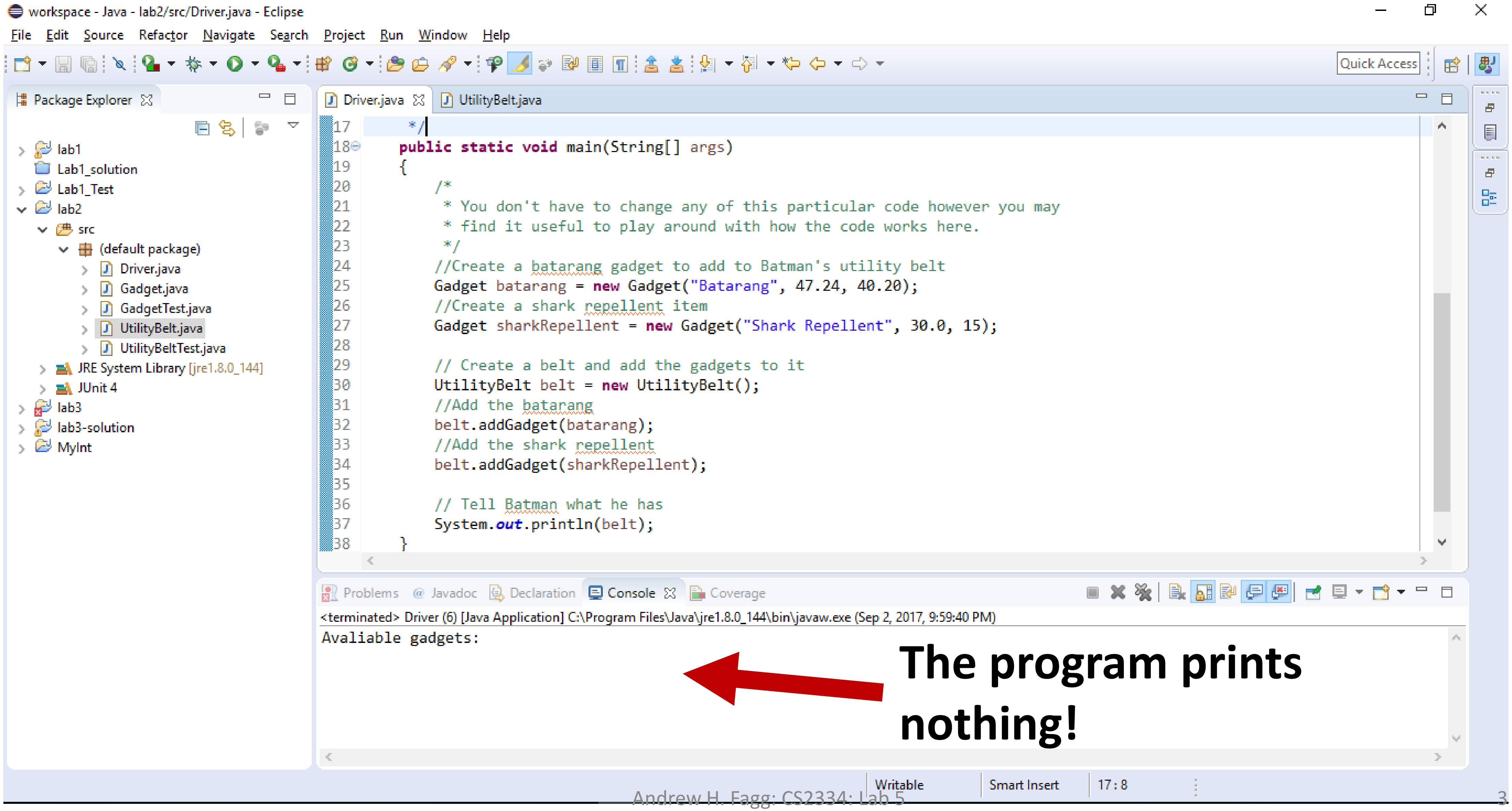
CS 2334: Debugger

Using the Eclipse Debugger

Sometimes we want to be able to see what our program is "thinking" at various times….

Recall Lab 2 …

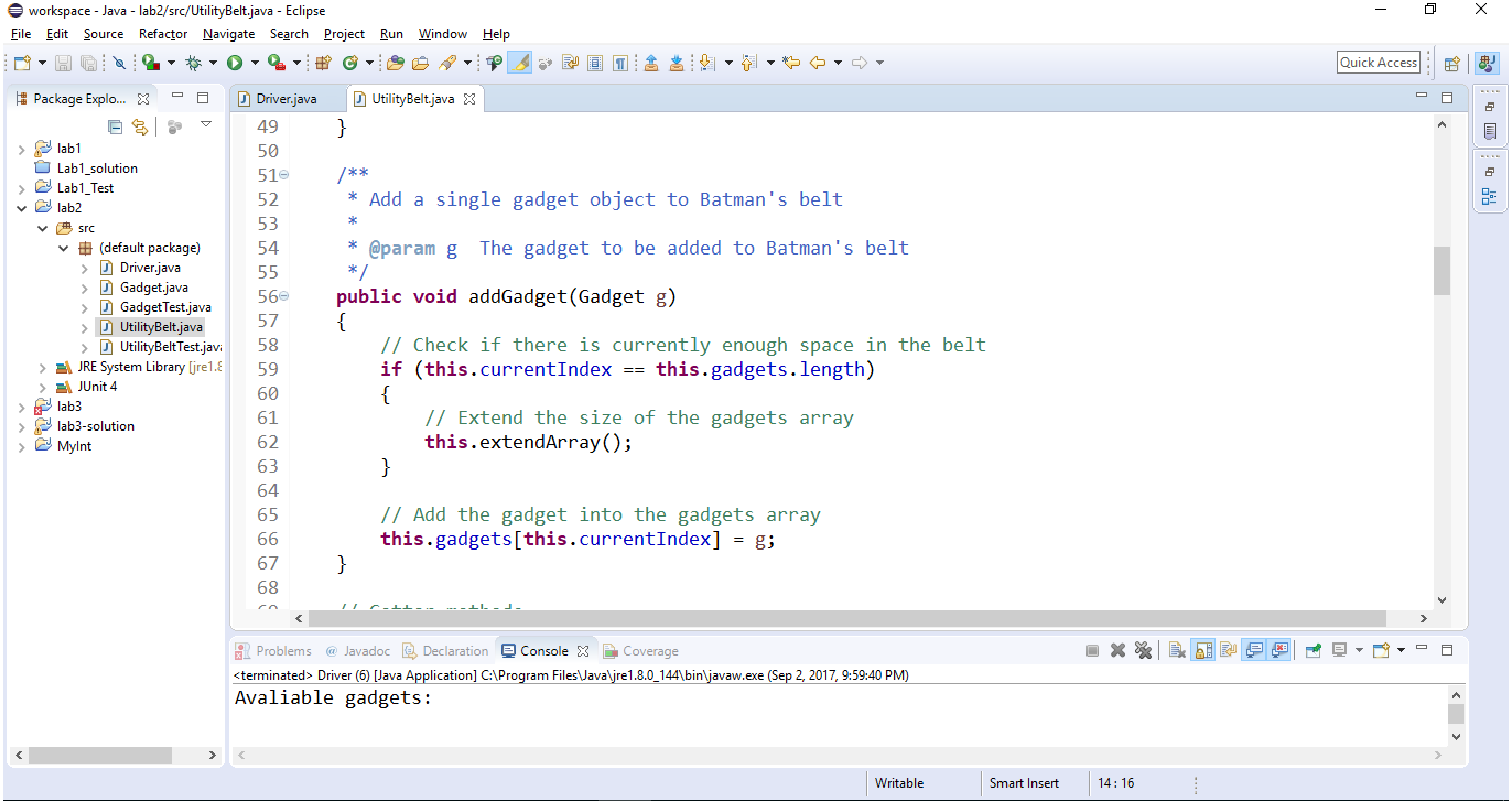


```java
	 */
	public static void main(String[] args)
	{
		/*
		 * You don't have to change any of this particular code however you may
		 * find it useful to play around with how the code works here.
		 */
		//Create a batarang gadget to add to Batman's utility belt
		Gadget batarang = new Gadget("Batarang", 47.24, 40.20);
		//Create a shark repellent item
		Gadget sharkRepellent = new Gadget("Shark Repellent", 30.0, 15);

		// Create a belt and add the gadgets to it
		UtilityBelt belt = new UtilityBelt();
		//Add the batarang
		belt.addGadget(batarang);
		//Add the shark repellent
		belt.addGadget(sharkRepellent);

		// Tell Batman what he has
		System.out.println(belt);
	}
```

```
<terminated> Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 9:59:40 PM)
Avaliable gadgets:
```

The program prints nothing!

