

SOFTWARE ENGINEERING FOUNDATIONS

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Assessment One: Cabin Manager

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ACRONYMS

Part I

CREATION OF A CABIN MANAGER

INTRODUCTION

This report shall provide detailed information about the implementation of the cabin manager application.

1.1 ATTRIBUTES

Apart from the mandatory attributes, the following attributes were chosen to be implemented as well:

SIZE: The area of available space in the cabin.

CONDITION: The condition the cabin is in. Only the following values are allowed: PERFECT, GOOD, FAIR, BAD, IN_SHAMBLES, UNKNOWN. The limitation to these attributes is achieved by utilizing an enumeration.

1.2 COST CALCULATION

The calculation of a cabin's cost for one night are calculated according to the following formula:

$$\text{BASIC_COST} + \text{CONDITION_COST} + \text{FACILITIES_COST} + \text{SIZE_COST} + (\text{BED_TO_ROOM_RATIO} * \text{BED_TO_ROOM_MULTIPLIER})$$

BASIC_COST and BED_TO_ROOM_MULTIPLIER are constants that can be set in the cabin class.

The costs associated with the condition, the facilities and the size are stored in a separate class (PriceMapping) and can be adjusted there. The prices are stored in five discreet values in a enumeration (Pricelist).

1.3 FREQUENCY REPORTS

The frequency-report provided outputs the number of cabins of a certain condition.

E.g. if two cabins are of the condition "IN_SHAMBLES" and one is of the condition "GOOD" the output would be as follows:

BAD	FAIR	GOOD	IN_SHAMBLES	PERFECT
0	0	1	2	0

1.4 STATUS REPORT

Even though not well-designed the application should meet the specification fully as all requirements were implemented and tested to function even in the case of incorrect input.

DIAGRAMS

2.1 CLASS DIAGRAM

The provided class diagram does not display getters and setters even though they are present for every non-final attribute present in the diagram.

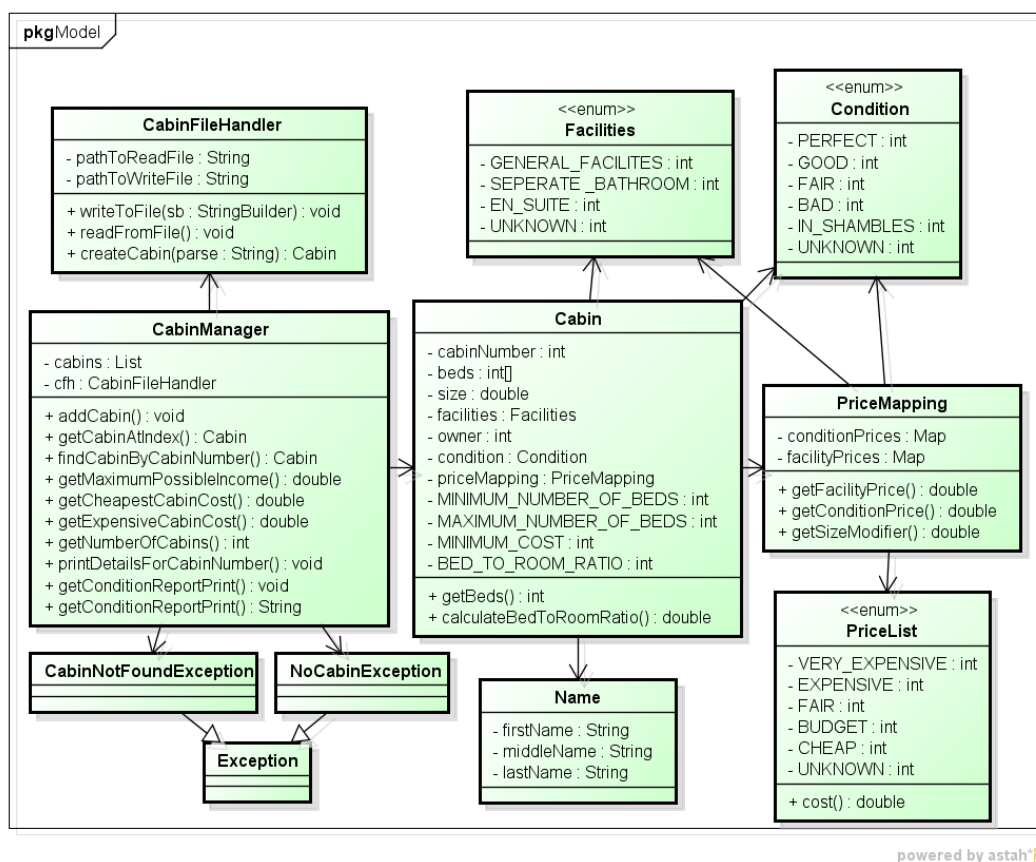


Figure 1: Class diagram of cabin manager

2.2 SEQUENCE DIAGRAM

The provided sequence diagram shows how the frequency report is generated and then printed to a file.

Even though the real implementation prints all other details as well (cabin details, overview, frequency report, most expensive & cheapest cabin) these have been left out of the sequence diagram to improve its clarity.

