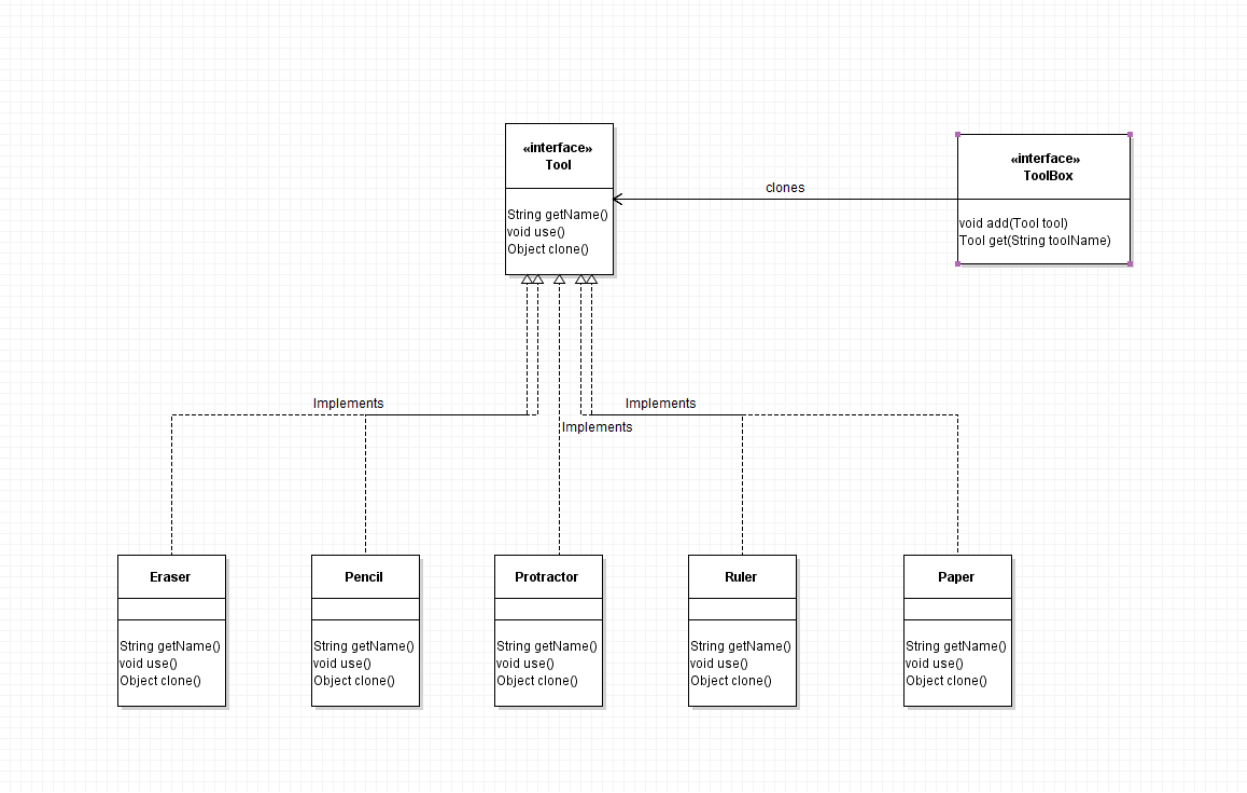
Homework 6

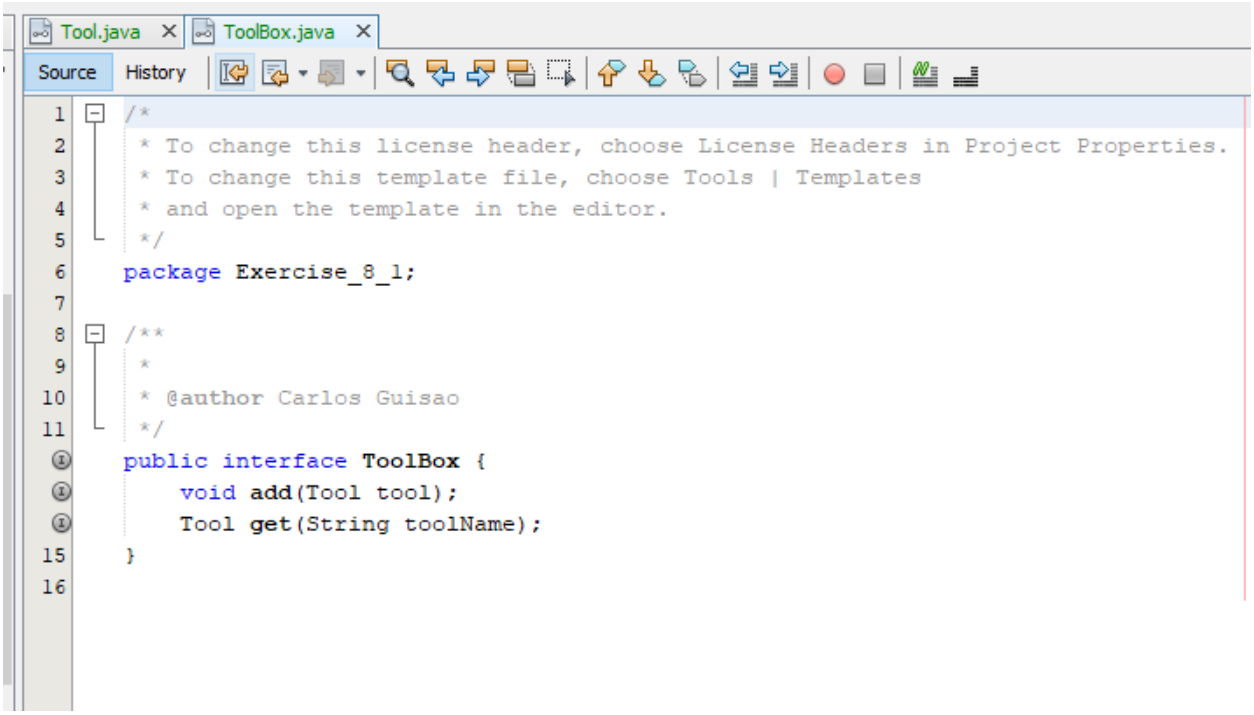
8.1



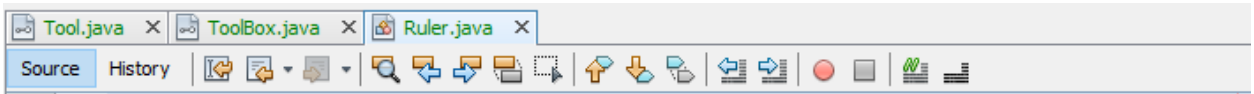
Tool.java

Source History

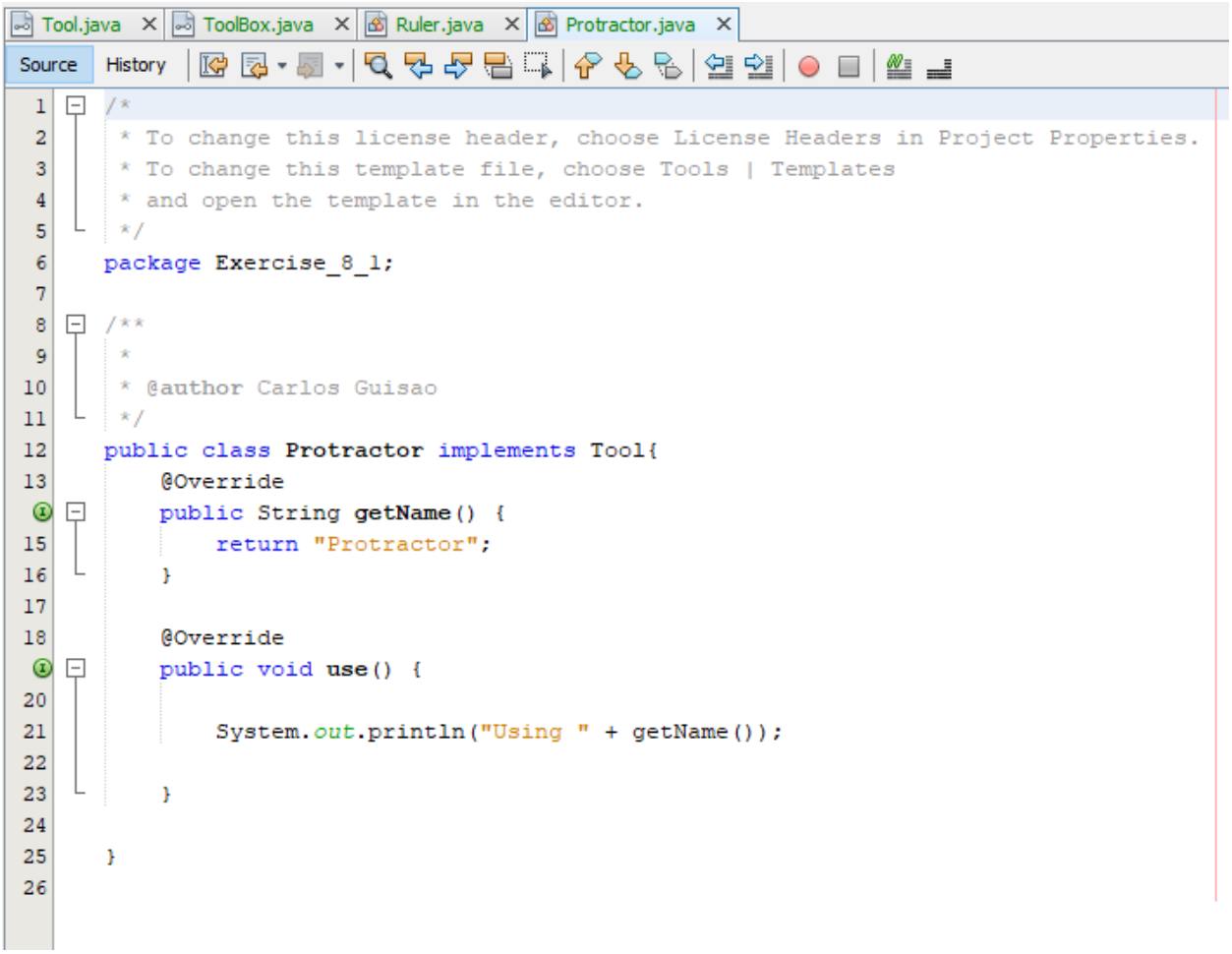
```
1  /*
2   * To change this license header, choose License Headers in Project Properties.
3   * To change this template file, choose Tools | Templates
4   * and open the template in the editor.
5   */
6  package Exercise_8_1;
7
8  /**
9   *
10  * @author Carlos Guisao
11  */
12 public interface Tool extends Cloneable{
13
14     String getName();
15
16     void use();
17
18 }
19
```

