EGCO 213

Group Project 1 – Hotel Booking Simulation

The project can be done in a group of <= 4 students. Each group must do the project by themselves. **Everyone involved in cheating will get ZERO point**

1. Implement **class Room** and **class Meal** that represents an individual hotel item read from hotel.txt. Each line of the input file consists of

```
R, Single Room,      1300
R, Twin Room,        1800
R, Triple Room,      2400
R, Single Dorm Bed,   600
M, Breakfast,         250
```

- Column 0 = item type (R = room, M = meal)
- Column 1 = item name
- Column 2 = rate
    - Room rate = price per room (or per bed) without service charge and VAT
    - Meal rate   = price per head including service charge and VAT

Your class should have variables to keep total sales in cash and total sales in units.
Don't hard code item information. I may change item names and rates to check whether your calculation is correct. But there are always 5 items in this file, with 1 meal item being the last item.

2. Implement **class Customer** that represents an individual customer. Customer name is read from bookings.txt in (3). Your class should have a variable to keep cashback calculated from booking

3. Implement **class Booking** that represents an individual booking read from bookings.txt. Each line of the input file consists of

```
1,  Annie,   2, 1, 1, 1,  1,  7
2,  Betty,   5, 2, 2, 0,  0,  6
3,  Cathy,   3, 0, 5, 0, 20, 30
4,  Annie,  10, 0, 0, 5,  0, 14
5,  David,   4, 1, 5, 1, 10, 20
6,  Ellen,   5, 5, 5, 1,  0, 18
7,  David,  10, 3, 6, 0,  0, 15
...
```

- Column 0 = booking ID
- Column 1 = customer name
- Column 2 = nights
- Last 5 columns = units of items 1-5 (corresponding to items in hotel.txt)

Lines that contain identical names are bookings by the same customers. For example, in order #1, Annie books {1 single room, 1 twin room, 1 triple room, 1 single dorm bed, 7 heads of breakfast} for 2 nights. Orders #1 and #4 are from the same person (Annie).

Don't hard code booking information. I may change customer names, nights, or number of items to check whether your calculation is correct. I may also add/remove some lines (number of bookings is not fixed).

Your class must have method **process** to process each booking as follows:

3.1 Calculate total room price for all nights. The price must include service charge and VAT
- Service charge = 10% of room rate
- VAT = 7% of room rate including service charge

3.2 Calculate total meal price for all nights
3.3 Calculate total bill = total room price + total meal price

3.4 Check customer's cashback

- If this is the customer's first order, add him/her to customer list. Set cashback = 0
- If this customer already exists, get available cashback. Cashback redemption is limited to 50% of total bill in (3.3); redemption <1 full baht is excluded. For example, if total bill = 3,560.20 ➔ max redemption = 1,780 baht

3.5 Calculate final bill = total bill – cashback redemption

3.6 Update customer's cashback for the next order

- After redemption in (3.4)
- Add cashback earned by the current booking = 0.05 * total room price in (3.1). Cashback <1 full baht is excluded. For example, if total room price = 14,359.40 ➔ cashback = 717 baht

3.7 Design your own output format, but it must show at least: booking information read from input file, total room price (3.1), total meal price (3.2), final bill (3.5), and cashback (3.6)

4. Implement main class with main method

4.1 Read data from input files

4.2 Process each booking

4.3 Report all rooms and their total sales in units and in cash, sorted in decreasing order of sales in units

4.4 Report total sales in units and in cash of meal

5. The program must be able to handle the following errors/exceptions

5.1 Missing files – if hotel.txt or bookings.txt is missing

5.2 bookings.txt may contain input errors as in bookings_errors.txt, but no input error hotel.txt

- Missing values, e.g. only 4 items instead of 5 items in a line
- Format errors, e.g. "O (oh)" instead of "0 (zero)"
- Invalid numbers, e.g. negative value for nights or units

You may handle these errors by:

- Skipping the whole line. Skipped bookings must not be added to room and meal sales.
- Replacing them with some default values e.g. 0
- All exception handling must be reported, so I can check whether your calculation is correct.

5.3 Handling the above errors/exceptions means your program must be able to continue and give correct output. Printing messages and ending the program doesn't count as proper exception handling.