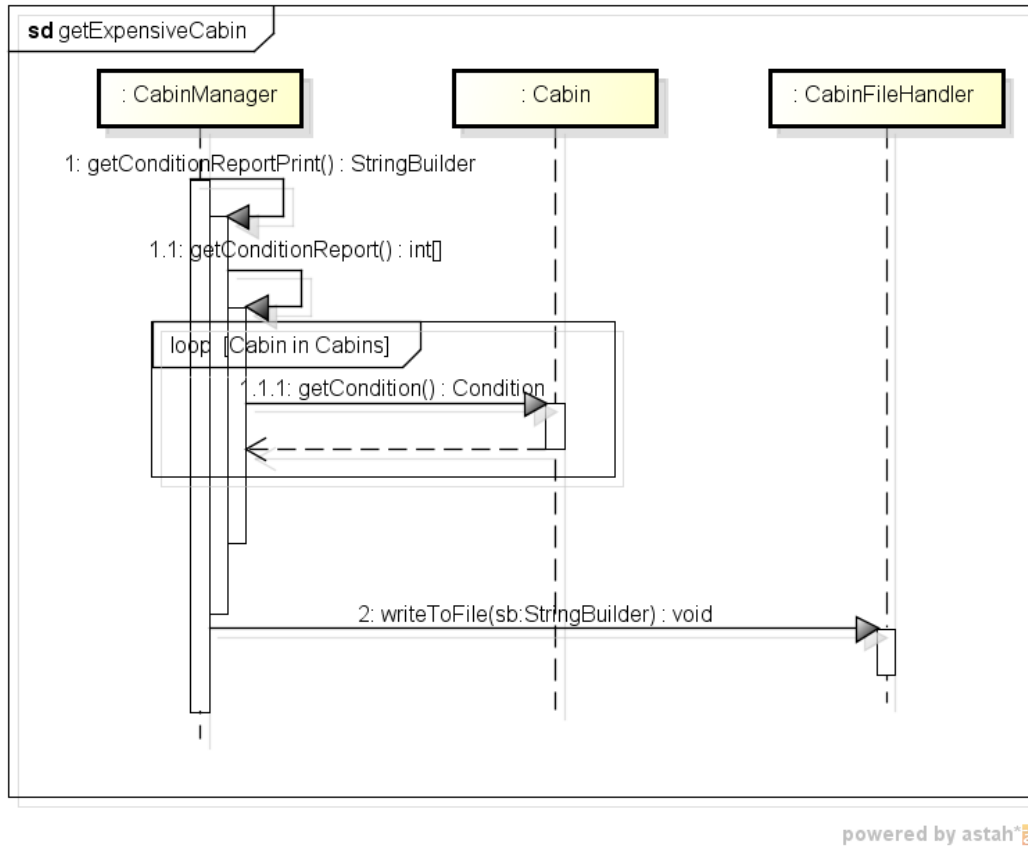


Figure 2: Sequence diagram of the printing of the frequency report

SOURCE CODE

Package: uk.heriotwatt.sef.model

```
1 package uk.heriotwatt.sef.model;
2
3 /**
4  * Stores the values associated with a cabin.
5  *
6  * @author Florian Bergmann
7  *
8  */
9 public class Cabin {
10
11     private int cabinNumber;
12     private int[] beds;
13     private double size;
14     private Facilities facilities;
15     private Name owner;
16     private Condition condition;
17
18     private PriceMapping data;
19
20     private final int MINIMUM_NUMBER_OF_BEDS = 2;
21     private final int MAXIMUM_NUMBER_OF_BEDS = 8;
22     private final double BASIC_COST = 10;
23     private final int BED_TO_ROOM_RATIO_MULTIPLIER = 5;
24
25     /**
26      * Creates a new cabin object without values.
27      */
28     public Cabin() {
29         this.data = new PriceMapping();
30     }
31
32     /**
33      * Creates a new cabin object with the specified values.
34      *
35      * @param cabinNumber
36      *         The cabin number.
37      * @param beds
38      *         The array of beds in the cabin..
39      * @param size
40      *         The size of the cabin.
41      * @param facilities
```

```

42     *           The facilites of the cabin.
43     * @param owner
44     *           The owner of the cabin.
45     * @param condition
46     *           The condition of the cabin.
47     */
48     public Cabin(int cabinNumber, int[] beds, double size,
49                 Facilities facilities, Name owner, Condition condition) {
50         super();
51         this.cabinNumber = cabinNumber;
52         this.beds = beds;
53         this.size = size;
54         this.facilities = facilities;
55         this.owner = owner;
56         this.condition = condition;
57         this.data = new PriceMapping();
58     }
59
60     /*
61     * Getters and setters
62     */
63
64     /**
65     * Returns the cabin number.
66     *
67     * @return The number of cabins stored in the manager.
68     */
69     public int getCabinNumber() {
70         return cabinNumber;
71     }
72
73     /**
74     * Sets the cabin number.
75     *
76     * @param cabinNumber
77     *           Number to be set.
78     */
79     public void setCabinNumber(int cabinNumber) {
80         this.cabinNumber = cabinNumber;
81     }
82
83     /**
84     * Returns the beds of the cabin as array. Each array-cell represents a
85     * room, each value of a cell the number of beds in the room.
86     *
87     * @return Array of beds.
88     */
89     public int[] getNumberOfBeds() {
90         return beds;
91     }
92

```

```

93  /**
94  * Sets the beds.
95  *
96  * @param numberOfBeds
97  *      The new array of beds.
98  */
99  public void setNumberOfBeds(int[] numberOfBeds) {
100      if (numberOfBeds.length > 0) {
101          int bedsInArray = this.calculateNumberOfBeds(numberOfBeds);
102          if (bedsInArray >= MINIMUM_NUMBER_OF_BEDS
103              && bedsInArray <= MAXIMUM_NUMBER_OF_BEDS) {
104              this.beds = numberOfBeds;
105          } else {
106              throw new IllegalArgumentException(
107                  String.format(
108                      "Only between %d and %
109                      d beds can be
110                      placed in a cabin.
111                      ",
112                      MINIMUM_NUMBER_OF_BEDS
113                      ,
114                      MAXIMUM_NUMBER_OF_BEDS
115                      ));
116          }
117      } else {
118          throw new IllegalArgumentException(
119              "The number of beds must be greater than 0.");
120      }
121  }
122
123  /**
124  * Returns the facilities of the cabin.
125  *
126  * @return The facilities of the cabin.
127  */
128  public Facilities getFacilities() {
129      return facilities;
130  }
131
132  /**
133  * Attempts to set the facilities of the cabin.
134  *
135  * @param facilities
136  */
137  public void setFacilities(Facilities facilities) {
138      this.facilities = facilities;
139  }
140
141  /**
142  * Returns the owner's name.
143  *

```

```

138     * @return The owner of the cabin.
139     */
140     public Name getOwner() {
141         return owner;
142     }
143
144     /**
145     * Sets the owner of the cabin.
146     *
147     * @param owner
148     */
149     public void setOwner(Name owner) {
150         this.owner = owner;
151     }
152
153     /**
154     * Returns the size of the cabin.
155     *
156     * @return The size of the cabin.
157     */
158     public double getSize() {
159         return size;
160     }
161
162     /**
163     * Sets the size of the cabin.
164     *
165     * @param size
166     *     The new size (must be bigger than 0)
167     */
168     public void setSize(double size) {
169         if (size >= 0) {
170             this.size = size;
171         } else {
172             throw new IllegalArgumentException("Size must be positive.");
173         }
174     }
175
176     /**
177     * The cost is calculated based on different factors: - The condition. - The
178     * facilities. - The size. - The beds/rooms present (The less beds per room
179     * the more expensive). The values associated with the first three are
180     * stored in {@link PriceMapping}
181     *
182     * @return The cost if the cabin.
183     */
184     public double getCost() {
185         double cost = BASIC_COST;
186
187         double conditionModifier = this.data.getConditionPrice(this.condition)
            ;