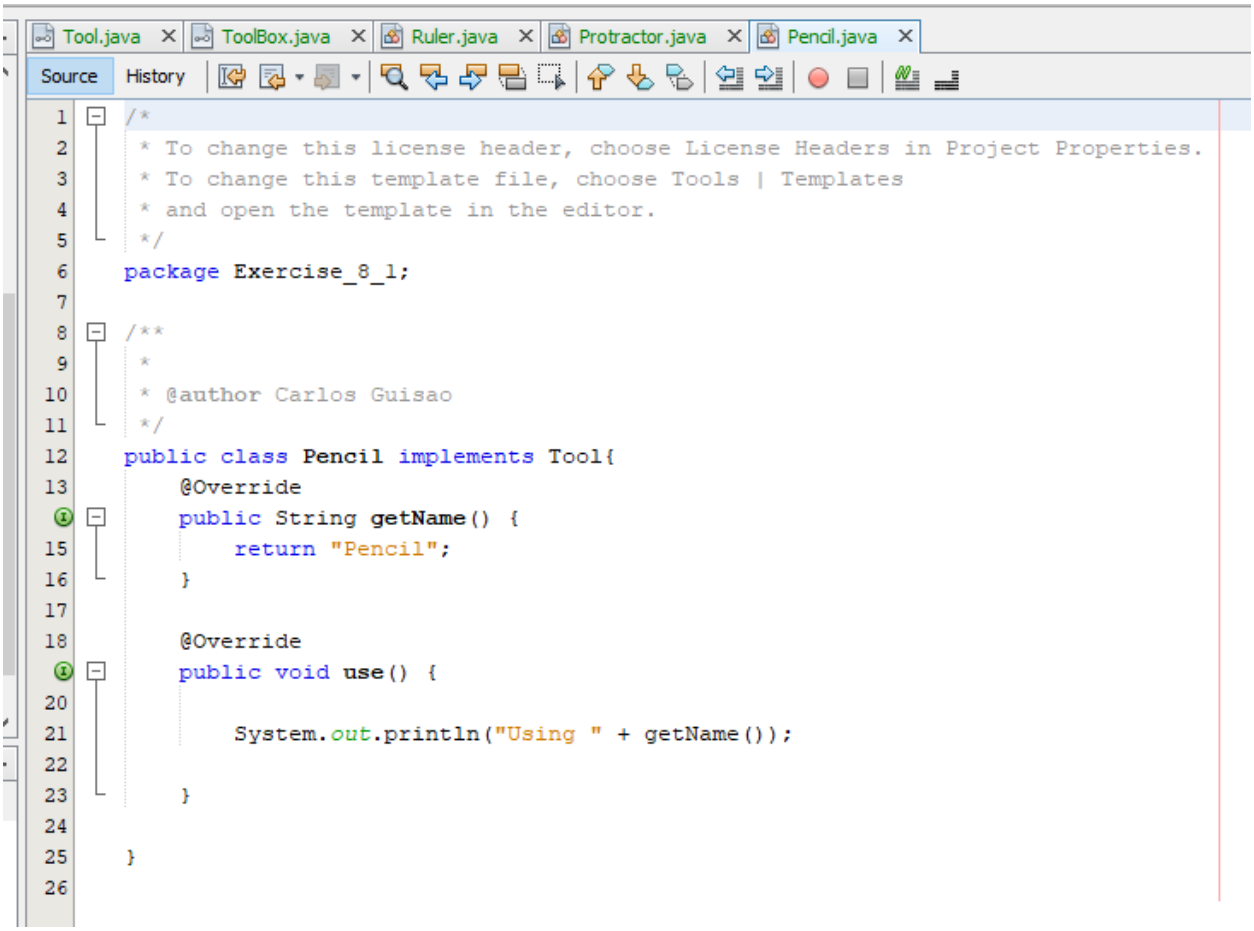


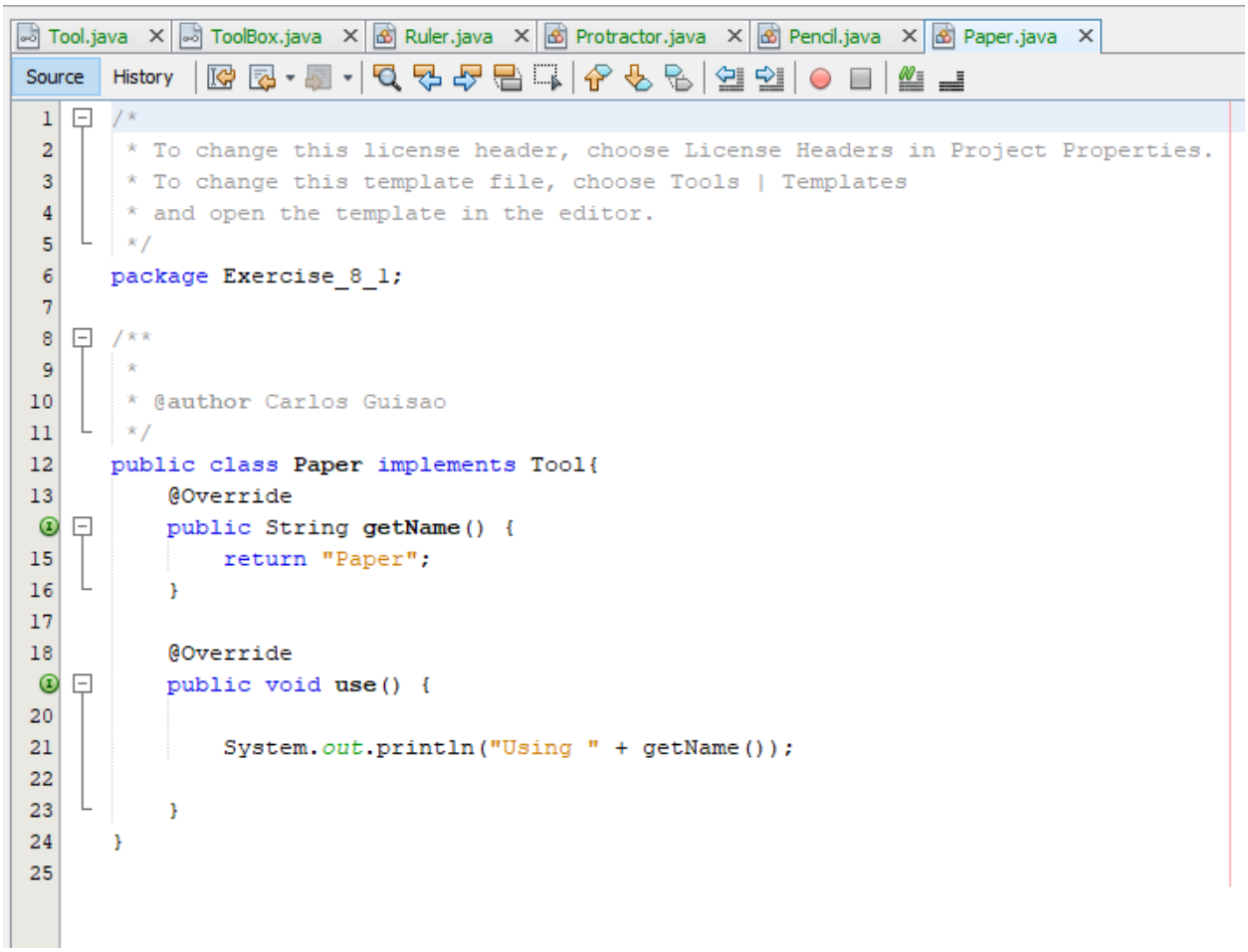

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package Exercise_8_1;