Maybe addGadget() is the problem…

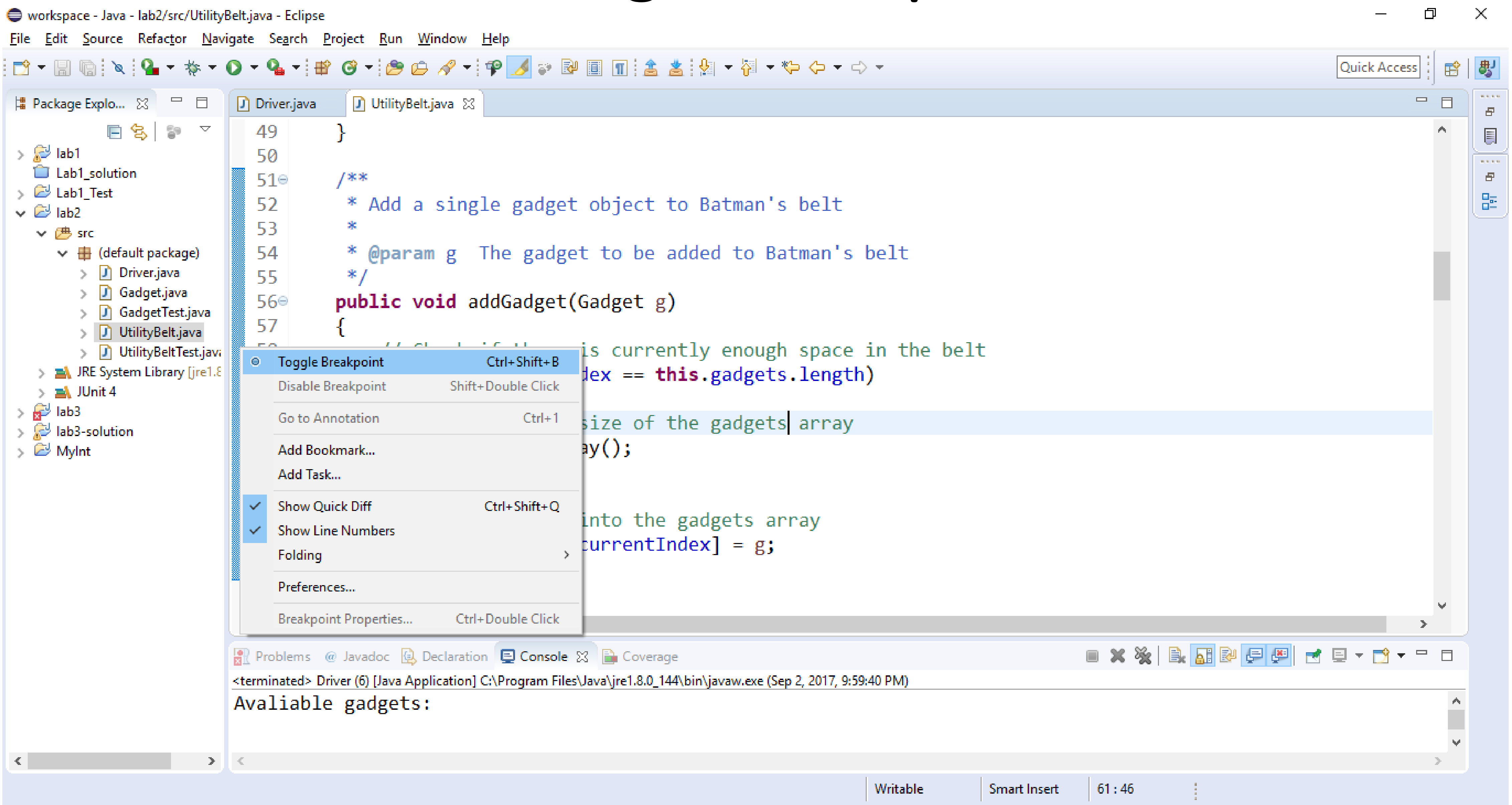


```java
    }

    /**
     * Add a single gadget object to Batman's belt
     *
     * @param g  The gadget to be added to Batman's belt
     */
    public void addGadget(Gadget g)
    {
        // Check if there is currently enough space in the belt
        if (this.currentIndex == this.gadgets.length)
        {
            // Extend the size of the gadgets array
            this.extendArray();
        }

        // Add the gadget into the gadgets array
        this.gadgets[this.currentIndex] = g;
    }

```

<terminated> Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 9:59:40 PM)

```
Avaliable gadgets:
```

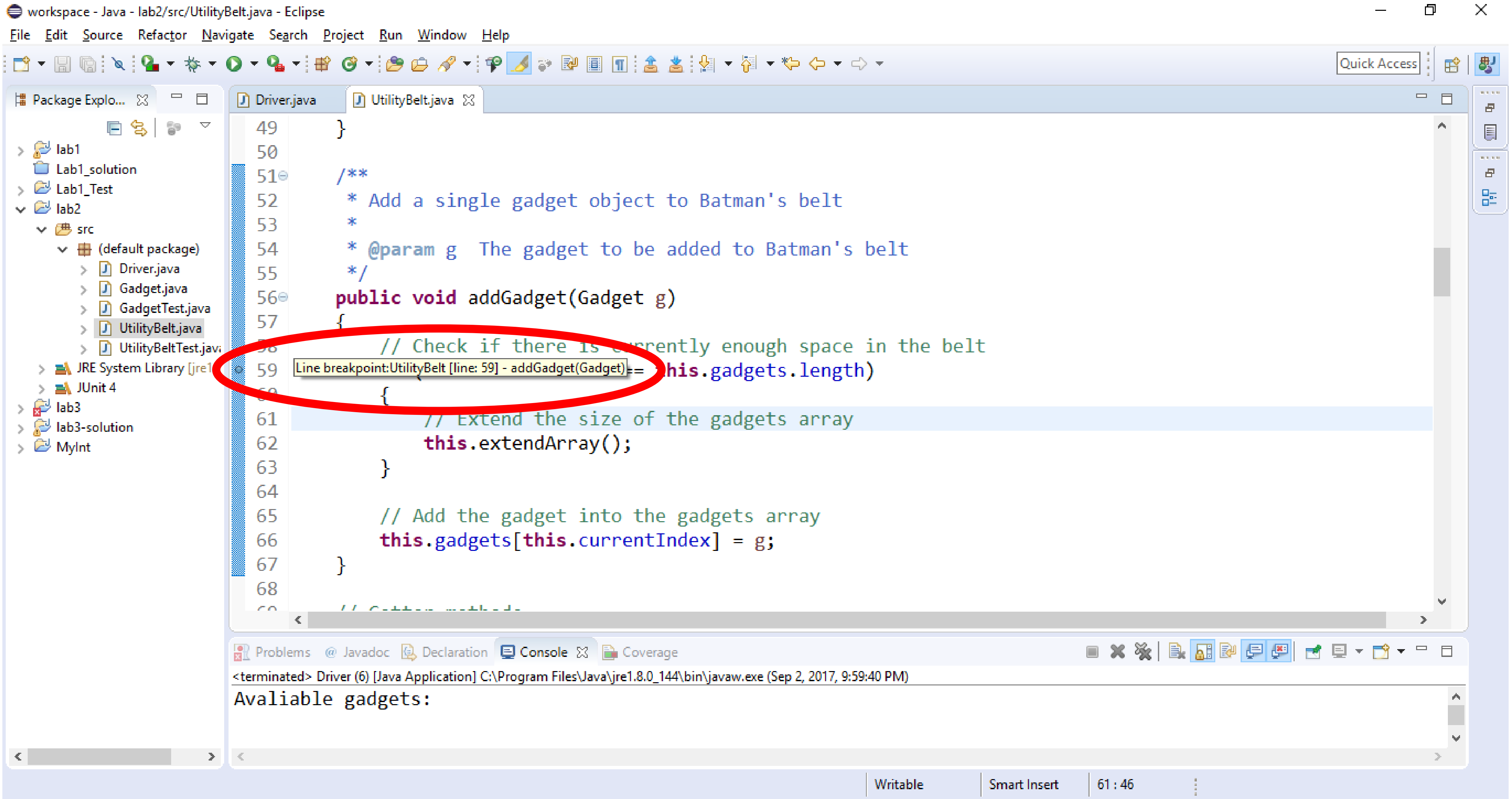
Setting a Breakpoint



```
    }

    /**
     * Add a single gadget object to Batman's belt
     *
     * @param g  The gadget to be added to Batman's belt
     */
    public void addGadget(Gadget g)
    {
                             is currently enough space in the belt
                         dex == this.gadgets.length)

                         size of the gadgets array
                         ay();


                         into the gadgets array
                         currentIndex] = g;
```

```
<terminated> Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 9:59:40 PM)
Avaliable gadgets:
```