```

```

188         double facilitiesModifier = this.data.getFacilityPrice(this.facilities)
189             ;
190         double sizeModifier = this.data.getSizeModifier(this.size);
191         double bedToRoomRatio = this.calculateRoomToBedRatio();
192
193         cost = BASIC_COST + conditionModifier + facilitiesModifier
194             + sizeModifier
195             + (BED_TO_ROOM_RATIO_MULTIPLIER * bedToRoomRatio);
196
197         return cost;
198     }
199
200     /**
201     * Returns the cabins condition.
202     *
203     * @return The condition.
204     */
205     public Condition getCondition() {
206         return condition;
207     }
208
209     /**
210     * Sets the condition of the cabin.
211     *
212     * @param condition
213     *         New condition to be set.
214     */
215     public void setCondition(Condition condition) {
216         this.condition = condition;
217     }
218
219     /**
220     * Returns the number of beds in a cabin.
221     *
222     * @return The number of beds in the cabin.
223     */
224     public int getBeds() {
225         return this.calculateNumberOfBeds(this.beds);
226     }
227
228     /**
229     * Calculates the room to bed ratio.
230     *
231     * @return The room to bed ratio.
232     */
233     public double calculateRoomToBedRatio() {
234         int rooms = this.getNumberOfBeds().length;
235         int beds = this.calculateNumberOfBeds(this.beds);
236         double bedToRoomRatio = rooms / beds;
237         return bedToRoomRatio;

```

```

238
239     private int calculateNumberOfBeds(int[] numberOfBeds) {
240         int result = 0;
241         for (int i : numberOfBeds) {
242             result += i;
243         }
244         return result;
245     }
246 }

```

Listing 1: uk.heriotwatt.sef.model.Cabin.java

```

1  package uk.heriotwatt.sef.model;
2
3  import java.util.ArrayList;
4  import java.util.Formatter;
5  import java.util.List;
6  import java.util.Locale;
7
8  public class CabinManager {
9
10     private List<Cabin> cabins;
11
12     private CabinFileHandler cfh;
13
14     /**
15      * Creates a new cabin manager object from the provided arguments.
16      *
17      * @param cfh
18      *      The filehandler that loads cabins from a file and saves
19      *      reports to a file.
20      */
21     public CabinManager(CabinFileHandler cfh) {
22         this.cabins = new ArrayList<Cabin>();
23         this.cfh = cfh;
24         this.cabins = this.cfh.readFromFile();
25     }
26
27     public void addCabin(Cabin cab) {
28         this.cabins.add(cab);
29     }
30
31     /**
32      * Attempts to find a cabin with the provided cabinNumber in the cabin-List.
33      *
34      * @param cabinNumber
35      *      The cabinnumber of the cabin to be returned
36      * @return The first cabin in the list with the corresponding cabinnumber.
37      * @throws CabinNotFoundException
38      *      If no cabin with the provided number could be found.
39      */

```

```

40 public Cabin findCabinByCabinNumber(int cabinNumber)
41     throws CabinNotFoundException {
42     Cabin cabinFound = null;
43     for (Cabin cabin : this.cabins) {
44         if (cabin.getCabinNumber() == cabinNumber) {
45             cabinFound = cabin;
46             break;
47         }
48     }
49     if (cabinFound != null) {
50         return cabinFound;
51     } else {
52         throw new CabinNotFoundException(String.format(
53             "The cabin with number %d was not in the list.",
54             cabinNumber));
55     }
56 }
57
58 /**
59  * Retrieves that cabin at the specified position in the cabin list.
60  *
61  * @param index
62  *         The position for which the cabin should be returned.
63  * @return The cabin.
64  */
65 public Cabin getCabinAtIndex(int index) {
66     if (index < this.getNumberOfCabins()) {
67         return this.cabins.get(index);
68     } else {
69         throw new IndexOutOfBoundsException();
70     }
71 }
72
73 /**
74  * Returns the maximum possible income that could be achieved. Therefore the
75  * cost for all cabins are added up.
76  *
77  * @return The added cost of all cabins.
78  */
79 public double getMaximumPossibleIncome() {
80     double result = 0;
81     for (Cabin cabin : this.cabins) {
82         result += cabin.getCost();
83     }
84     return result;
85 }
86
87 /**
88  * Returns the cost for the cheapest cabin.
89  *

```



```

90     * @return The cost of the cheapest cabin.
91     * @throws NoCabinsException
92     */
93     public double getCheapestCabinCost() throws NoCabinsException {
94         // TODO: Empty array;
95         if (this.cabins.size() > 0) {
96             Cabin cheapestCab = null;
97             for (Cabin cab : this.cabins) {
98                 if (cheapestCab == null) {
99                     cheapestCab = cab;
100                 }
101                 if (cab.getCost() < cheapestCab.getCost()) {
102                     cheapestCab = cab;
103                 }
104             }
105             return cheapestCab.getCost();
106         } else {
107             throw new NoCabinsException(
108                 "There are no cabins present. Insert cabins
109                 first.");
110         }
111     }
112
113     /**
114     * Returns the cost for the most expensive cabin.
115     *
116     * @return The cost of the most expensive cabin.
117     * @throws NoCabinsException
118     */
119     public double getExpensiveCabinCost() throws NoCabinsException {
120         if (this.cabins.size() > 0) {
121             Cabin expensiveCab = null;
122             for (Cabin cab : this.cabins) {
123                 if (expensiveCab == null) {
124                     expensiveCab = cab;
125                 }
126                 if (cab.getCost() > expensiveCab.getCost()) {
127                     expensiveCab = cab;
128                 }
129             }
130             return expensiveCab.getCost();
131         } else {
132             throw new NoCabinsException(
133                 "There are no cabins present. Insert cabins
134                 first.");
135         }
136     }
137
138     /**
139     * Returns the number of cabins currently registered in the list.