/**
 *
 * @author Carlos Guisao
 */
public interface ToolBox {
    void add(Tool tool);
    Tool get(String toolName);
}
```



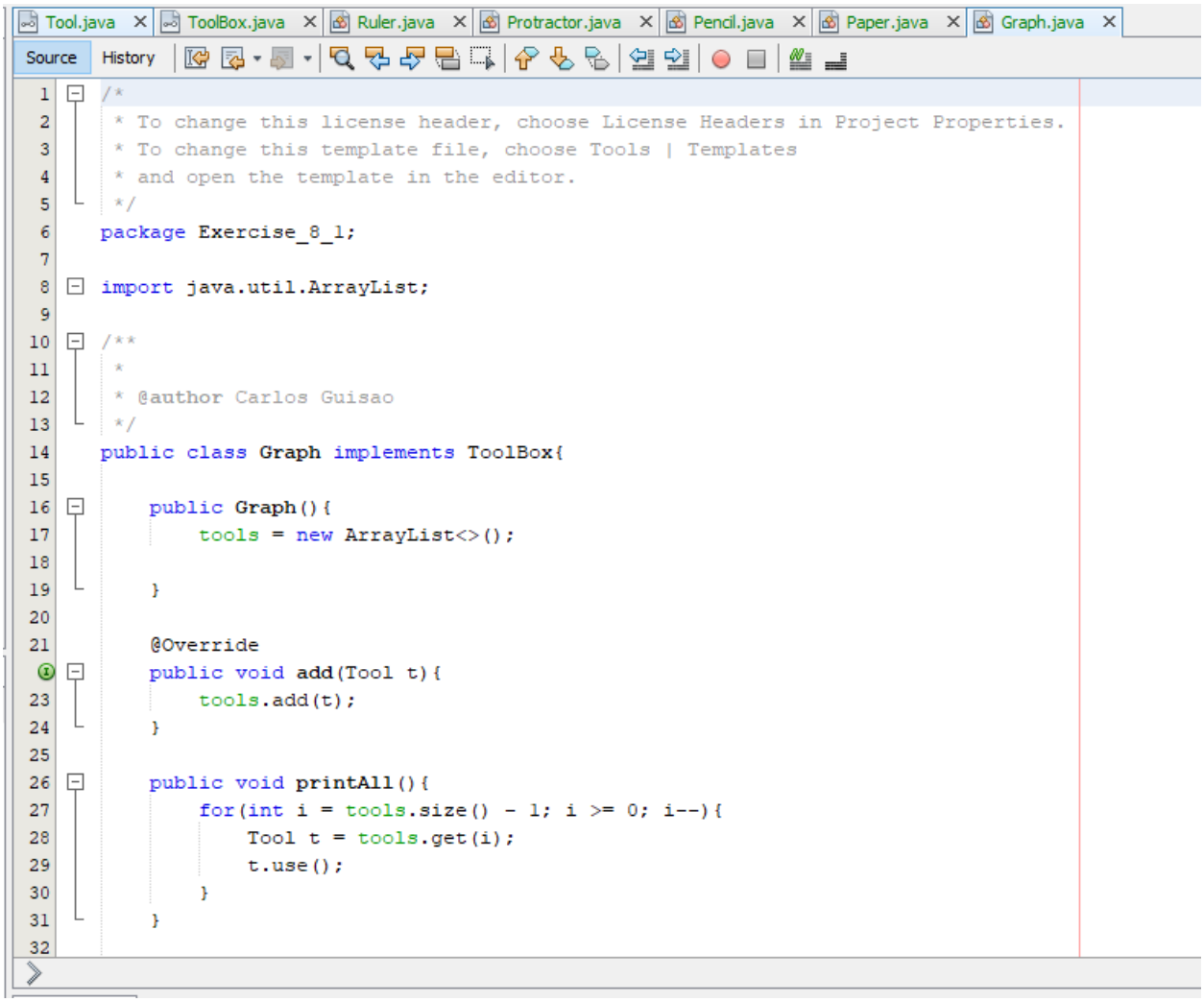

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package Exercise_8_1;

/**
 *
 * @author Carlos Guisao
 */
public class Ruler implements Tool{
    @Override
    public String getName() {
        return "Ruler";
    }

    @Override
    public void use() {

        System.out.println("Using " + getName());

    }

}
```


Tool.java
ToolBox.java
Ruler.java
Protractor.java
Source
History
/*
* To change this license header, choose License Headers in Project Properties.
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
package Exercise_8_1;
/**
*
* @author Carlos Guisao
*/
public class Protractor implements Tool{
@Override
public String getName() {
return "Protractor";
}
@Override
public void use() {
System.out.println("Using " + getName());
}
}