Breakpoint is now set

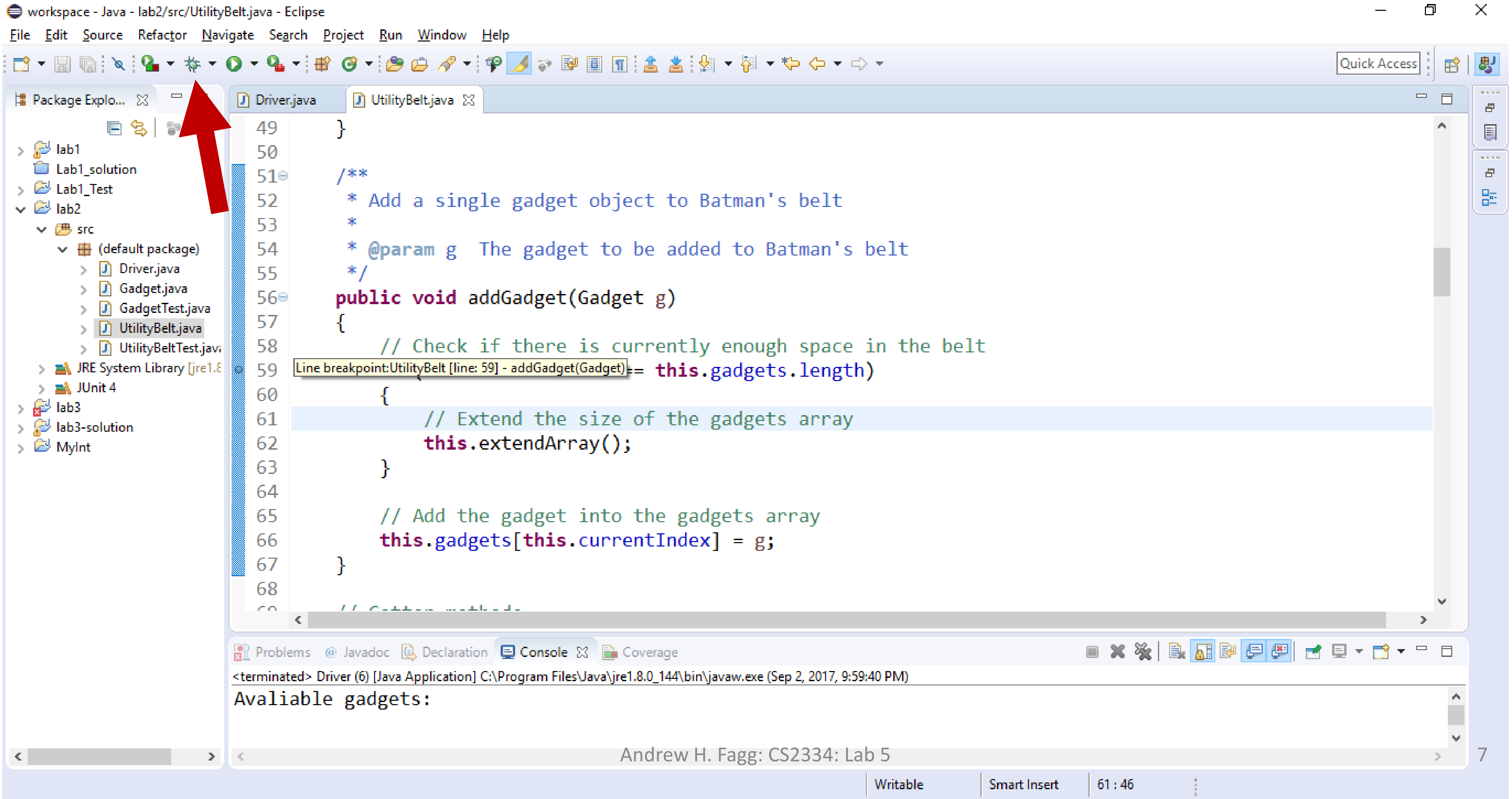


```
    }

    /**
     * Add a single gadget object to Batman's belt
     *
     * @param g  The gadget to be added to Batman's belt
     */
    public void addGadget(Gadget g)
    {
        // Check if there is currently enough space in the belt
        Line breakpoint:UtilityBelt [line: 59] - addGadget(Gadget) == this.gadgets.length)
        {
            // Extend the size of the gadgets array
            this.extendArray();
        }

        // Add the gadget into the gadgets array
        this.gadgets[this.currentIndex] = g;
    }

    // Getter methods
```

<terminated> Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 9:59:40 PM)

