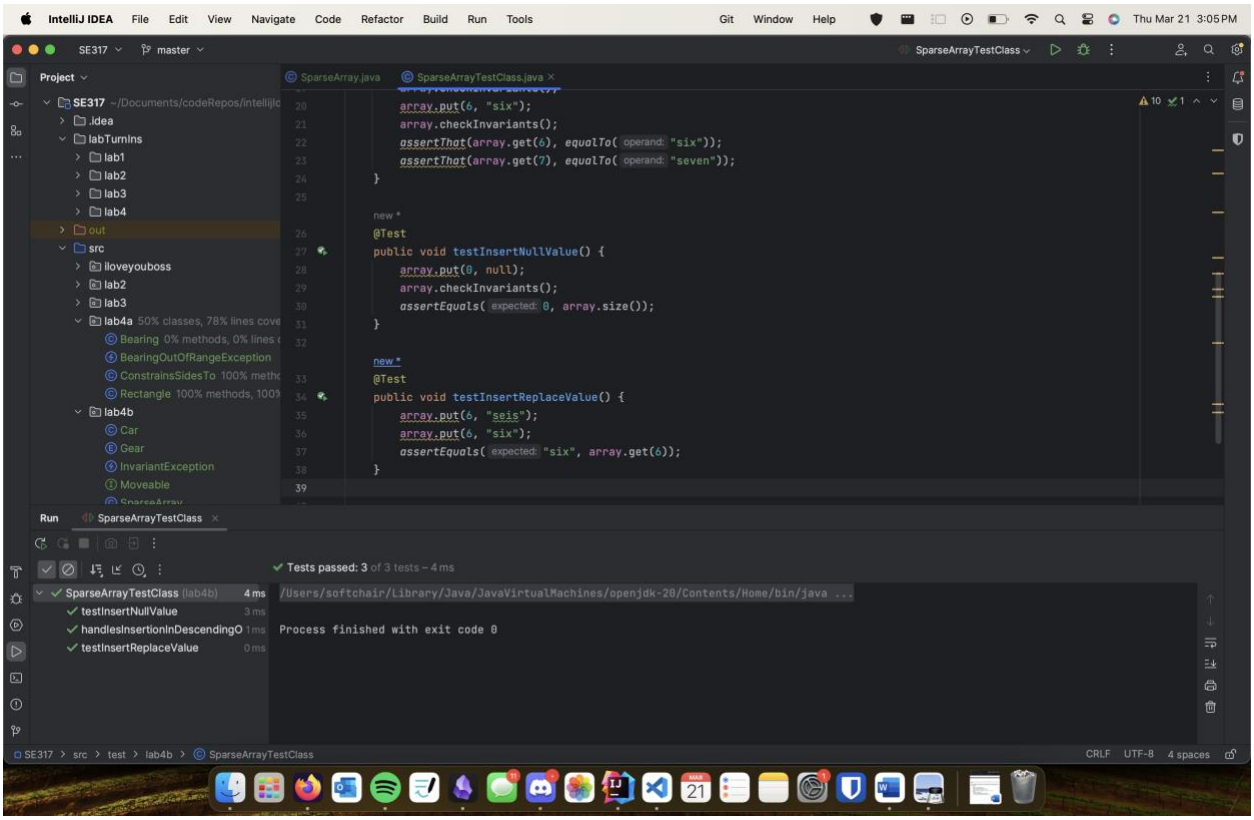
Part1:


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 2:52 PM
SE317 master
RectangleTest.al...gingSize
Project
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a 50% classes, 78% lines cove
lab4b
Car
Gear
InvariantException
Moveable
SparseArray
Transmission
test
iloveyouboss
lab2
lab3
lab4a
lab4b
SparseArrayTestClass
TransmissionTest
Main
.gitignore
SE317.iml
External Libraries
Scratches and Consoles
SparseArray.java
System.arraycopy(values, srcPos: 0, newValues, destPos: 0, length: index + 1);
/unchecked/
public T get(int key) {
int index = binarySearch(key, keys, size);
if (index != -1 && keys[index] == key)
return (T)values[index];
return null;
}
//TODO
2 usages new *
int binarySearch(int n, int[] nums, int size) {
int low = 0;
int high = size - 1;
while (low <= high) {
int midIndex = (low + high) / 2;
if (n > nums[midIndex])
low = midIndex + 1;
else if (n < nums[midIndex])
high = midIndex - 1;
else
return midIndex;
}
return low - 1;
}
}
SE317 > src > lab4b > SparseArray > binarySearch
74:33 CRLF UTF-8 Tab*