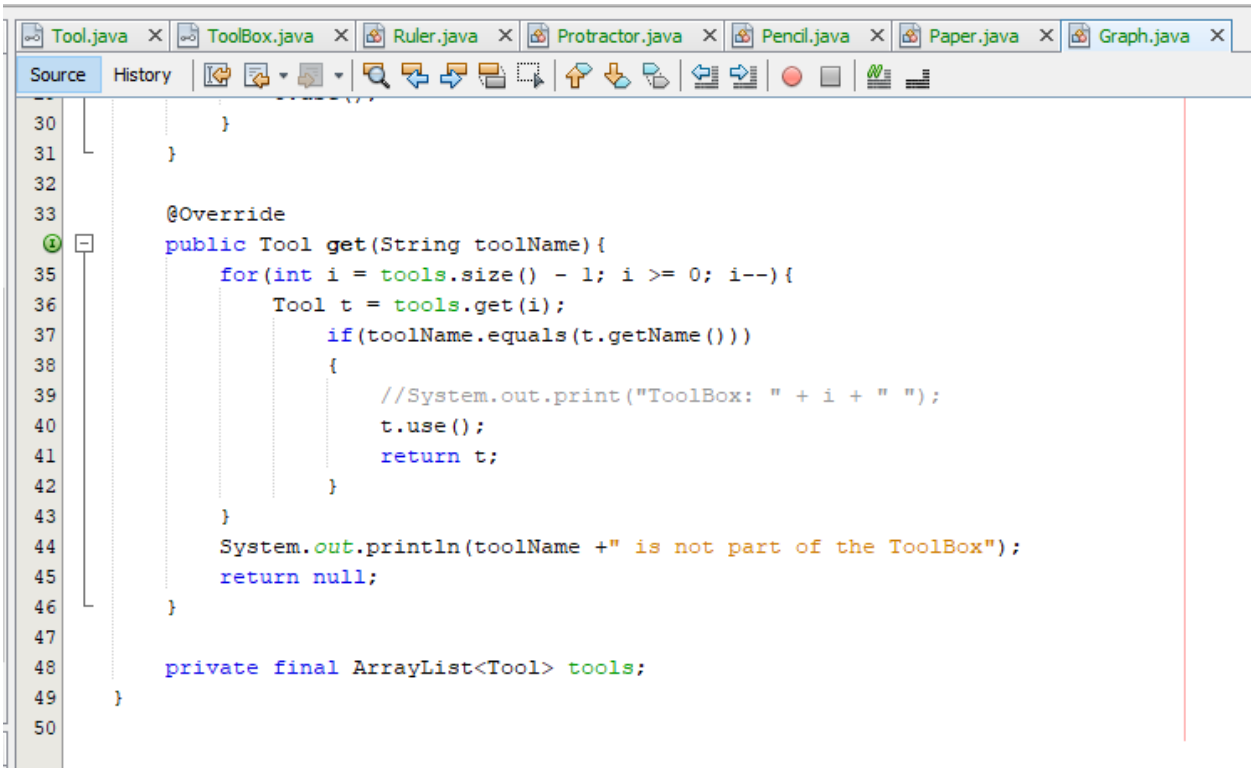

Tool.java
ToolBox.java
Ruler.java
Protractor.java
Pencil.java
Source
History
/*
* To change this license header, choose License Headers in Project Properties.
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
package Exercise_8_1;
/**
*
* @author Carlos Guisao
*/
public class Pencil implements Tool{
@Override
public String getName() {
return "Pencil";
}
@Override
public void use() {
System.out.println("Using " + getName());
}
}



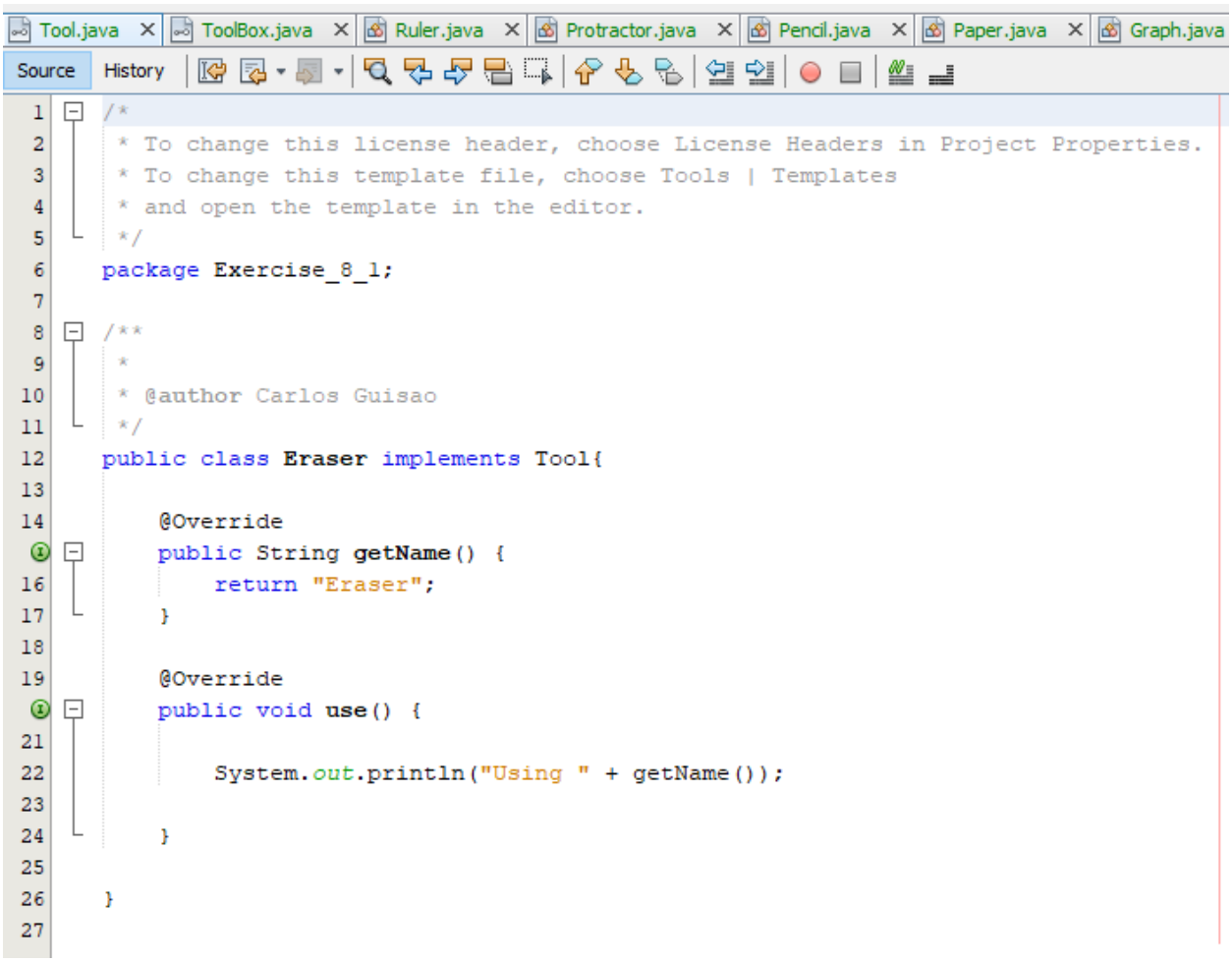

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package Exercise_8_1;

/**
 *
 * @author Carlos Guisao
 */
public class Paper implements Tool{
    @Override
    public String getName() {
        return "Paper";
    }

    @Override
    public void use() {

        System.out.println("Using " + getName());