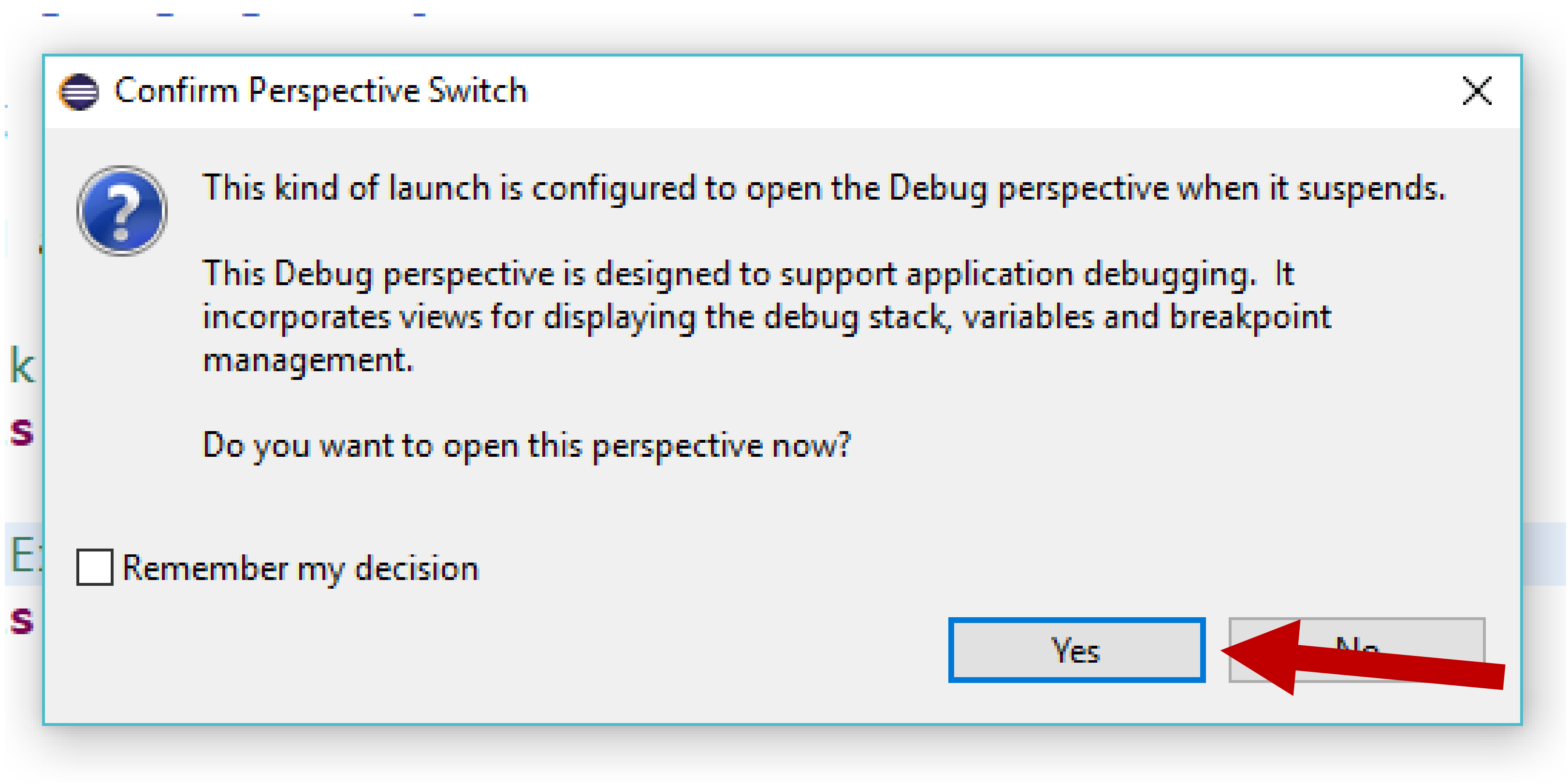
```
Avaliable gadgets:
```

Now enter debugging context and execute program



```
49      }
50
51      /**
52       * Add a single gadget object to Batman's belt
53       *
54       * @param g  The gadget to be added to Batman's belt
55       */
56      public void addGadget(Gadget g)
57      {
58          // Check if there is currently enough space in the belt
59  Line breakpoint:UtilityBelt [line: 59] - addGadget(Gadget)== this.gadgets.length)
60          {
61              // Extend the size of the gadgets array
62              this.extendArray();
63          }
64
65          // Add the gadget into the gadgets array
66          this.gadgets[this.currentIndex] = g;
67      }
68
69      // Getter methods
```

```
<terminated> Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 9:59:40 PM)
Avaliable gadgets:
```



Confirm Perspective Switch

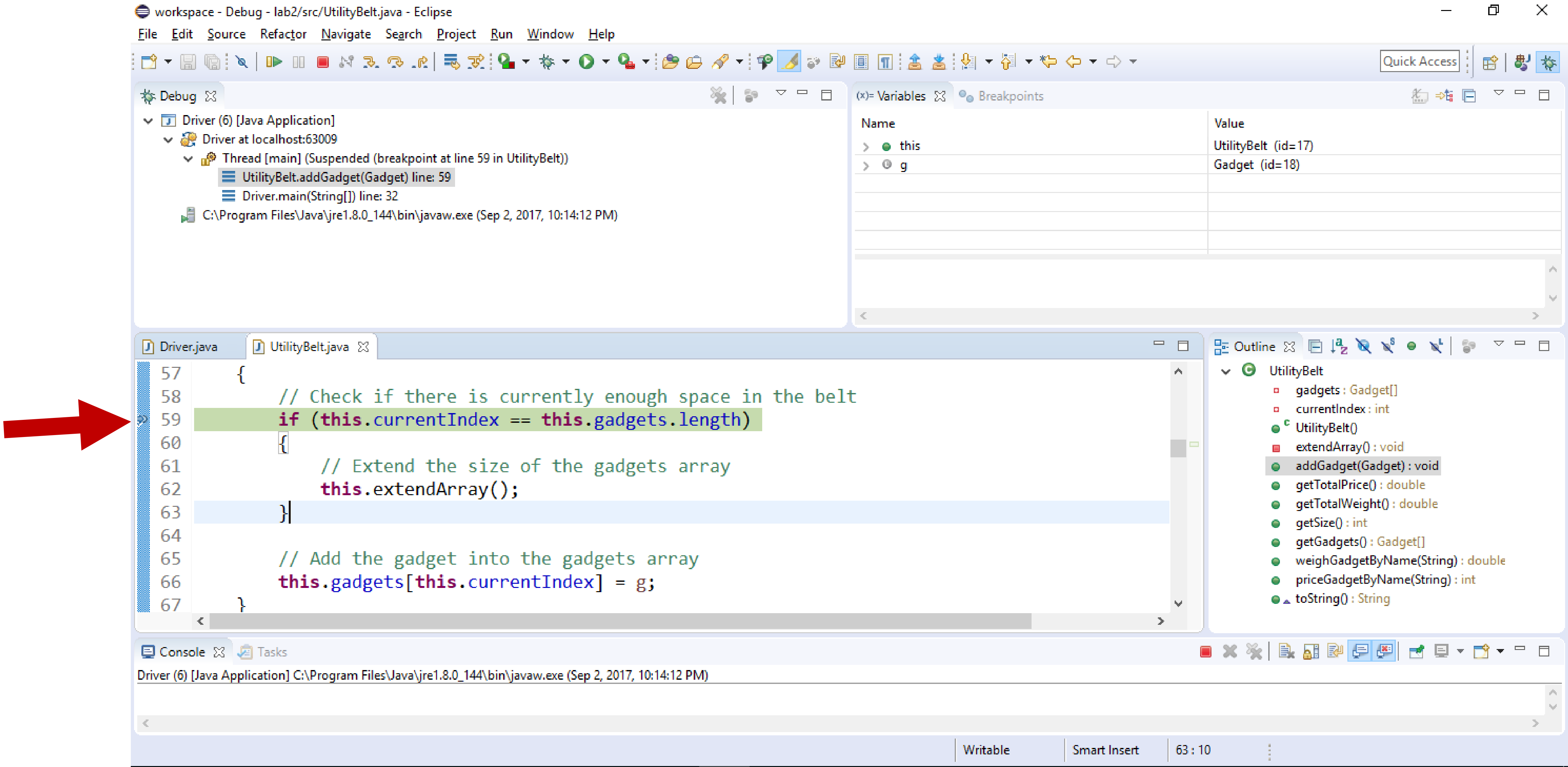
This kind of launch is configured to open the Debug perspective when it suspends.

This Debug perspective is designed to support application debugging. It incorporates views for displaying the debug stack, variables and breakpoint management.

Do you want to open this perspective now?