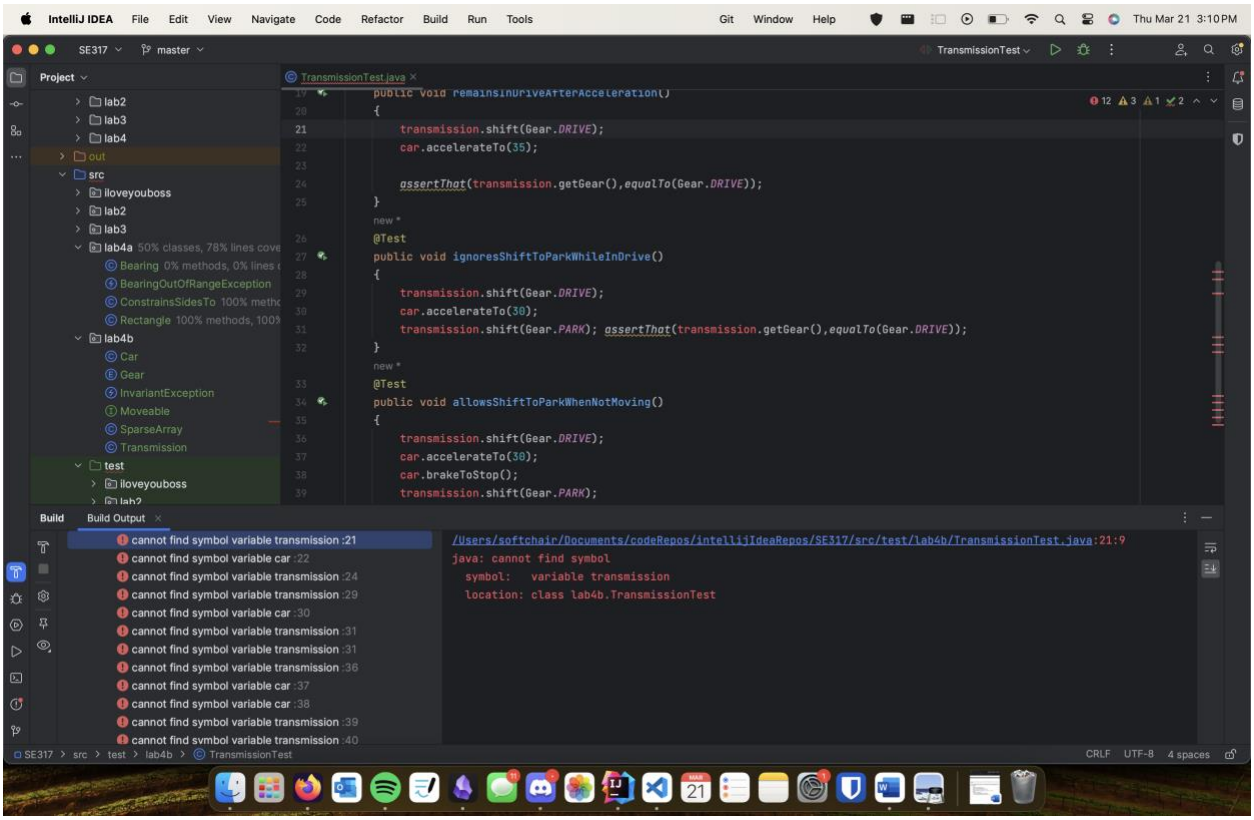

IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 2:56 PM
SE317 master
SparseArrayTestC...ingOrder
Project
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a 50% classes, 78% lines cove
Bearing 0% methods, 0% lines
BearingOutOfRangeException
ConstrainsSidesTo 100% metho
Rectangle 100% methods, 100%
lab4b
Car
Gear
InvariantException
Moveable
public class SparseArrayTestClass {
SparseArray array;
new *
@Before
public void setup() {
array = new SparseArray();
}
new *
@Test
public void handlesInsertionInDescendingOrder() {
array.put(7, "seven");
array.checkInvariants();
array.put(6, "six");
array.checkInvariants();
assertThat(array.get(6), equalTo(operand: "six")); assertThat(array.get(7), equalTo(operand: "seven"));
}
}
Debug SparseArrayTestClass.handlesInsertionInDescendingOrder
Threads & Variables Console
Tests failed: 1 of 1 test – 10 sec 621 ms
SparseArrayTestClass (lab 10 sec 621 ms
handlesInsertionInDesc 10 sec 621 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Connected to the target VM, address: '127.0.0.1:64031', transport: 'socket'
lab4b.InvariantException: size 0 does not match value count of 1
at lab4b.SparseArray.checkInvariants(SparseArray.java:81)
at lab4b.SparseArrayTestClass.handlesInsertionInDescendingOrder(SparseArrayTestClass.java:19) <26 internal lines>
Disconnected from the target VM, address: '127.0.0.1:64031', transport: 'socket'
SE317 > src > test > lab4b > SparseArrayTestClass > handlesInsertionInDescendingOrder
26:2 CRLF UTF-8 4 spaces