```

```

139     *
140     * @return The number of cabins.
141     */
142     public int getNumberOfCabins() {
143         return this.cabins.size();
144     }
145
146     /**
147     * Acquires all information from the reports and prints the to a file.
148     */
149     public void printReportsToFile() {
150         String printString = "";
151         printString += "OVERVIEW OF CABIN DETAILS:\n\n";
152         StringBuilder sb = getAllCabinDetails();
153         printString += sb.toString();
154         printString += "SINGLE CABIN INFORMATION: \n\n";
155         for (Cabin cab : this.cabins) {
156             StringBuilder db = this.getCabinDetails(cab);
157             printString += db.toString();
158         }
159         try {
160             printString += "MOST EXPENSIVE CABIN: "
161                 + this.getExpensiveCabinCost() + "\n\n";
162             printString += "CHEAPEST CABIN: " + this.getCheapestCabinCost()
163                 + "\n\n";
164         } catch (NoCabinsException e) {
165             // TODO Auto-generated catch block
166             e.printStackTrace();
167         }
168         printString += "MAXIMUM INCOME PER NIGHT: "
169             + this.getMaximumPossibleIncome() + "\n\n";
170         printString += "CONDITION REPORT: \n\n";
171         printString += this.getConditionReportPrint().toString();
172         cfh.writeToFile(printString);
173     }
174
175     /**
176     * Prints the details of one cabin.
177     *
178     * @param cab
179     *         The cabin which details should be printed.
180     */
181     public void printCabDetails(Cabin cab) {
182         StringBuilder sb = getCabinDetails(cab);
183         System.out.println(sb.toString());
184     }
185
186     /**
187     * Prints the details for all cabins to the standard output.
188     */

```

```

189     public void printAllCabins() {
190         StringBuilder sb = getAllCabinDetails();
191         System.out.println(sb.toString());
192     }
193
194     /**
195      * Prints the details of a specific cabin that is specified by its cabin
196      * number.
197      *
198      * @param cabinNumber
199      *         The cabin number of the cabin whose details should be printed.
200      */
201     public void printDetailsForCabinNumber(int cabinNumber) {
202         try {
203             Cabin cab = this.findCabinByCabinNumber(cabinNumber);
204             this.printCabDetails(cab);
205         } catch (CabinNotFoundException e) {
206             System.out
207                 .println(String
208                     .format("Could not find the
209                             cabin for number %d. No
210                             details printed.",
211                             cabinNumber));
212         }
213     }
214
215     /**
216      * Returns a formatted condition report.
217      *
218      * @return A stringbuilder containing the formatted condition report.
219      */
220     public StringBuilder getConditionReportPrint() {
221         int[] conRep = getConditionReport();
222         StringBuilder sb = new StringBuilder();
223         Formatter formatter = new Formatter(sb, Locale.UK);
224         formatter.format("%1$15s | %2$15s | %3$15s | %4$15s | %5$15s %n",
225             Condition.BAD.toString(), Condition.FAIR.toString(),
226             Condition.GOOD.toString(), Condition.IN_SHAMBLES.
227                 toString(),
228             Condition.PERFECT.toString(), Condition.UNKNOWN.
229                 toString());
230         formatter.format("%1$15d | %2$15d | %3$15d | %4$15d | %5$15d %n",
231             conRep[0], conRep[1], conRep[2], conRep[3], conRep[4],
232             conRep[5]);
233         formatter.format("%n");
234         return sb;
235     }
236
237     /**
238      * Returns the values of the condition report.
239      *

```

```

236     * @return String array containing the number of cabins of a certain
237     *     condition.
238     */
239     public int[] getConditionReport() {
240         int size = Condition.values().length;
241         int[] frequencyOfConditions = new int[size];
242         for (Cabin cabin : this.cabins) {
243             switch (cabin.getCondition()) {
244                 case BAD:
245                     frequencyOfConditions[0]++;
246                     break;
247                 case FAIR:
248                     frequencyOfConditions[1]++;
249                     break;
250                 case GOOD:
251                     frequencyOfConditions[2]++;
252                     break;
253                 case IN_SHAMBLES:
254                     frequencyOfConditions[3]++;
255                     break;
256                 case PERFECT:
257                     frequencyOfConditions[4]++;
258                     break;
259                 case UNKNOWN:
260                     frequencyOfConditions[5]++;
261                     break;
262                 default:
263                     break;
264             }
265         }
266         return frequencyOfConditions;
267     }
268
269     /**
270     * Returns the details of one cabin.
271     *
272     * @param cab
273     *     The cabin which details should be returned
274     * @return A stringbuilder with formatted output.
275     */
276     private StringBuilder getCabinDetails(Cabin cab) {
277         StringBuilder sb = new StringBuilder();
278         Formatter formatter = new Formatter(sb, Locale.UK);
279         formatter
280             .format("%1$10s | %2$15s | %3$20s | %4$15s | %5$5s | "
281                 .format("%6$5s | %7$5s | %8$5s %n",
282                     "NUMBER", "OWNER", "FACILITIES", " "
283                     "CONDITION", "BEDS",
284                     "ROOMS", "SIZE", "COST"));

```

```

284         .format("%1$s10d | %2$s15s | %3$s20s | %4$s15s | %5$s5d |
285                %6$s5d | %7$s5.2f | %8$s5.2f %n",
286                cab.getCabinNumber(), cab.getOwner()
287                .getFirstAndLastName(), cab.
288                getFacilities()
289                .toString().
290                toLowerCase(), cab
291                .getCondition()
292                .toString().
293                toLowerCase(), cab
294                .getBeds(), cab
295                .getNumberOfBeds().
296                length, cab.
297                getSize(), cab
298                .getCost());
299
300     formatter.format("%n");
301     return sb;
302 }
303
304 /**
305  * Returns the details about all cabins
306  *
307  * @return A stringbuilder with formatted output.
308  */
309 private StringBuilder getAllCabinDetails() {
310     StringBuilder sb = new StringBuilder();
311     Formatter formatter = new Formatter(sb, Locale.UK);
312     formatter.format("%1$s10s | %2$s10s | %3$s20s | %4$s5s %n", "NUMBER",
313                     "OWNER", "FACILITIES", "BEDS");
314     for (Cabin cab : this.cabins) {
315         // TODO Return the initials of the owner.
316         formatter.format("%1$s10d | %2$s10s | %3$s20s | %4$s5d %n",
317                         cab.getCabinNumber(), cab.getOwner().
318                         getInitials(), cab
319                         .getFacilities().toString().
320                         toLowerCase(),
321                         cab.getBeds());
322     }
323     formatter.format("%n");
324     return sb;
325 }
326 }