□ Remember my decision

Debugging View: Current Point in Program


workspace - Debug - lab2/src/UtilityBelt.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Debug
Variables
Breakpoints
Driver.java
UtilityBelt.java
Outline
Console
Tasks
Writable
Smart Insert
63 : 10

```
Driver (6) [Java Application]
  Driver at localhost:63009
    Thread [main] (Suspended (breakpoint at line 59 in UtilityBelt))
      UtilityBelt.addGadget(Gadget) line: 59
      Driver.main(String[]) line: 32
  C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

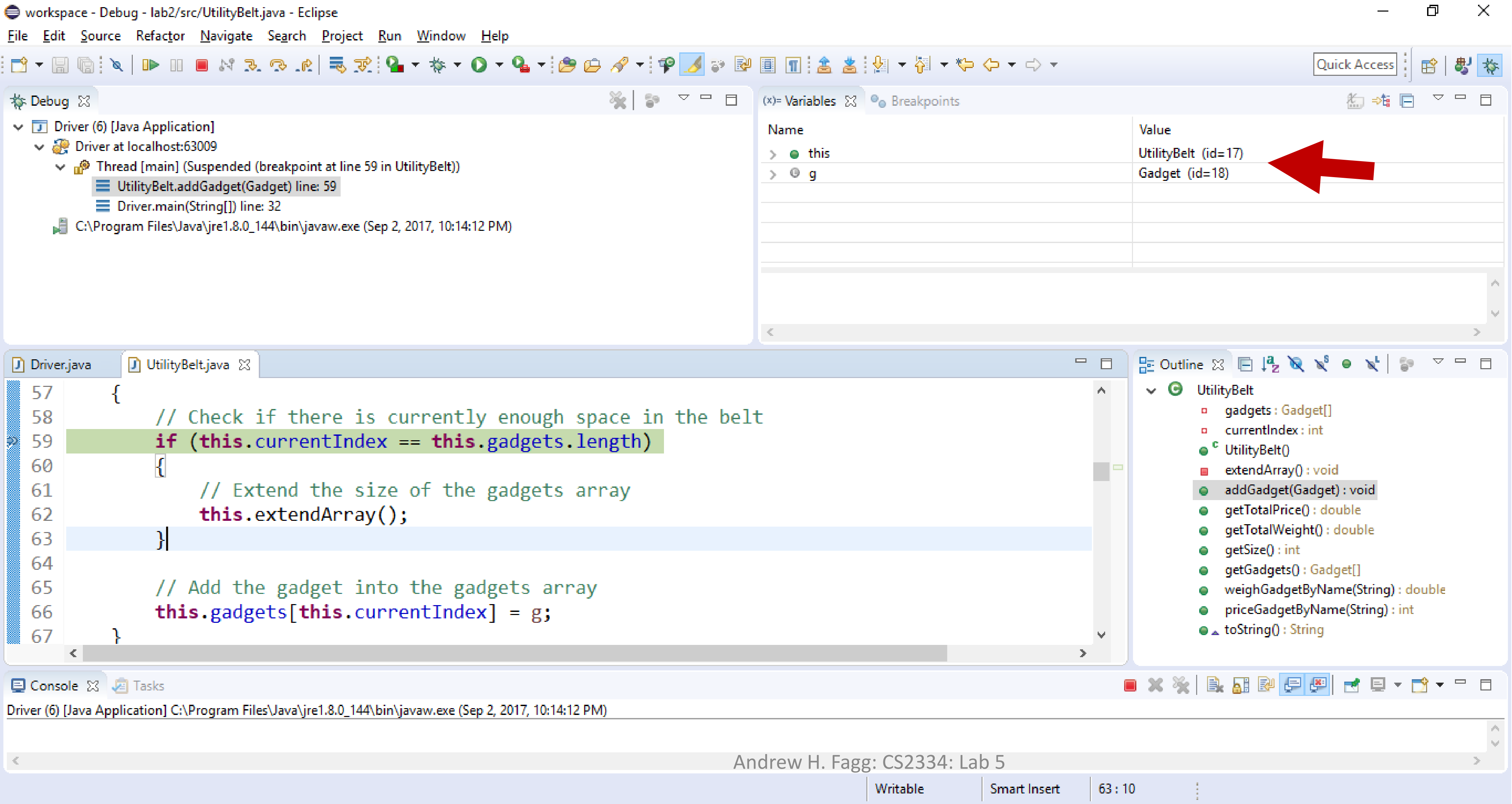
Name	Value
this	UtilityBelt (id=17)
g	Gadget (id=18)

```
57      {
58          // Check if there is currently enough space in the belt
59          if (this.currentIndex == this.gadgets.length)
60          {
61              // Extend the size of the gadgets array
62              this.extendArray();
63          }
64  
65          // Add the gadget into the gadgets array
66          this.gadgets[this.currentIndex] = g;
67      }
```

```
UtilityBelt
  gadgets : Gadget[]
  currentIndex : int
  UtilityBelt()
  extendArray() : void
  addGadget(Gadget) : void
  getTotalPrice() : double
  getTotalWeight() : double
  getSize() : int
  getGadgets() : Gadget[]
  weighGadgetByName(String) : double
  priceGadgetByName(String) : int
  toString() : String
```

```
Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Debugging View: Current Variable Values



workspace - Debug - lab2/src/UtilityBelt.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Debug
Variables
Breakpoints
Driver.java
UtilityBelt.java
Outline
Console
Tasks
Writable
Smart Insert
63 : 10

```
Driver (6) [Java Application]
    Driver at localhost:63009
        Thread [main] (Suspended (breakpoint at line 59 in UtilityBelt))
            UtilityBelt.addGadget(Gadget) line: 59
            Driver.main(String[]) line: 32
    C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

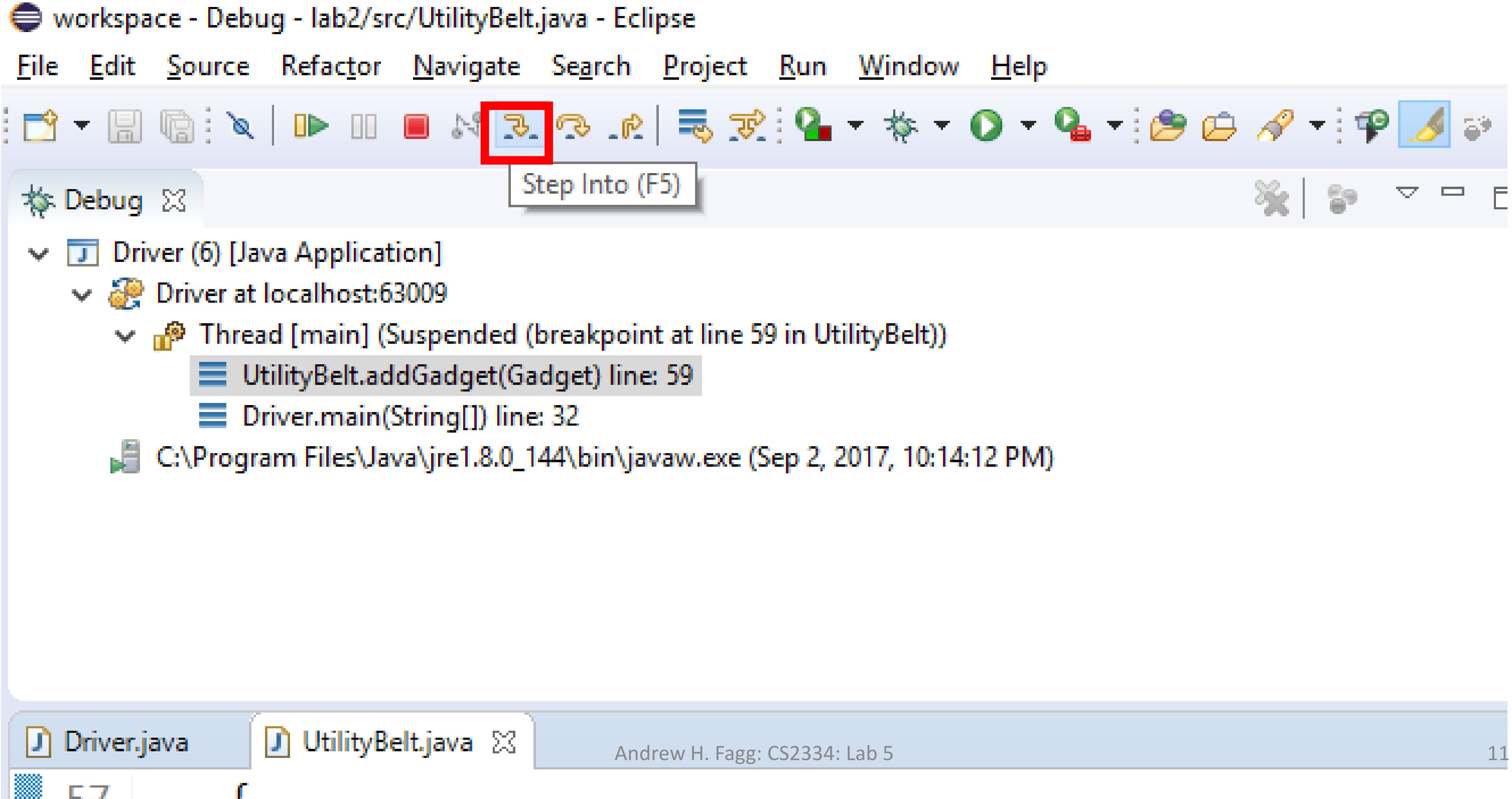
Name	Value
this	UtilityBelt (id=17)
g	Gadget (id=18)