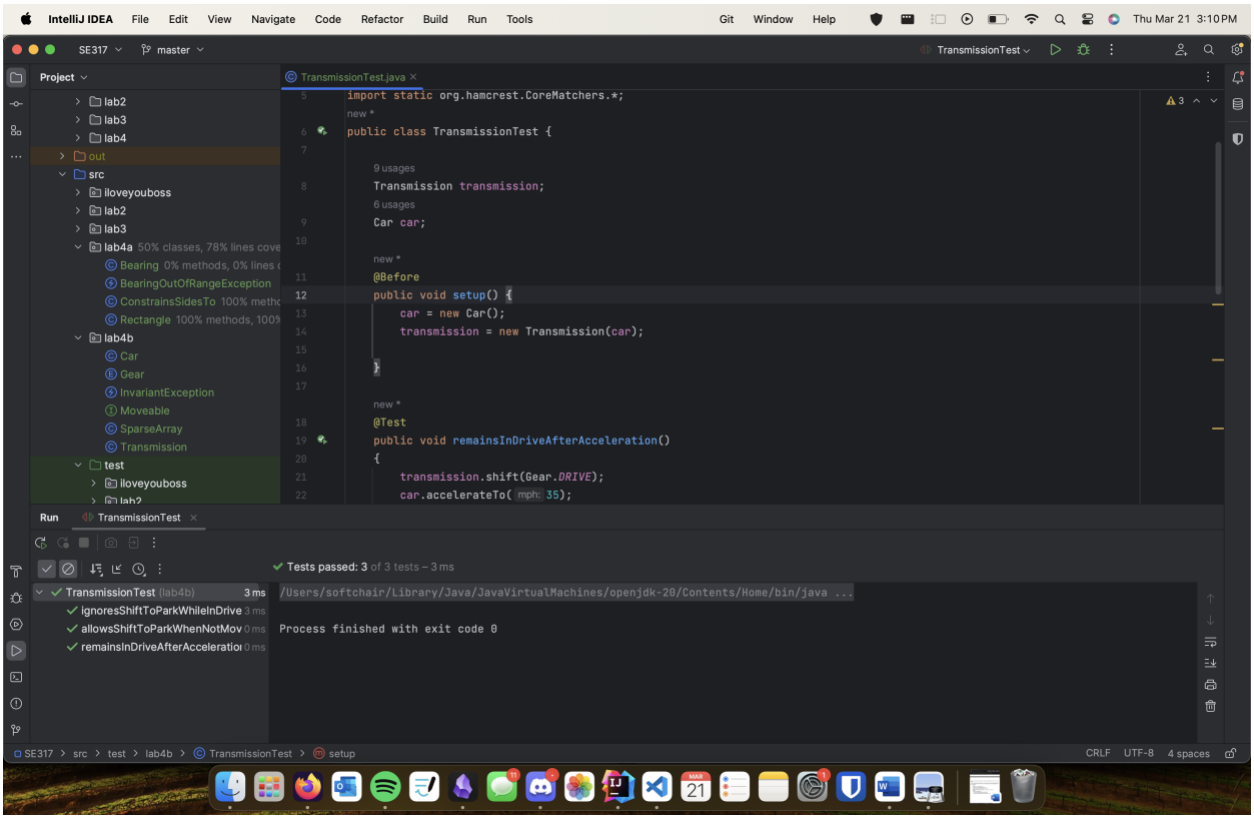
The problem was that the put function never incremented the size of the sparsearray, which meant that it was always zero. To fix this you simply need to add a size++; in the put after the if else statement so that it always increments it as its always adding to the array.




IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:05 PM
SE317 master SparseArrayTestClass
Project
SparseArray.java SparseArrayTestClass.java
SE317 ~/Documents/codeRepos/intellijIc
.idea
labTurnIns
lab1
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a 50% classes, 78% lines cove
Bearing 0% methods, 0% lines
BearingOutOfRangeException
ConstrainsSidesTo 100% metho
Rectangle 100% methods, 100%
lab4b
Car
Gear
InvariantException
Moveable
array.put(6, "six");
array.checkInvariants();
assertThat(array.get(6), equalTo(operand: "six"));
assertThat(array.get(7), equalTo(operand: "seven"));
}
new *
@Test
public void testInsertNullValue() {
array.put(0, null);
array.checkInvariants();
assertEquals(expected: 0, array.size());
}
new *
@Test
public void testInsertReplaceValue() {
array.put(6, "seis");
array.put(6, "six");
assertEquals(expected: "six", array.get(6));
}
Run SparseArrayTestClass
Tests passed: 3 of 3 tests – 4 ms
SparseArrayTestClass (lab4b) 4 ms
testInsertNullValue 3 ms
handlesInsertionInDescendingO 1 ms
testInsertReplaceValue 0 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 > src > test > lab4b > SparseArrayTestClass
CRLF UTF-8 4 spaces

Part2:


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:10 PM
SE317 master TransmissionTest
Project
TransmissionTest.java
lab2
lab3
lab4
out
src
iloveyouboss
lab2
lab3
lab4a 50% classes, 78% lines cove
Bearing 0% methods, 0% lines
BearingOutOfRangeException
ConstrainsSidesTo 100% metho
Rectangle 100% methods, 100%
lab4b
Car
Gear
InvariantException
Moveable
SparseArray
Transmission
test
iloveyouboss
lab2
public void remainsInDriveAfterAcceleration()
{
transmission.shift(Gear.DRIVE);
car.accelerateTo(35);
assertThat(transmission.getGear(),equalTo(Gear.DRIVE));
}
new *
@Test
public void ignoresShiftToParkWhileInDrive()
{
transmission.shift(Gear.DRIVE);
car.accelerateTo(30);
transmission.shift(Gear.PARK); assertThat(transmission.getGear(),equalTo(Gear.DRIVE));
}
new *
@Test
public void allowsShiftToParkWhenNotMoving()
{
transmission.shift(Gear.DRIVE);
car.accelerateTo(30);
car.brakeToStop();
transmission.shift(Gear.PARK);
Build
Build Output
cannot find symbol variable transmission :21
cannot find symbol variable car :22
cannot find symbol variable transmission :24
cannot find symbol variable transmission :29
cannot find symbol variable car :30
cannot find symbol variable transmission :31
cannot find symbol variable transmission :31
cannot find symbol variable transmission :36
cannot find symbol variable car :37
cannot find symbol variable car :38
cannot find symbol variable transmission :39
cannot find symbol variable transmission :40
/Users/softchair/Documents/codeRepos/intellijIdeaRepos/SE317/src/test/lab4b/TransmissionTest.java:21:9
java: cannot find symbol
symbol: variable transmission
location: class lab4b.TransmissionTest
SE317 src test lab4b TransmissionTest
CRLF UTF-8 4 spaces


IntelliJ IDEA File Edit View Navigate Code Refactor Build Run Tools Git Window Help Thu Mar 21 3:10 PM
SE317 master TransmissionTest
Project
TransmissionTest.java
import static org.hamcrest.CoreMatchers.*;
new *
public class TransmissionTest {
9 usages
Transmission transmission;
6 usages
Car car;
new *
@Before
public void setup() {
car = new Car();
transmission = new Transmission(car);
}
new *
@Test
public void remainsInDriveAfterAcceleration()
{
transmission.shift(Gear.DRIVE);
car.accelerateTo(mph: 35);
Run
TransmissionTest
Tests passed: 3 of 3 tests – 3 ms
TransmissionTest (lab4b) 3 ms
ignoresShiftToParkWhileInDrive 3 ms
allowsShiftToParkWhenNotMov 0 ms
remainsInDriveAfterAccelerati 0 ms
/Users/softchair/Library/Java/JavaVirtualMachines/openjdk-20/Contents/Home/bin/java ...
Process finished with exit code 0
SE317 src test lab4b TransmissionTest setup
CRLF UTF-8 4 spaces

Part3:

Q: What does checkInvariants() method do?

The checkInvariants method takes all the non null values from the array, and the compares it to the size that the program has been incrementing over time. If they are not the same it will throw a InvariantException saying the size was not the same

Q: What does Transmission.Java class do?

Transmission makes sure that when trying to shift gears, the moveable (which can be a car, or another class that extends it) is not moving and not already in park. If it is moving you cant put the car in park, and when its not moving you can put the car into park.