```

Listing 2: uk.heriotwatt.sef.model.CabinManager.java

```

1 package uk.heriotwatt.sef.model;
2
3 /**
4  * Stores the different possible of conditions.
5  */

```

```

6  * @author fhb2
7  *
8  */
9  public enum Condition {
10
11      PERFECT, GOOD, FAIR, BAD, IN_SHAMBLES, UNKNOWN
12
13  }

```

Listing 3: uk.heriotwatt.sef.model.Condition.java

```

1  package uk.heriotwatt.sef.model;
2
3  /**
4   * Stores the different possible values of facilities.
5   *
6   * @author fhb2
7   *
8   */
9  public enum Facilities {
10
11      GENERAL_FACILITIES, SEPERATE_BATHROOM, EN_SUITE, UNKNOWN
12
13  }

```

Listing 4: uk.heriotwatt.sef.model.Facilities.java

```

1  package uk.heriotwatt.sef.model;
2
3  /**
4   * Stores the price modifiers for certain discrete price categories.
5   *
6   * @author fhb2
7   *
8   */
9  public enum PriceList {
10
11      VERY_EXPENSIVE(10.0), EXPENSIVE(7.5), FAIR(5.0), BUDGET(2.5), CHEAP(1.0),
12          UNKNOWN(
13              0.0);
14
15      private final double cost;
16
17      private PriceList(double cost) {
18          this.cost = cost;
19      }
20
21      public double cost() {
22          return this.cost;
23      }
24
25  }

```

```

23 |
24 | }

```

Listing 5: uk.heriotwatt.sef.model.PriceList.java

```

1  package uk.heriotwatt.sef.model;
2
3  import java.util.HashMap;
4  import java.util.Map;
5
6  /**
7   * Class to separate the pricing mapping from the information of the cabin.
8   *
9   * @author florian
10  *
11  */
12  public class PriceMapping {
13
14      private Map<Condition, Double> conditionPrices;
15      private Map<Facilities, Double> facilityPrices;
16
17      public PriceMapping() {
18          this.initializeConditionPriceMapping();
19          this.initializeFacilityPriceMapping();
20      }
21
22      public Map<Condition, Double> getConditionPrices() {
23          return conditionPrices;
24      }
25
26      public Map<Facilities, Double> getFacilityPrices() {
27          return facilityPrices;
28      }
29
30      /*
31       * Getters and setters
32       */
33
34      public double getFacilityPrice(Facilities facilities) {
35          return facilityPrices.get(facilities);
36      }
37
38      public double getConditionPrice(Condition condition) {
39          return conditionPrices.get(condition);
40      }
41
42      /**
43       * Adds Condition - Price pairs to a map. Will be used in the getCost()
44       * method.
45       */
46      private void initializeConditionPriceMapping() {

```

```

47         this.conditionPrices = new HashMap<Condition, Double>();
48         this.conditionPrices.put(Condition.PERFECT,
49             PriceList.VERY_EXPENSIVE.cost());
50         this.conditionPrices.put(Condition.GOOD, PriceList.EXPENSIVE.cost());
51         this.conditionPrices.put(Condition.FAIR, PriceList.FAIR.cost());
52         this.conditionPrices.put(Condition.BAD, PriceList.BUDGET.cost());
53         this.conditionPrices.put(Condition.IN_SHAMBLES, PriceList.CHEAP.cost()
54             );
55     }
56     /**
57      * Adds Facilities - Price pairs to a map. Will be used in the getCost()
58      * method.
59      */
60     private void initializeFacilityPriceMapping() {
61         this.facilityPrices = new HashMap<Facilities, Double>();
62         this.facilityPrices.put(Facilities.EN_SUITE,
63             PriceList.VERY_EXPENSIVE.cost());
64         this.facilityPrices.put(Facilities.SEPERATE_BATHROOM,
65             PriceList.FAIR.cost());
66         this.facilityPrices.put(Facilities.GENERAL_FACILITIES,
67             PriceList.BUDGET.cost());
68     }
69
70     /**
71      * Return the size modifier that can be used to calculate a price for a
72      * cabin.
73      *
74      * @param size
75      *         The size of the cabin.
76      * @return The size modifier according to the provided size of a room.
77      */
78     public double getSizeModifier(double size) {
79         if (size < 20) {
80             return PriceList.BUDGET.cost();
81         } else if (size >= 20 && size < 30) {
82             return PriceList.CHEAP.cost();
83         } else if (size >= 30 && size < 40) {
84             return PriceList.FAIR.cost();
85         } else if (size >= 40 && size < 50) {
86             return PriceList.EXPENSIVE.cost();
87         } else {
88             return PriceList.VERY_EXPENSIVE.cost();
89         }
90     }
91 }

```

Listing 6: uk.heriotwatt.sef.model.PriceMapping.java

```

1 package uk.heriotwatt.sef.model;
2

```



```

3 import java.io.File;
4 import java.io.FileNotFoundException;
5 import java.io.IOException;
6 import java.io.PrintWriter;
7 import java.util.Date;
8 import java.util.LinkedList;
9 import java.util.List;
10 import java.util.Scanner;
11
12 public class CabinFileHandler {
13
14     private String pathToReadFile;
15     private String pathToReportFile;
16
17     /**
18      * Creates a new cabinfilehandler object from the provided arguments.
19      * @param pathReadFile The path of the file of cabins.
20      * @param pathWriteFile The path of the file to write the reports to.
21      */
22     public CabinFileHandler(String pathReadFile, String pathWriteFile) {
23         this.pathToReadFile = pathReadFile;
24         this.pathToReportFile = pathWriteFile;
25     }
26
27     /**
28      * Attempts to write a provided string to a file.
29      * @param sb The string to be written to a file.
30      */
31     public void writeToFile(String sb) {
32         try {
33             File file = new File(pathToReportFile);
34             PrintWriter pw = new PrintWriter(file);
35             pw.write(sb);
36             pw.flush();
37             pw.close();
38         } catch (Exception e) {
39             e.printStackTrace();
40         }
41     }
42
43     /**
44      * Attempts to read a list of cabins from a file.
45      * @return A new list of cabin objects.
46      */
47     public List<Cabin> readFromFile() {
48         List<Cabin> cabinList = new LinkedList<Cabin>();
49         try {
50             File file = new File(this.pathToReadFile);
51             Scanner scanner = new Scanner(file);
52             while (scanner.hasNext()) {
53                 String nextLine = scanner.nextLine();