6. Package and folder structure must be correct

6.1 Your source files (.java) must be in folder Project1_XXX where XXX = ID of the group representative, assuming that this folder is under Maven's "src/main/java" structure. The first lines of all source files must be comments containing names & IDs of all members.

6.2 Input files must be read from Project1_XXX. Don't use absolute path that is valid only on your PC.

6.3 Add readme.txt containing names & IDs of all members in Project1_XXX.

Submission

1. Group representative zips and submits Project1_XXX to Google classroom
2. Other members submit only readme.txt to Google classroom

Grading

4	points	requirements + correct results	(total room price, total meal price, final bill, cashback)
1.5	points	correct summary report	(sorted room sales, meal sales)
1.5	points	proper exception handling	(missing files, input errors)
3	points	proper design & programming in OOP style	

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ solutions ---
Read hotel data from file src/main/java/Project1/hotel.txt

Single Room          rate =  1,300.00      rate++ =  1,530.10
Twin Room            rate =  1,800.00      rate++ =  2,118.60
Triple Room          rate =  2,400.00      rate++ =  2,824.80
Single Dorm Bed      rate =    600.00      rate++ =    706.20
Breakfast            rate =    250.00      rate++ =    250.00

Read booking data from file src/main/java/Project1/bookings.txt


===== Booking Processing =====
Booking  1, Annie,  2 nights  >> Single Room (  1)    Twin Room (  1)    Triple Room (  1)    Single Dorm Bed (  1)    Breakfast (  7)
Available cashback = 0        >> Total room price++  =   14,359.40     with service charge and VAT
                              >> Total meal price    =    3,500.00
                              >> Total bill          =   17,859.40     redeem = 0
                              >> Final bill          =   17,859.40     cashback for next booking = 717

Booking  2, Betty,  5 nights  >> Single Room (  2)    Twin Room (  2)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast (  6)
Available cashback = 0        >> Total room price++  =   36,487.00     with service charge and VAT
                              >> Total meal price    =    7,500.00
                              >> Total bill          =   43,987.00     redeem = 0
                              >> Final bill          =   43,987.00     cashback for next booking = 1,824

Booking  3, Cathy,  3 nights  >> Single Room (  0)    Twin Room (  5)    Triple Room (  0)    Single Dorm Bed ( 20)    Breakfast ( 30)
Available cashback = 0        >> Total room price++  =   74,151.00     with service charge and VAT
                              >> Total meal price    =   22,500.00
                              >> Total bill          =   96,651.00     redeem = 0
                              >> Final bill          =   96,651.00     cashback for next booking = 3,707

Booking  4, Annie, 10 nights  >> Single Room (  0)    Twin Room (  0)    Triple Room (  5)    Single Dorm Bed (  0)    Breakfast ( 14)
Available cashback = 717       >> Total room price++  =  141,240.00     with service charge and VAT
                              >> Total meal price    =   35,000.00
                              >> Total bill          =  176,240.00     redeem = 717
                              >> Final bill          =  175,523.00     cashback for next booking = 7,062

Booking  5, David,  4 nights  >> Single Room (  1)    Twin Room (  5)    Triple Room (  1)    Single Dorm Bed ( 10)    Breakfast ( 20)
Available cashback = 0        >> Total room price++  =   88,039.60     with service charge and VAT
                              >> Total meal price    =   20,000.00
                              >> Total bill          =  108,039.60     redeem = 0
                              >> Final bill          =  108,039.60     cashback for next booking = 4,401

Booking  6, Ellen,  5 nights  >> Single Room (  5)    Twin Room (  5)    Triple Room (  1)    Single Dorm Bed (  0)    Breakfast ( 18)
Available cashback = 0        >> Total room price++  =  105,341.50     with service charge and VAT
                              >> Total meal price    =   22,500.00
                              >> Total bill          =  127,841.50     redeem = 0
                              >> Final bill          =  127,841.50     cashback for next booking = 5,267

Booking  7, David, 10 nights  >> Single Room (  3)    Twin Room (  6)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast ( 15)
Available cashback = 4,401     >> Total room price++  =  173,019.00     with service charge and VAT
                              >> Total meal price    =   37,500.00
                              >> Total bill          =  210,519.00     redeem = 4,401
                              >> Final bill          =  206,118.00     cashback for next booking = 8,650