```
57      {
58          // Check if there is currently enough space in the belt
59          if (this.currentIndex == this.gadgets.length)
60          {
61              // Extend the size of the gadgets array
62              this.extendArray();
63          }
64
65          // Add the gadget into the gadgets array
66          this.gadgets[this.currentIndex] = g;
67      }
```

```
UtilityBelt
    gadgets : Gadget[]
    currentIndex : int
    UtilityBelt()
    extendArray() : void
    addGadget(Gadget) : void
    getTotalPrice() : double
    getTotalWeight() : double
    getSize() : int
    getGadgets() : Gadget[]
    weighGadgetByName(String) : double
    priceGadgetByName(String) : int
    toString() : String
```

```
Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Step Into: Execute one line of code and stop (even if that is within a method)

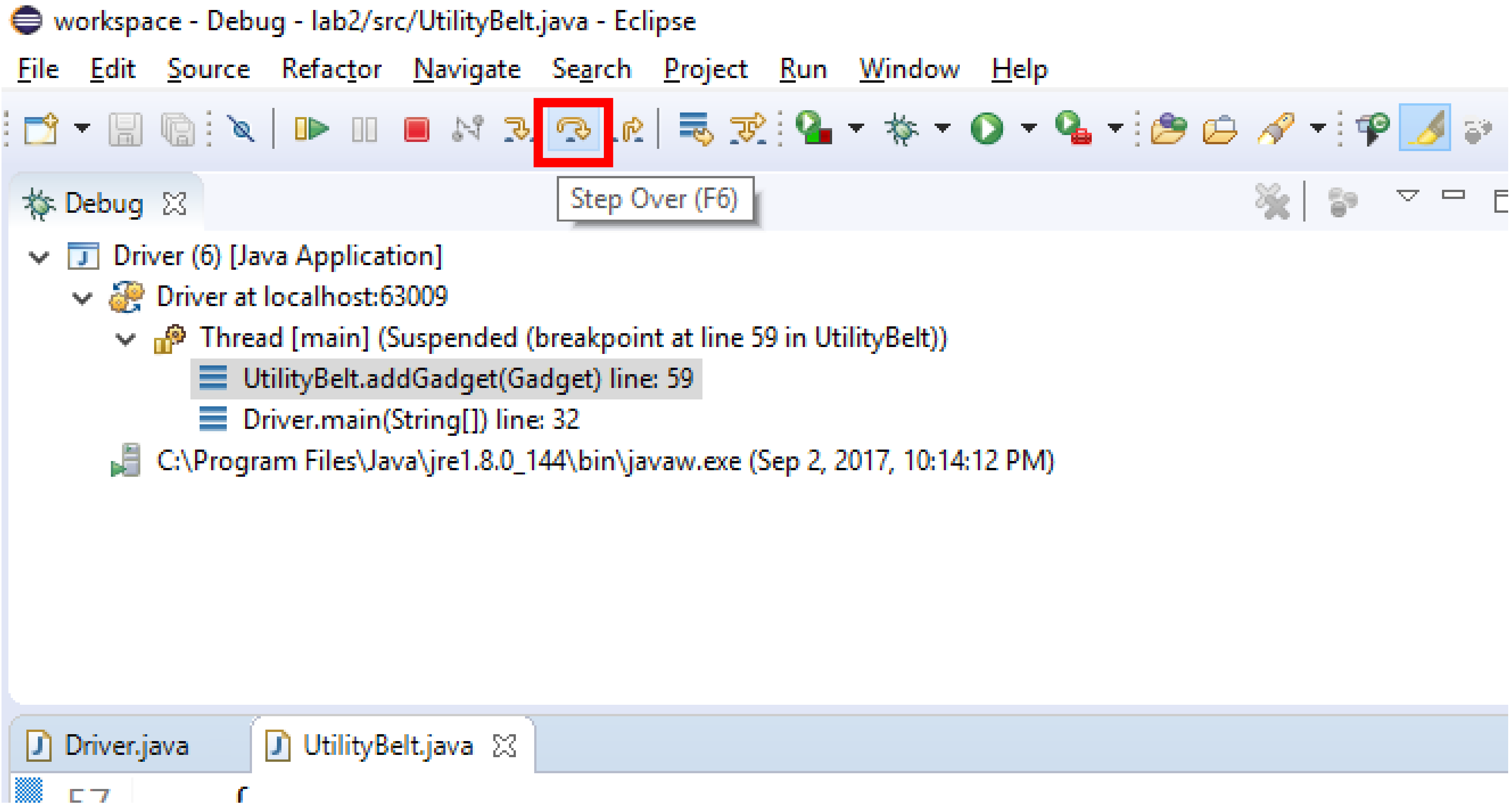


workspace - Debug - lab2/src/UtilityBelt.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help
Step Into (F5)
Debug
Driver.java
UtilityBelt.java

Driver (6) [Java Application]
Driver at localhost:63009
Thread [main] (Suspended (breakpoint at line 59 in UtilityBelt))
UtilityBelt.addGadget(Gadget) line: 59
Driver.main(String[]) line: 32
C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)

Step Over: Execute one line of code and stop (stay within the current method)