```

```

54         if (nextLine.trim().startsWith("#")) {
55             // Ignoring commented out lines.
56             System.out.println("Ignoring a commented out
                    line.");
57         } else {
58             try {
59                 Cabin cabin = this.createCabin(
                    nextLine);
60                 cabinList.add(cabin);
61             } catch (IllegalArgumentException e) {
62                 e.printStackTrace();
63             }
64         }
65     }
66     } catch (FileNotFoundException e) {
67         e.printStackTrace();
68     } catch (IOException e) {
69         e.printStackTrace();
70     }
71     return cabinList;
72 }
73
74 /**
75  * Attempts to parse a cabin from a provided string that must comply to the
76  * following format:
77  * CabinNumber,Size,Facilities,Condition,Forename,Middlename,Surname,BedsRoom1
78  * ,BedsRoom2,...,[BedsRoomN]
79  * @param nextLine
80  *     The string containing all arguments.
81  * @return A cabin object created from the provided arguments.
82  * @throws IllegalArgumentException
83  *     If the provided string does not comply to the needed format.
84  */
85 public Cabin createCabin(String nextLine) {
86     Cabin cabin = null;
87     String[] splitList = nextLine.split(",");
88     String errorString = "";
89
90     int cabinNumber = 0;
91     double size = 0;
92     Facilities facilities = null;
93     Condition condition = null;
94     Name name;
95     int[] beds;
96     try {
97         cabinNumber = Integer.parseInt(splitList[0]);
98     } catch (NumberFormatException e) {
99         errorString += splitList[0];
100     }
101     try {
        size = Double.parseDouble(splitList[1]);

```

```

102         } catch (NumberFormatException e) {
103             errorString += ", " + splitList[1];
104         }
105         try {
106             facilities = Facilities.valueOf(splitList[2]);
107         } catch (IllegalArgumentException e) {
108             errorString += ", " + splitList[2];
109         }
110         try {
111             condition = Condition.valueOf(splitList[3]);
112         } catch (IllegalArgumentException e) {
113             errorString += ", " + splitList[3];
114         }
115         name = new Name(splitList[4], splitList[5], splitList[6]);
116         beds = new int[splitList.length - 7];
117         for (int i = 7; i < splitList.length; i++) {
118             try {
119                 beds[i - 7] = Integer.parseInt(splitList[i]);
120             } catch (Exception e) {
121                 errorString += ", " + beds[i - 7];
122             }
123         }
124         if (errorString.length() == 0) {
125             cabin = new Cabin(cabinNumber, beds, size, facilities, name,
126                             condition);
127             return cabin;
128         } else {
129             throw new IllegalArgumentException(
130                 String.format(
131                     "There were errors parsing the
                        line:\r\n%s\nThe following
                        arguments were violating
                        the format:%s",
132                     nextLine, errorString));
133         }
134     }
135 }
136 }

```

Listing 7: uk.heriotwatt.sef.model.CabinFileHandler.java

```

1 package uk.heriotwatt.sef.model;
2
3 /**
4  * Exception to clarify the missing of a cabin.
5  *
6  * @author florian
7  *
8  */
9 public class CabinNotFoundException extends Exception {
10

```

```

11     /**
12      * Generated serialVersionUID to allow serialisation.
13      */
14     private static final long serialVersionUID = -7740644730079198039L;
15
16     public CabinNotFoundException(String msg) {
17         super(msg);
18     }
19 }

```

Listing 8: uk.heriotwatt.sef.model.CabinNotFoundException.java

```

1 package uk.heriotwatt.sef.model;
2
3 /**
4  * Shows that no cabins are currently loaded.
5  *
6  * @author florian
7  *
8  */
9 public class NoCabinsException extends Exception {
10
11     /**
12      * Generated serialVersionUID to allow serialisation.
13      */
14     private static final long serialVersionUID = 2274177224545932291L;
15
16     public NoCabinsException(String msg) {
17         super(msg);
18     }
19 }

```

Listing 9: uk.heriotwatt.sef.model.NoCabinsException.java

```

1 package uk.heriotwatt.sef.model;
2
3 //First Name class
4 //F21SF - Monica
5 public class Name {
6     private String firstName;
7     private String middleName;
8     private String lastName;
9
10    // constructor to create object with first, middle and last name
11    // if there isn't a middle name, that parameter could be an empty String
12    public Name(String fName, String mName, String lName) {
13        firstName = fName;
14        middleName = mName;
15        lastName = lName;
16    }

```

```
17
18 // returns the first name
19 public String getFirstName() {
20     return firstName;
21 }
22
23 // returns the last name
24 public String getLastName() {
25     return lastName;
26 }
27
28 // change the last name to the value provided in the parameter
29 public void setLastName(String ln) {
30     lastName = ln;
31 }
32
33 // returns the first name then a space then the last name
34 public String getFirstAndLastName() {
35     return firstName + " " + lastName;
36 }
37
38 // returns the last name followed by a comma and a space
39 // then the first name
40 public String getLastCommaFirst() {
41     return lastName + ", " + firstName;
42 }
43
44 // returns name in the format initial, period, space, lastname
45 public String getInitPeriodLast() {
46     return firstName.charAt(0) + ". " + lastName;
47 }
48
49 public String getInitials() {
50     return firstName.charAt(0) + ". " + lastName.charAt(0) + ".";
51 }
52 }
```

Listing 10: uk.heriotwatt.sef.model.Name.java


```

33         8 | Robert Cotton | seperate_bathroom | fair | 4 | 3
34         | 38.00 | 25.00
35 NUMBER | OWNER | FACILITIES | CONDITION | BEDS | ROOMS
36     9 | Beo Wulf | general_facilities | bad | 4 | 2
37     | 38.50 | 20.00
38 NUMBER | OWNER | FACILITIES | CONDITION | BEDS | ROOMS
39     10 | Grimur Jonsson | en_suite | good | 8 | 3
40     | 27.00 | 28.50
41 NUMBER | OWNER | FACILITIES | CONDITION | BEDS | ROOMS
42     2 | Ben Franklin | en_suite | perfect | 3 | 3
43     | 35.75 | 40.00
44 NUMBER | OWNER | FACILITIES | CONDITION | BEDS | ROOMS
45     3 | Homer Simpson | general_facilities | fair | 6 | 3
46     | 53.95 | 27.50
47 MOST EXPENSIVE CABIN: 40.0
48
49 CHEAPEST CABIN: 20.0
50
51 MAXIMUM INCOME PER NIGHT: 289.5
52
53 CONDITION REPORT:
54
55     BAD | FAIR | GOOD | IN_SHAMBLES |
56     PERFECT
57     1 | 3 | 2 | 1 |
58     3

```

Listing 11: Example output-file

TESTING REPORT

The application is delivered with a set of test cases that all pass: they are printed in [Appendix A](#)¹.