Booking  8, Annie,  4 nights  >> Single Room (  0)    Twin Room (  1)    Triple Room (  5)    Single Dorm Bed ( 15)    Breakfast ( 31)
Available cashback = 7,062     >> Total room price++  =  107,342.40     with service charge and VAT
                              >> Total meal price    =   31,000.00
                              >> Total bill          =  138,342.40     redeem = 7,062
                              >> Final bill          =  131,280.40     cashback for next booking = 5,367
```

Demo 1
No error

Single Room
- Service charge = 1300 * 0.1 = 130
- VAT = (1300 + 130) * 0.07 = 100.10
- Rate++ = 1430 + 100.10 = 1530.10

Cashback = 14359.40 * 0.05 = 717.95 = 717

```
Booking  9, Cathy,  3 nights   >> Single Room (  0)    Twin Room (  4)    Triple Room (  4)    Single Dorm Bed (  0)    Breakfast ( 20)
Available cashback = 3,707      >> Total room price++   =   59,320.80    with service charge and VAT
                               >> Total meal price    =   15,000.00
                               >> Total bill          =   74,320.80    redeem = 3,707
                               >> Final bill          =   70,613.80    cashback for next booking = 2,966


Booking 10, Frodo,  6 nights   >> Single Room (  2)    Twin Room (  3)    Triple Room (  0)    Single Dorm Bed (  4)    Breakfast ( 12)
Available cashback = 0          >> Total room price++   =   73,444.80    with service charge and VAT
                               >> Total meal price    =   18,000.00
                               >> Total bill          =   91,444.80    redeem = 0
                               >> Final bill          =   91,444.80    cashback for next booking = 3,672


Booking 11, Ellen,  1 nights   >> Single Room (  2)    Twin Room (  0)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast (  2)
Available cashback = 5,267      >> Total room price++   =    3,060.20    with service charge and VAT
                               >> Total meal price    =      500.00                              Cashback = 5267 – 1780 + 153 = 3640
                               >> Total bill          =    3,560.20    redeem = 1,780
                               >> Final bill          =    1,780.20    cashback for next booking = 3,640


Booking 12, Ginny,  3 nights   >> Single Room (  2)    Twin Room ( 10)    Triple Room (  2)    Single Dorm Bed (  0)    Breakfast ( 28)
Available cashback = 0          >> Total room price++   =   89,687.40    with service charge and VAT
                               >> Total meal price    =   21,000.00
                               >> Total bill          =  110,687.40    redeem = 0
                               >> Final bill          =  110,687.40    cashback for next booking = 4,484


===== Room Summary =====
Twin Room          total sales =   196 rooms      415,245.60 Baht  ⎫
Single Dorm Bed    total sales =   186 rooms      131,353.20 Baht  ⎬  Total = Sum(Total room price++) from all bookings
Triple Room        total sales =    99 rooms      279,655.20 Baht  ⎪
Single Room        total sales =    91 rooms      139,239.10 Baht  ⎭

===== Meal Summary =====
Breakfast          total sales =   936 heads      234,000.00 Baht    = Sum(Total meal price) from all bookings

    ------------------------------------------------------------------
```

```
  --- exec-maven-plugin:3.0.0:exec (default-cli) @ solutions ---
  java.io.FileNotFoundException: src\main\java\Project1\hotels.txt (The system cannot find the file specified)
  Enter file name for hotel data =
  hotel
  java.io.FileNotFoundException: src\main\java\Project1\hotel (The system cannot find the file specified)
  Enter file name for hotel data =
  hotel.txt
  Read hotel data from file src/main/java/Project1/hotel.txt

  Single Room           rate =  1,300.00     rate++ =  1,530.10
  Twin Room             rate =  1,800.00     rate++ =  2,118.60
  Triple Room           rate =  2,400.00     rate++ =  2,824.80
  Single Dorm Bed       rate =    600.00     rate++ =    706.20
  Breakfast             rate =    250.00     rate++ =    250.00

  java.io.FileNotFoundException: src\main\java\Project1\bookings_error.txt (The system cannot find the file specified)
  Enter file name for booking data =
  bookings_errors
  java.io.FileNotFoundException: src\main\java\Project1\bookings_errors (The system cannot find the file specified)
  Enter file name for booking data =
  bookings_errors.txt
  Read booking data from file src/main/java/Project1/bookings_errors.txt

  java.lang.NumberFormatException: For input string: "S"
  [1,  Annie,   S,  1,  1,  1,  1,  7]  -->  skip this booking

  java.lang.ArrayIndexOutOfBoundsException: Index 7 out of bounds for length 7
  [2,  Betty,   5,  2,  2,  0,      6 ]  -->  skip this booking