    }
}
```

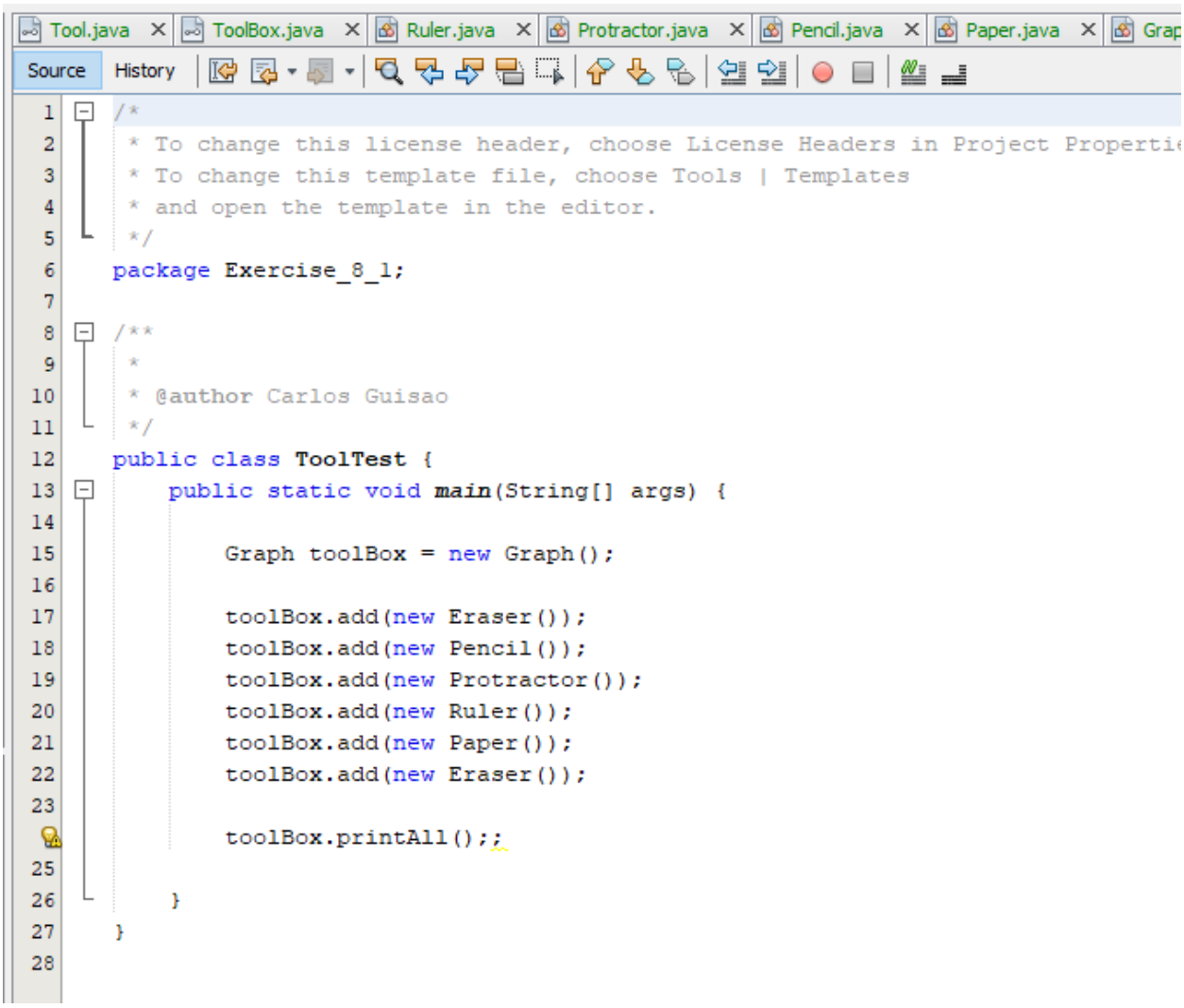


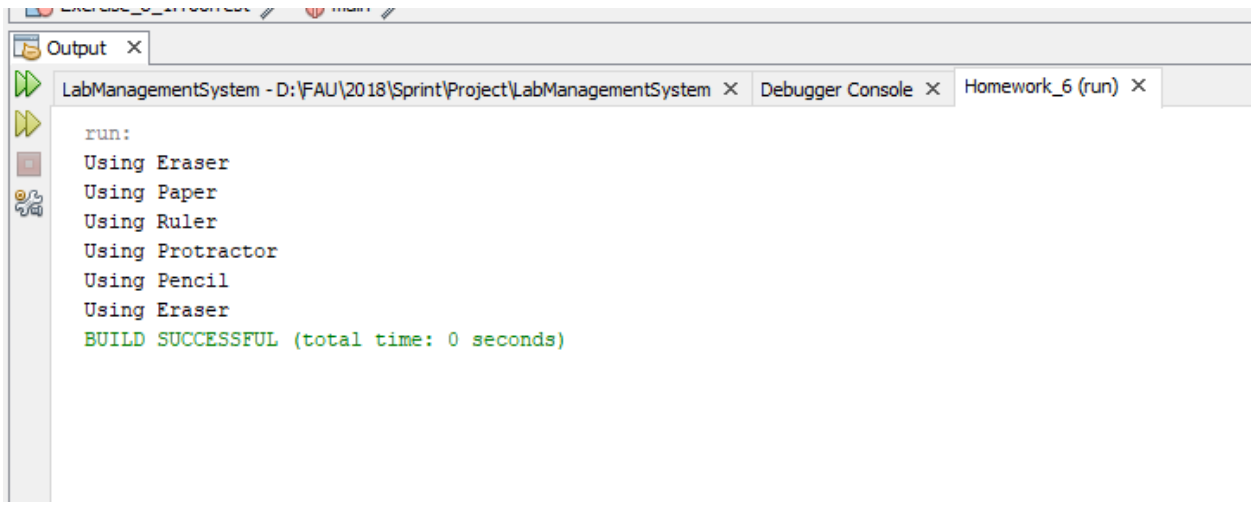

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package Exercise_8_1;

import java.util.ArrayList;

/**
 *
 * @author Carlos Guisao
 */
public class Graph implements ToolBox{

    public Graph(){
        tools = new ArrayList<>();

    }

    @Override
    public void add(Tool t){
        tools.add(t);
    }

    public void printAll(){
        for(int i = tools.size() - 1; i >= 0; i--){
            Tool t = tools.get(i);
            t.use();
        }
    }