A short list of noteworthy test cases shall be provided as an overview:

- FILE HANDLING:**
- Create new Cabin from valid input string.
 - Create new cabin from invalid input string (throws `IllegalArgumentException`).
 - Read from non present file (catch with stack trace).
 - Write to non present file (catch with stack trace).
- CABIN:**
- Set number of beds (too few → `IllegalArgumentException`, too many → `IllegalArgumentException`, valid numbers).
 - Test cost calculation algorithm.
- CABIN MANAGER:**
- Add cabin.
 - Get cabin at index (with and without any cabins → `IndexOutOfBoundsException`).
 - Find cabin by number (cabin is in list and cabin is not in list → `CabinNotFoundException`).
 - Get cheapest and most expensive cabin (without cabins → `NoCabinsException`).

The error handling of incorrect input in the file handler is performed by checking each attribute and - if an error occurs - add this attribute to an error-string that will be returned via an `IllegalArgumentException`. This way it is possible to inform the user about the concrete argument that caused the error.

¹ In order to run the test cases it is necessary that the `JUnit` (<http://www.junit.org/>) and the `Mockito` (<http://code.google.com/p/mockito/>) framework are present.

Part II

APPENDIX

APPENDIX

Package: uk.heriotwatt.sef.model.tests

```
1 package uk.heriotwatt.sef.model.tests;
2
3 import junit.framework.Assert;
4
5 import org.junit.After;
6 import org.junit.Before;
7 import org.junit.Test;
8
9 import uk.heriotwatt.sef.model.Cabin;
10 import uk.heriotwatt.sef.model.CabinFileHandler;
11
12 public class CabinFileHandlerTests {
13
14     private CabinFileHandler fileHandler;
15
16     @Before
17     public void setUp() throws Exception {
18         this.fileHandler = new CabinFileHandler("", "");
19     }
20
21     @After
22     public void tearDown() throws Exception {
23     }
24
25     @Test
26     public void testCreateCabin()
27     {
28         String toParse = "1,10,EN_SUITE,IN_SHAMBLES,John,Jack,MasterMind
29             ,2,2,2,2";
30         Cabin cabin = fileHandler.createCabin(toParse);
31         Assert.assertNotNull(cabin);
32     }
33
34     @Test(expected=IllegalArgumentException.class)
35     public void testCreateCabinFaultyValues()
36     {
37         String toParse = "1,10,EN_SITE,IN_SHAMBLES,John,Jack,MasterMind
38             ,2,2,2,2";
39         Cabin cabin = fileHandler.createCabin(toParse);
40     }
```

```

40     @Test
41     public void testReadFromNonPresentFile()
42     {
43         this.fileHandler.readFromFile();
44         /*
45          * Testing that the test runner does not crash but the false input is
46          * caught.
47          */
48         Assert.assertTrue(true);
49     }
50     @Test
51     public void testWriteToNonPresentFile()
52     {
53         this.fileHandler.writeToFile("Nothing");
54         /*
55          * Testing that the test runner does not crash but the false input is
56          * caught.
57          */
58         Assert.assertTrue(true);
59     }

```

Listing 12: uk.heriotwatt.sef.model.tests.CabinFileHandlerTests.java

```

1  /**
2   *
3   */
4  package uk.heriotwatt.sef.model.tests;
5
6  import static org.junit.Assert.*;
7
8  import java.util.LinkedList;
9
10 import junit.framework.Assert;
11
12 import org.junit.After;
13 import org.junit.Before;
14 import org.junit.Test;
15
16 import static org.mockito.Mockito.*;
17
18 import uk.heriotwatt.sef.model.Cabin;
19 import uk.heriotwatt.sef.model.CabinFileHandler;
20 import uk.heriotwatt.sef.model.CabinManager;
21 import uk.heriotwatt.sef.model.CabinNotFoundException;
22 import uk.heriotwatt.sef.model.Condition;
23 import uk.heriotwatt.sef.model.Facilities;
24 import uk.heriotwatt.sef.model.Name;
25 import uk.heriotwatt.sef.model.NoCabinsException;
26

```

```

27 /**
28  * @author Florian Bergmann
29  *
30  */
31 public class CabinManagerTests {
32
33     private CabinManager cabMan;
34     private Cabin mockin;
35     private Cabin mockin2;
36
37     /**
38      * @throws java.lang.Exception
39      */
40     @Before
41     public void setUp() throws Exception {
42         CabinFileHandler mockHandler = mock(CabinFileHandler.class);
43         when(mockHandler.readFromFile()).thenReturn(new LinkedList());
44         cabMan = new CabinManager(mockHandler);
45         mockin = mock(Cabin.class);
46         mockin2 = mock(Cabin.class);
47     }
48
49     /**
50      * @throws java.lang.Exception
51      */
52     @After
53     public void tearDown() throws Exception {
54     }
55
56     /**
57      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#addCabin(uk.
58          heriotwatt.sef.model.Cabin)}.
59      */
60     @Test
61     public void testAddCabin() {
62         Cabin cab = new Cabin(1, new int[] {2,3}, 55.0, Facilities.EN_SUITE,
63             new Name("Test", "Test", "Test"), Condition.GOOD);
64         cabMan.addCabin(cab);
65         Assert.assertEquals(1, cabMan.getNumberOfCabins());
66     }
67
68     /**
69      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#getCabinAtIndex
70          (int)}.
71      */
72     @Test
73     public void testGetCabinAtIndex() {
74         Cabin cab = new Cabin(1, new int[] {2,3}, 55.0, Facilities.EN_SUITE,
75             new Name("Test", "Test", "Test"), Condition.GOOD);
76         cabMan.addCabin(cab);
77         Cabin cabIndex = cabMan.getCabinAtIndex(0);