  Project1.InvalidInputException: For input: -3
  [3,  Cathy,  -3,  0,  5,  X, 20, 30]  -->  skip this booking

  Project1.InvalidInputException: For input: -4
  [9,  Cathy,   3,  0,  4, -4,  0, 20]  -->  skip this booking

  java.lang.NumberFormatException: For input string: "2.8"
  [12, Ginny,   3,  2, 10,  2,  0, 2.8]  -->  skip this booking
```

Missing file ➔ keep asking for a new file name

Demo 2
Skip lines with errors

Input errors ➔ skip whole line

```
===== Booking Processing =====
Booking  4, Annie, 10 nights   >> Single Room (  0)     Twin Room (  0)     Triple Room (  5)     Single Dorm Bed (  0)     Breakfast ( 14)
Available cashback = 0          >> Total room price++    =  141,240.00       with service charge and VAT
                               >> Total meal price      =   35,000.00
                               >> Total bill            =  176,240.00       redeem = 0
                               >> Final bill            =  176,240.00       cashback for next booking = 7,062
```

0 nights doesn't lead to program crash or wrong calculation. You may treat it as valid input

```
Booking  5, David,  0 nights   >> Single Room (  1)     Twin Room (  5)     Triple Room (  1)     Single Dorm Bed ( 10)     Breakfast ( 20)
Available cashback = 0          >> Total room price++    =        0.00       with service charge and VAT
                               >> Total meal price      =        0.00
                               >> Total bill            =        0.00       redeem = 0
                               >> Final bill            =        0.00       cashback for next booking = 0

Booking  6, Ellen,  5 nights   >> Single Room (  5)     Twin Room (  5)     Triple Room (  1)     Single Dorm Bed (  0)     Breakfast ( 18)
Available cashback = 0          >> Total room price++    =  105,341.50       with service charge and VAT
                               >> Total meal price      =   22,500.00
                               >> Total bill            =  127,841.50       redeem = 0
                               >> Final bill            =  127,841.50       cashback for next booking = 5,267

Booking  7, David, 10 nights   >> Single Room (  3)     Twin Room (  6)     Triple Room (  0)     Single Dorm Bed (  0)     Breakfast ( 15)
Available cashback = 0          >> Total room price++    =  173,019.00       with service charge and VAT
                               >> Total meal price      =   37,500.00
                               >> Total bill            =  210,519.00       redeem = 0
                               >> Final bill            =  210,519.00       cashback for next booking = 8,650

Booking  8, Annie,  4 nights   >> Single Room (  0)     Twin Room (  1)     Triple Room (  5)     Single Dorm Bed ( 15)     Breakfast ( 31)
Available cashback = 7,062      >> Total room price++    =  107,342.40       with service charge and VAT
                               >> Total meal price      =   31,000.00
                               >> Total bill            =  138,342.40       redeem = 7,062
                               >> Final bill            =  131,280.40       cashback for next booking = 5,367

Booking 10, Frodo,  6 nights   >> Single Room (  2)     Twin Room (  3)     Triple Room (  0)     Single Dorm Bed (  4)     Breakfast ( 12)
Available cashback = 0          >> Total room price++    =   73,444.80       with service charge and VAT
                               >> Total meal price      =   18,000.00
                               >> Total bill            =   91,444.80       redeem = 0
                               >> Final bill            =   91,444.80       cashback for next booking = 3,672

Booking 11, Ellen,  1 nights   >> Single Room (  2)     Twin Room (  0)     Triple Room (  0)     Single Dorm Bed (  0)     Breakfast (  2)
Available cashback = 5,267      >> Total room price++    =    3,060.20       with service charge and VAT
                               >> Total meal price      =      500.00
                               >> Total bill            =    3,560.20       redeem = 1,780
                               >> Final bill            =    1,780.20       cashback for next booking = 3,640

===== Room Summary =====
Twin Room           total sales =    107 rooms       226,690.20 Baht
Single Dorm Bed     total sales =     84 rooms        59,320.80 Baht
Triple Room         total sales =     75 rooms       211,860.00 Baht
Single Room         total sales =     69 rooms       105,576.90 Baht