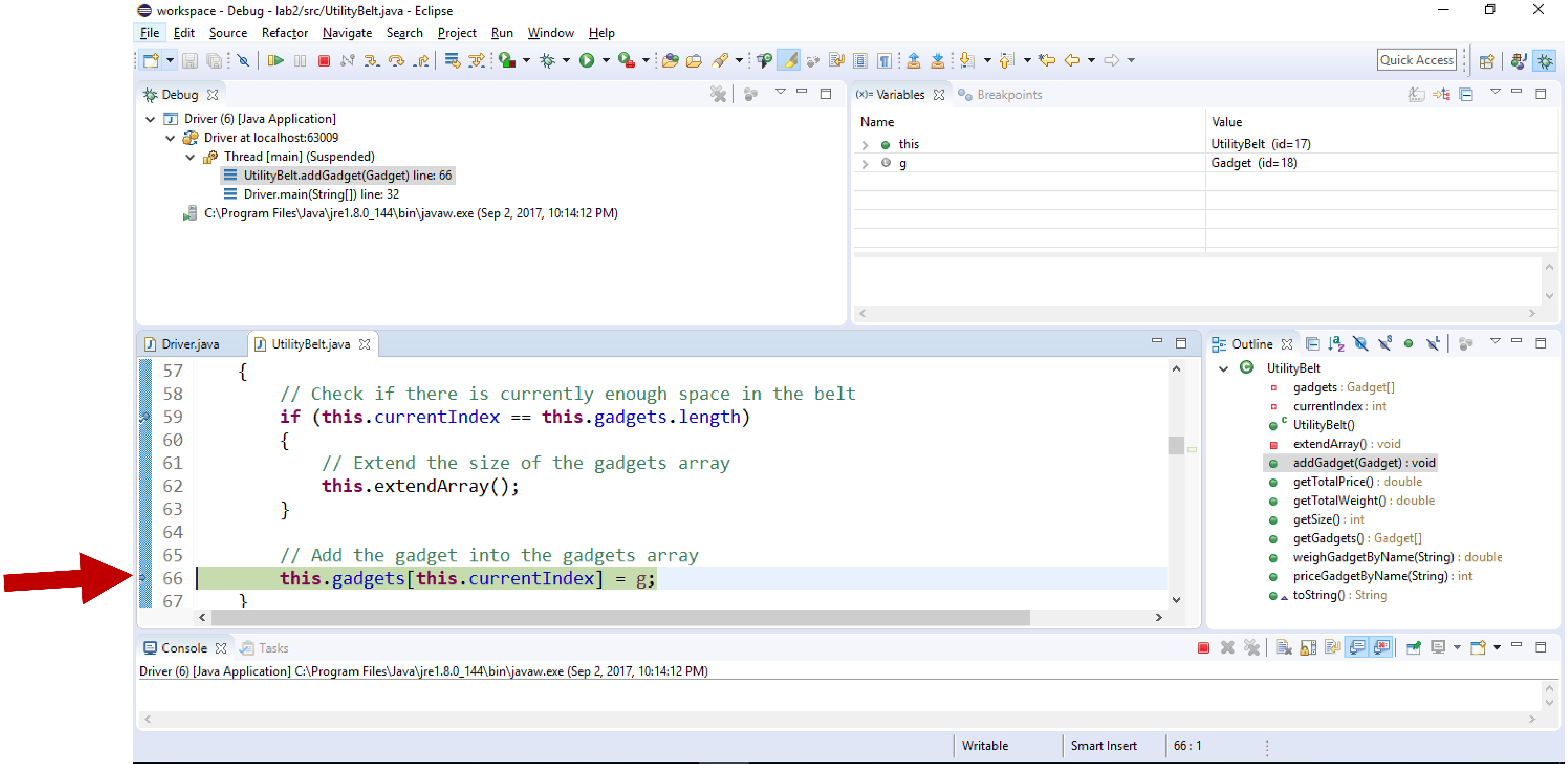


workspace - Debug - lab2/src/UtilityBelt.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help
Step Over (F6)
Debug
Driver.java
UtilityBelt.java
57

```
Driver (6) [Java Application]
  Driver at localhost:63009
    Thread [main] (Suspended (breakpoint at line 59 in UtilityBelt))
      UtilityBelt.addGadget(Gadget) line: 59
      Driver.main(String[]) line: 32
  C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Step Over: now at next line



```
Driver (6) [Java Application]
  Driver at localhost:63009
    Thread [main] (Suspended)
      UtilityBelt.addGadget(Gadget) line: 66
      Driver.main(String[]) line: 32
  C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Name	Value
this	UtilityBelt (id=17)
g	Gadget (id=18)

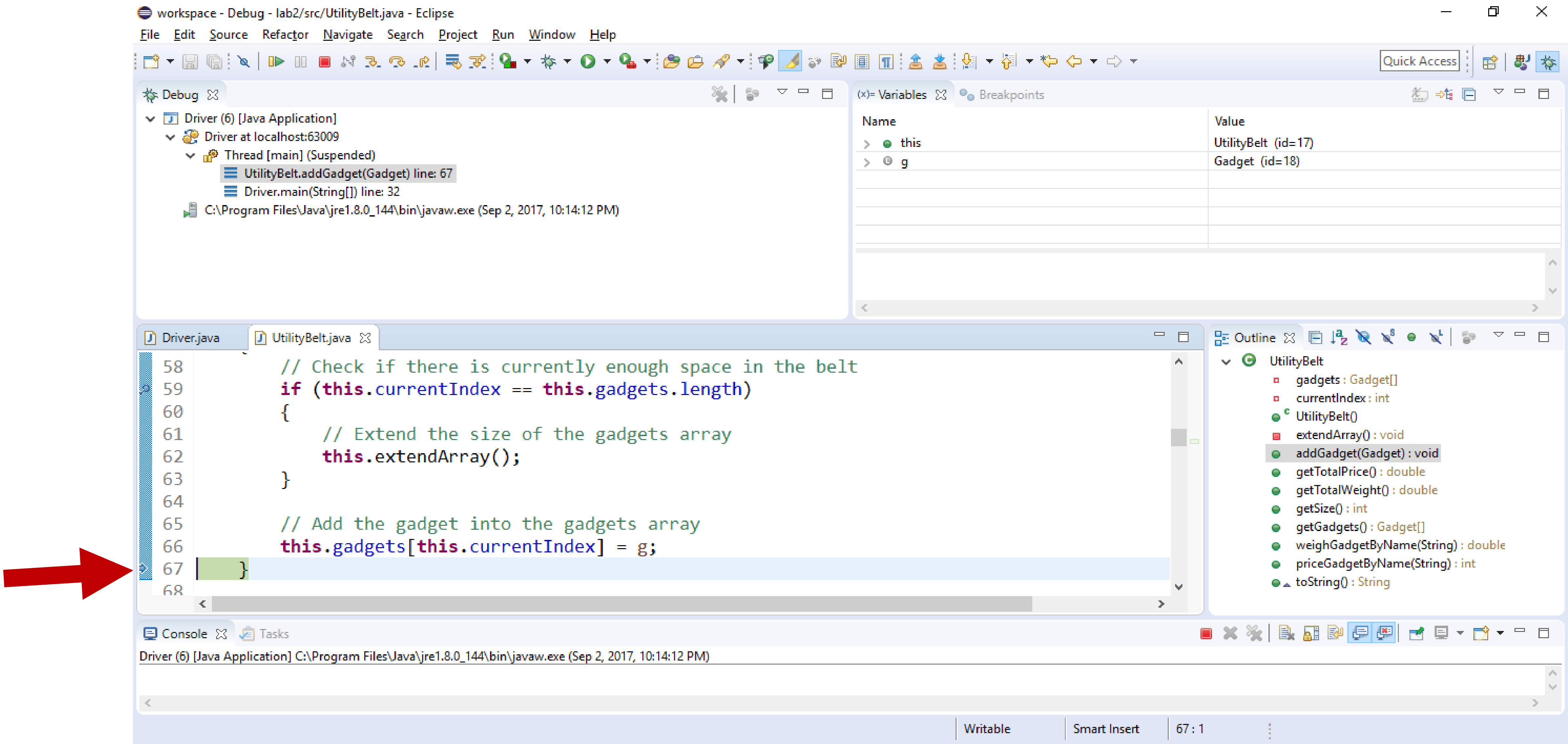
```
57      {
58          // Check if there is currently enough space in the belt
59          if (this.currentIndex == this.gadgets.length)
60          {
61              // Extend the size of the gadgets array
62              this.extendArray();
63          }
64
65          // Add the gadget into the gadgets array
66          this.gadgets[this.currentIndex] = g;
67      }
```

```
UtilityBelt
    gadgets : Gadget[]
    currentIndex : int
    UtilityBelt()
    extendArray() : void
    addGadget(Gadget) : void
    getTotalPrice() : double
    getTotalWeight() : double
    getSize() : int
    getGadgets() : Gadget[]
    weighGadgetByName(String) : double
    priceGadgetByName(String) : int
    toString() : String
```

```
Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Writable | Smart Insert | 66 : 1

Step Over: now at the next-next line



Debug

```
Driver (6) [Java Application]
  Driver at localhost:63009
    Thread [main] (Suspended)
      UtilityBelt.addGadget(Gadget) line: 67
      Driver.main(String[]) line: 32
  C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

Variables

Name	Value
this	UtilityBelt (id=17)
g	Gadget (id=18)

UtilityBelt.java

```
58          // Check if there is currently enough space in the belt
59          if (this.currentIndex == this.gadgets.length)
60          {
61              // Extend the size of the gadgets array
62              this.extendArray();
63          }
64
65          // Add the gadget into the gadgets array
66          this.gadgets[this.currentIndex] = g;
67      }
68
```