```

```

74         Assert.assertEquals(cabIndex, cab);
75     }
76
77     @Test(expected=IndexOutOfBoundsException.class)
78     public void testGetCabinAtIndexWrongIndex() {
79         cabMan.getCabinAtIndex(1);
80     }
81
82     /**
83      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#
84          findCabinByCabinNumber(int)}.
85      */
86     @Test
87     public void testFindCabinByCabinNumber() {
88         Cabin cab = new Cabin(1, new int[] {2,3}, 55.0, Facilities.EN_SUITE,
89             new Name("Test", "Test", "Test"), Condition.GOOD);
90         cabMan.addCabin(cab);
91         Cabin cabFound = null;
92         try {
93             cabFound = cabMan.findCabinByCabinNumber(1);
94         } catch (CabinNotFoundException e) {
95             // TODO Auto-generated catch block
96             e.printStackTrace();
97         }
98         Assert.assertEquals(cab, cabFound);
99     }
100
101     @Test(expected=CabinNotFoundException.class)
102     public void testFindCabinByCabinNumberWrongNumber() throws
103         CabinNotFoundException {
104         cabMan.findCabinByCabinNumber(1);
105     }
106
107     /**
108      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#
109          getMaximumPossibleIncome()}.
110      */
111     @Test
112     public void testGetMaximumPossibleIncome() {
113         when(mockin.getCost()).thenReturn(50.0);
114         when(mockin2.getCost()).thenReturn(40.0);
115         cabMan.addCabin(mockin);
116         cabMan.addCabin(mockin2);
117         double getMaxIncome = cabMan.getMaximumPossibleIncome();
118         Assert.assertEquals(90, getMaxIncome, 0);
119     }
120
121     /**
122      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#
123          getCheapestCabinCost()}.
124      */

```

```

120     @Test
121     public void testGetCheapestCabinCost() {
122         when(mockin.getCost()).thenReturn(50.0);
123         when(mockin2.getCost()).thenReturn(40.0);
124         cabMan.addCabin(mockin);
125         cabMan.addCabin(mockin2);
126         double cheapest = 0;
127         try {
128             cheapest = cabMan.getCheapestCabinCost();
129         } catch (NoCabinsException e) {
130             // TODO Auto-generated catch block
131             e.printStackTrace();
132         }
133         Assert.assertEquals(40, cheapest, 0);
134     }
135
136     @Test(expected=NoCabinsException.class)
137     public void testGetCheapestCabinCostNoCabins() throws NoCabinsException {
138         cabMan.getCheapestCabinCost();
139     }
140
141     /**
142      * Test method for {@link uk.heriotwatt.sef.model.CabinManager#
143      * getExpensiveCabinCost()}.
144      */
145     @Test
146     public void testGetExpensiveCabinCost() {
147         when(mockin.getCost()).thenReturn(50.0);
148         when(mockin2.getCost()).thenReturn(40.0);
149         cabMan.addCabin(mockin);
150         cabMan.addCabin(mockin2);
151         double mostExpensive = 0;
152         try {
153             mostExpensive = cabMan.getExpensiveCabinCost();
154         } catch (NoCabinsException e) {
155             // TODO: handle exception
156         }
157         Assert.assertEquals(50, mostExpensive, 0);
158     }
159
160     @Test(expected=NoCabinsException.class)
161     public void testGetExpensiveCabinCostNoCabins() throws NoCabinsException {
162         cabMan.getExpensiveCabinCost();
163     }
164 }

```

Listing 13: uk.heriotwatt.sef.model.tests.CabinManagerTests.java

```

1 package uk.heriotwatt.sef.model.tests;
2
3

```

```

4 import org.junit.Assert;
5 import org.junit.Before;
6 import org.junit.Test;
7
8 import uk.heriotwatt.sef.model.Cabin;
9 import uk.heriotwatt.sef.model.Condition;
10 import uk.heriotwatt.sef.model.Facilities;
11 import uk.heriotwatt.sef.model.Name;
12 import uk.heriotwatt.sef.model.PriceMapping;
13
14 public class CabinTests {
15
16     private Cabin cabin;
17
18     @Before
19     public void setUp() throws Exception {
20         cabin = new Cabin();
21     }
22
23     @Test
24     public void testSetNumberOfBeds()
25     {
26         int[] numberToSet = new int[] {2};
27         cabin.setNumberOfBeds(numberToSet);
28         int[] numberSet = cabin.getNumberOfBeds();
29         Assert.assertArrayEquals(numberToSet, numberSet);
30
31         numberToSet = new int[] {2, 2, 4};
32         cabin.setNumberOfBeds(numberToSet);
33         numberSet = cabin.getNumberOfBeds();
34         Assert.assertArrayEquals(numberToSet, numberSet);
35     }
36
37     @Test(expected=IllegalArgumentException.class)
38     public void testSetNumberOfBedsWithTooFewBeds()
39     {
40         int[] numberToSet = new int[] {1};
41         cabin.setNumberOfBeds(numberToSet);
42     }
43
44     @Test(expected=IllegalArgumentException.class)
45     public void testSetNumberOfBedsWithTooManyBeds()
46     {
47         int[] numberToSet = new int[] {9};
48         cabin.setNumberOfBeds(numberToSet);
49     }
50
51     @Test
52     public void testCostForFacilites()
53     {
54         PriceMapping pm = new PriceMapping();

```

```
55
56     Facilities fac = Facilities.EN_SUITE;
57     Condition con = Condition.FAIR;
58     int[] beds = new int[] {2,2};
59     double size = 49.99;
60
61     double basePrice = 10;
62     double conPrice = pm.getConditionPrice(con);
63     double facPrice = pm.getFacilityPrice(fac);
64     double sizePrice = pm.getSizeModifier(size);
65
66     double expectedPrice = basePrice + conPrice + facPrice + sizePrice + 5
        * (2/4);
67
68     Cabin cab = new Cabin(1, beds,size, fac, new Name("Ho", "ho", "ho"),
        con);
69
70     double price = cab.getCost();
71
72     Assert.assertEquals(expectedPrice, price, 0);
73 }
74
75 }
```

Listing 14: uk.heriotwatt.sef.model.tests.CabinTests.java