```



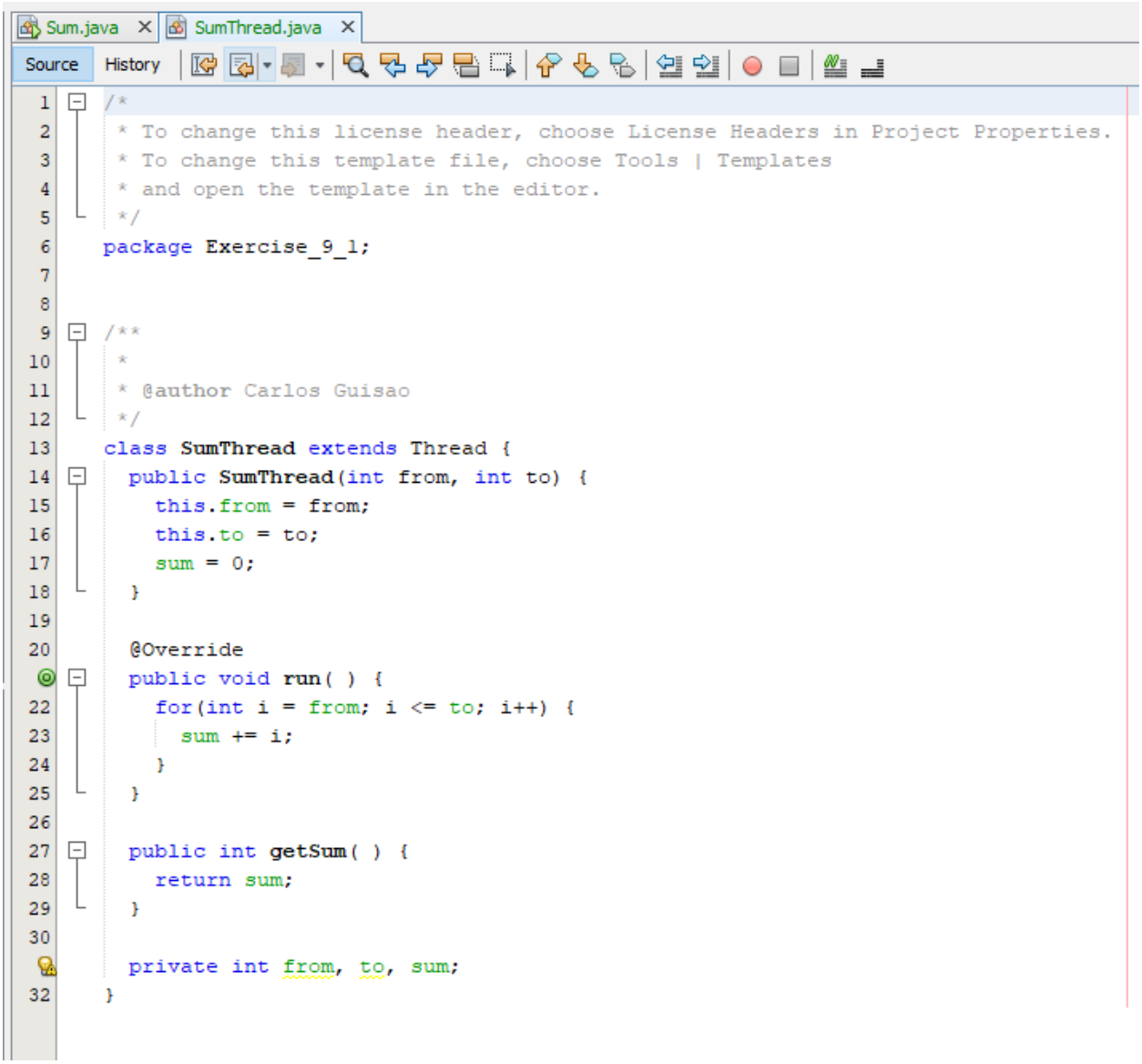

```
30              }
31          }
32
33          @Override
34          public Tool get(String toolName){
35              for(int i = tools.size() - 1; i >= 0; i--){
36                  Tool t = tools.get(i);
37                      if(toolName.equals(t.getName()))
38                      {
39                          //System.out.print("ToolBox: " + i + " ");
40                          t.use();
41                          return t;
42                      }
43              }
44              System.out.println(toolName +" is not part of the ToolBox");
45              return null;
46          }
47
48          private final ArrayList<Tool> tools;
49      }
50
```

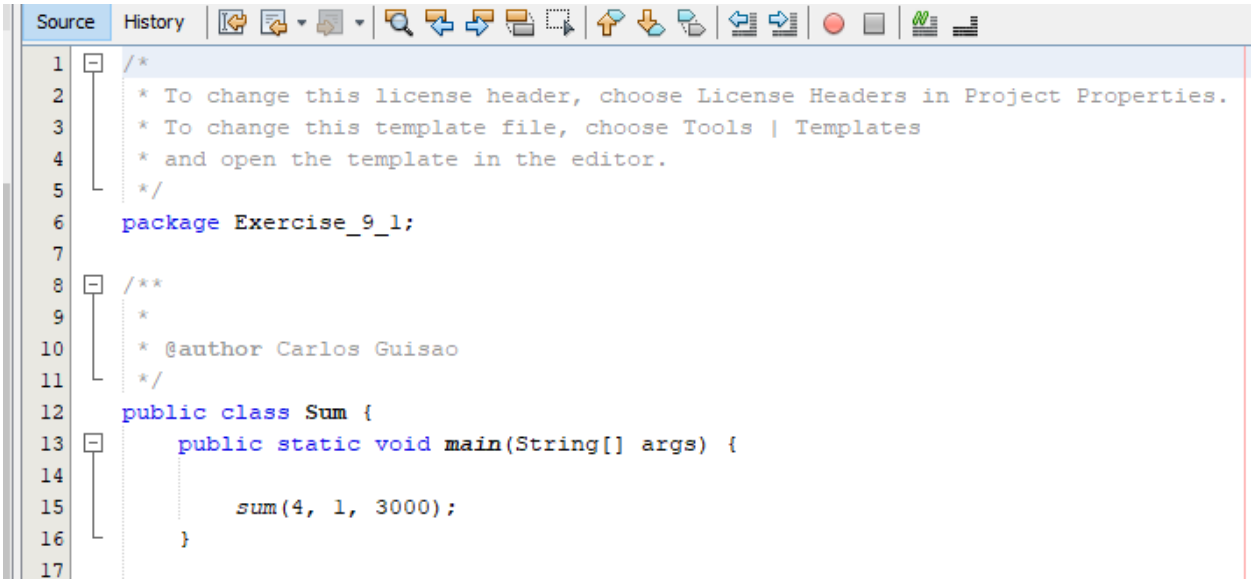

Tool.java
ToolBox.java
Ruler.java
Protractor.java
Pencil.java
Paper.java
Graph.java
Source
History
/*
* To change this license header, choose License Headers in Project Properties.
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
package Exercise_8_1;
/**
*
* @author Carlos Guisao
*/
public class Eraser implements Tool{
@Override
public String getName() {
return "Eraser";
}
@Override
public void use() {
System.out.println("Using " + getName());
}
}