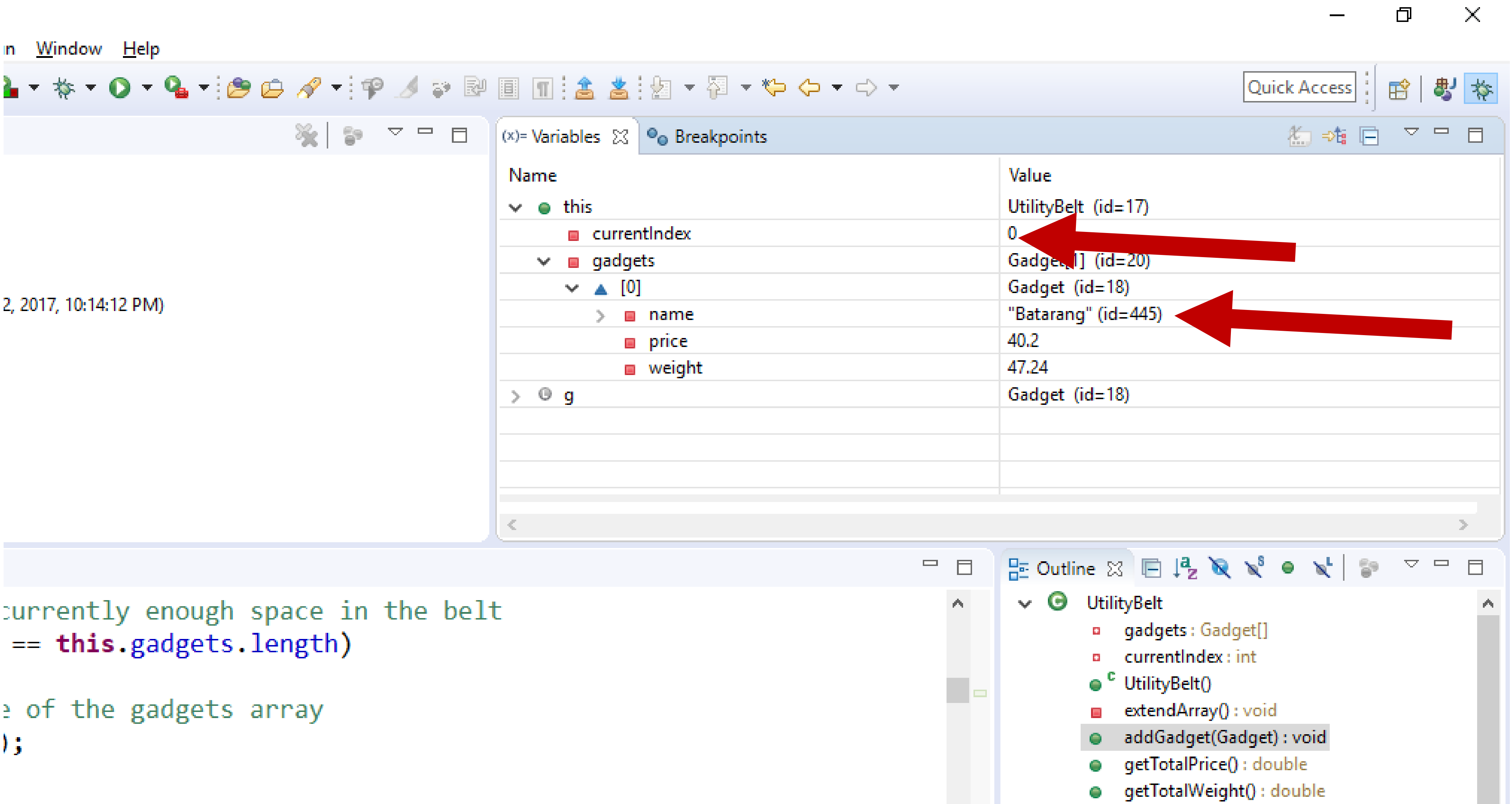
Outline

```
UtilityBelt
    gadgets : Gadget[]
    currentIndex : int
    UtilityBelt()
    extendArray() : void
    addGadget(Gadget) : void
    getTotalPrice() : double
    getTotalWeight() : double
    getSize() : int
    getGadgets() : Gadget[]
    weighGadgetByName(String) : double
    priceGadgetByName(String) : int
    toString() : String
```

Console

```
Driver (6) [Java Application] C:\Program Files\Java\jre1.8.0_144\bin\javaw.exe (Sep 2, 2017, 10:14:12 PM)
```

The Batarang has been added to the UtilityBelt but currentIndex has not been updated!



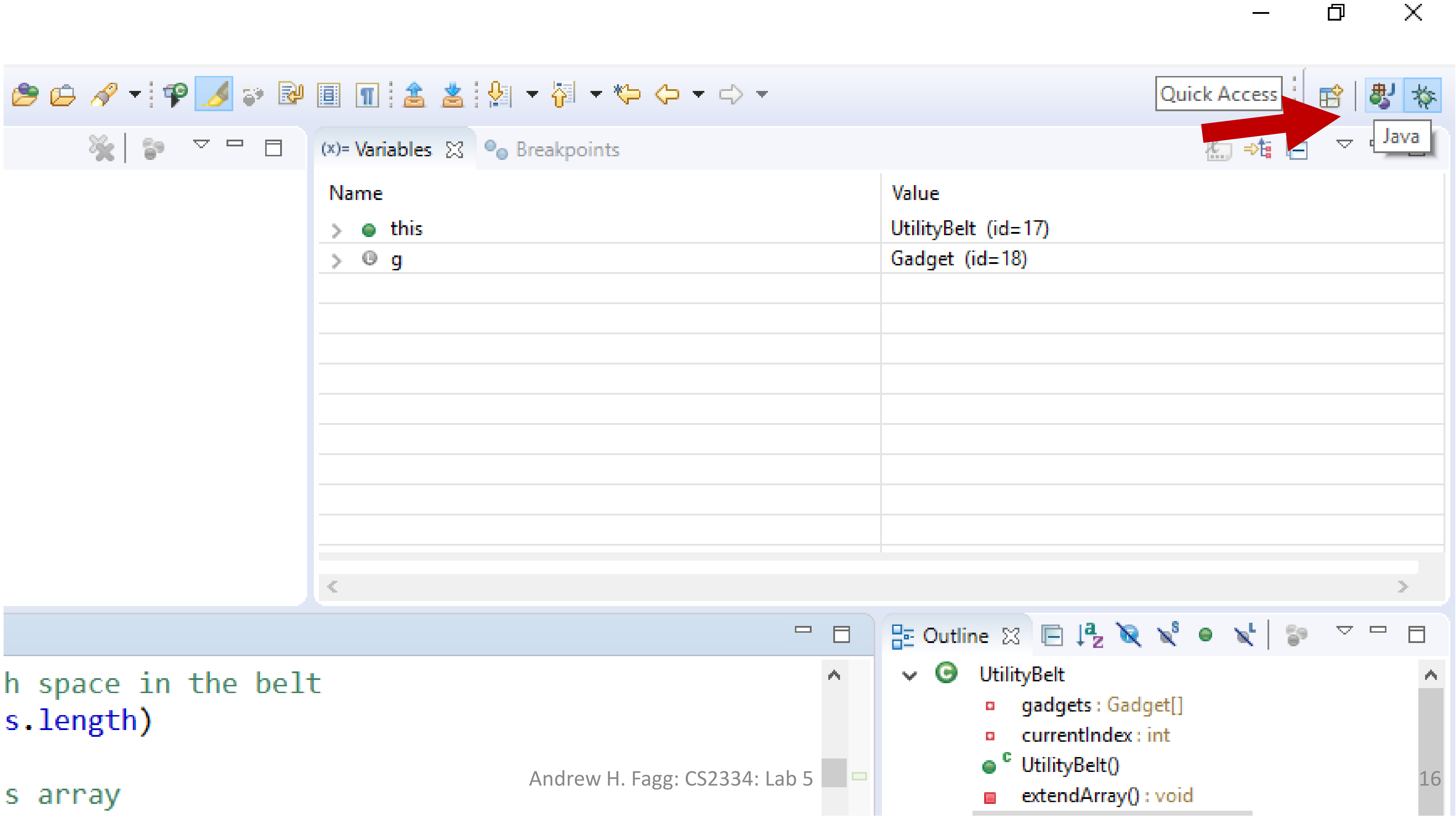
2, 2017, 10:14:12 PM)

Name	Value
this	UtilityBelt (id=17)
currentIndex	0
gadgets	Gadget[] (id=20)
[0]	Gadget (id=18)
name	"Batarang" (id=445)
price	40.2
weight	47.24
g	Gadget (id=18)

```
currently enough space in the belt
 == this.gadgets.length)

e of the gadgets array
);
```

UtilityBelt
- gadgets : Gadget[]
- currentIndex : int
- UtilityBelt()
- extendArray() : void
- addGadget(Gadget) : void
- getTotalPrice() : double
- getTotalWeight() : double

Getting Out of Debug Mode



Name	Value
this	UtilityBelt (id=17)
g	Gadget (id=18)

```
h space in the belt
s.length)

s array
```

- UtilityBelt
  - gadgets : Gadget[]
  - currentIndex : int
  - UtilityBelt()
  - extendArray() : void

Live demonstration….