Tool.java
ToolBox.java
Ruler.java
Protractor.java
Pencil.java
Paper.java
Source
History
/*
* To change this license header, choose License Headers in Project Properti
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
package Exercise_8_1;
/**
*
* @author Carlos Guisao
*/
public class ToolTest {
public static void main(String[] args) {
Graph toolBox = new Graph();
toolBox.add(new Eraser());
toolBox.add(new Pencil());
toolBox.add(new Protractor());
toolBox.add(new Ruler());
toolBox.add(new Paper());
toolBox.add(new Eraser());
toolBox.printAll();;
}
}


Output
LabManagementSystem - D:\FAU\2018\Sprint\Project\LabManagementSystem
Debugger Console
Homework_6 (run)
run:
Using Eraser
Using Paper
Using Ruler
Using Protractor
Using Pencil
Using Eraser
BUILD SUCCESSFUL (total time: 0 seconds)

9.1


Sum.java
SumThread.java
Source
History
/*
* To change this license header, choose License Headers in Project Properties.
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
package Exercise_9_1;
/**
*
* @author Carlos Guisao
*/
class SumThread extends Thread {
public SumThread(int from, int to) {
this.from = from;
this.to = to;
sum = 0;
}
@Override
public void run( ) {
for(int i = from; i <= to; i++) {
sum += i;
}
}
public int getSum( ) {
return sum;
}
private int from, to, sum;
}



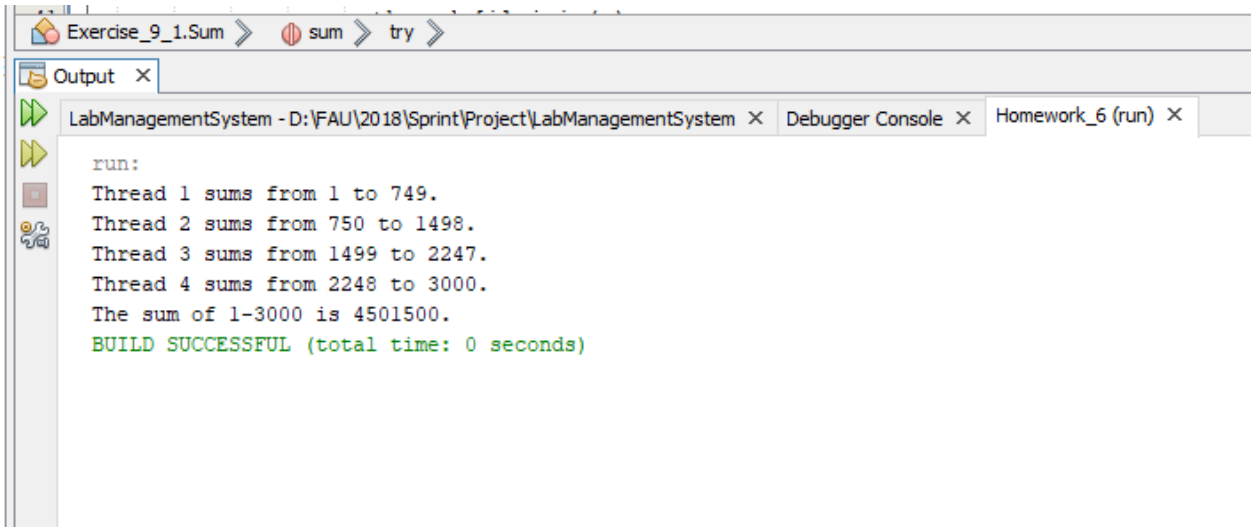
Source History

```
1  /*
2   * To change this license header, choose License Headers in Project Properties.
3   * To change this template file, choose Tools | Templates
4   * and open the template in the editor.
5   */
6  package Exercise_9_1;
7
8  /**
9   *
10  * @author Carlos Guisao
11  */
12 public class Sum {
13     public static void main(String[] args) {
14
15         sum(4, 1, 3000);
16     }
17
```

Sum.java | SumThread.java

Source | History

```
17
18      public static void sum(int num_threads, int from, int to){
19
20          SumThread [] threads = new SumThread[num_threads];
21
22          int step = (to - from) / num_threads;
23
24          for(int i = 0; i < num_threads; i++) {
25              int start = from + step * i;
26              int stop = (start + step) - 1;
27              if(i == (num_threads - 1)) {
28                  stop = to;
29              }
30
31                System.out.printf("Thread %d sums from %d to %d.\n", i+1, start, stop);
32                threads[i] = new SumThread(start, stop);
33          }
34
35          for(int i = 0; i < num_threads; i++) {
36              threads[i].start( );
37          }
38
39          try {
40              for(int i = 0; i < num_threads; i++) {
41                  threads[i].join( );
42              }
43          } catch(InterruptedException e) {
44              System.out.println("Interrupted");
45          }
46
47          int total_sum = 0;
48          for(int i = 0; i < num_threads; i++) {
49              total_sum += threads[i].getSum( );
50          }
51
52          System.out.printf("The sum of %d-%d is %d.\n", from, to, total_sum);
53      }
54  }
55
```


Exercise_9_1.Sum
sum
try
Output
LabManagementSystem - D:\FAU\2018\Sprint\Project\LabManagementSystem
Debugger Console
Homework_6 (run)
run:
Thread 1 sums from 1 to 749.
Thread 2 sums from 750 to 1498.
Thread 3 sums from 1499 to 2247.
Thread 4 sums from 2248 to 3000.
The sum of 1-3000 is 4501500.
BUILD SUCCESSFUL (total time: 0 seconds)