===== Meal Summary =====
Breakfast           total sales =    578 heads       144,500.00 Baht
```

Total = Sum(Total room price++) from all unskipped bookings

= Sum(Total meal price) from all unskipped bookings

```
----------------------------------------------------------------------
```

Demo 3
Use default value (0)

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ solutions ---
Read hotel data from file src/main/java/Project1/hotel.txt

Single Room          rate =  1,300.00       rate++ =  1,530.10
Twin Room            rate =  1,800.00       rate++ =  2,118.60
Triple Room          rate =  2,400.00       rate++ =  2,824.80
Single Dorm Bed      rate =    600.00       rate++ =    706.20
Breakfast            rate =    250.00       rate++ =    250.00


Read booking data from file src/main/java/Project1/bookings_errors.txt

java.lang.NumberFormatException: For input string: "S"
Original [1,  Annie,   S,  1,  1,  1,  1,  7]  --> Correction  [1, Annie, 0,  1,  1,  1,  1,  7]

Project1.MissingInputException: 1 columns missing
Original [2,  Betty,   5,  2,  2,  0,     6 ]  --> Correction  [2, Betty, 5,  2,  2,  0,  6,  0]

Project1.InvalidInputException: For input: -3
java.lang.NumberFormatException: For input string: "X"
Original [3,  Cathy,  -3,  0,  5,  X, 20, 30]  --> Correction  [3, Cathy, 0,  0,  5,  0, 20, 30]

Project1.InvalidInputException: For input: -4
java.lang.NumberFormatException: For input string: "2O"
Original [9,  Cathy,   3,  0,  4, -4,  0, 2O]  --> Correction  [9, Cathy, 3,  0,  4,  0,  0,  0]

java.lang.NumberFormatException: For input string: "2.8"
Original [12, Ginny,   3,  2, 10,  2,  0, 2.8]  --> Correction  [12, Ginny, 3,  2, 10,  2,  0,  0]
```

```
===== Booking Processing =====
Booking  1, Annie,  0 nights   >> Single Room (  1)    Twin Room (  1)    Triple Room (  1)    Single Dorm Bed (  1)    Breakfast (  7)
Available cashback = 0          >> Total room price++  =         0.00    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =         0.00    redeem = 0
                                >> Final bill          =         0.00    cashback for next booking = 0

Booking  2, Betty,  5 nights   >> Single Room (  2)    Twin Room (  2)    Triple Room (  0)    Single Dorm Bed (  6)    Breakfast (  0)
Available cashback = 0          >> Total room price++  =    57,673.00    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =    57,673.00    redeem = 0
                                >> Final bill          =    57,673.00    cashback for next booking = 2,883

Booking  3, Cathy,  0 nights   >> Single Room (  0)    Twin Room (  5)    Triple Room (  0)    Single Dorm Bed ( 20)    Breakfast ( 30)
Available cashback = 0          >> Total room price++  =         0.00    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =         0.00    redeem = 0
                                >> Final bill          =         0.00    cashback for next booking = 0

Booking  4, Annie, 10 nights   >> Single Room (  0)    Twin Room (  0)    Triple Room (  5)    Single Dorm Bed (  0)    Breakfast ( 14)
Available cashback = 0          >> Total room price++  =   141,240.00    with service charge and VAT
                                >> Total meal price    =    35,000.00
                                >> Total bill          =   176,240.00    redeem = 0
                                >> Final bill          =   176,240.00    cashback for next booking = 7,062

Booking  5, David,  0 nights   >> Single Room (  1)    Twin Room (  5)    Triple Room (  1)    Single Dorm Bed ( 10)    Breakfast ( 20)
Available cashback = 0          >> Total room price++  =         0.00    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =         0.00    redeem = 0
                                >> Final bill          =         0.00    cashback for next booking = 0

Booking  6, Ellen,  5 nights   >> Single Room (  5)    Twin Room (  5)    Triple Room (  1)    Single Dorm Bed (  0)    Breakfast ( 18)
Available cashback = 0          >> Total room price++  =   105,341.50    with service charge and VAT
                                >> Total meal price    =    22,500.00
                                >> Total bill          =   127,841.50    redeem = 0
                                >> Final bill          =   127,841.50    cashback for next booking = 5,267

Booking  7, David, 10 nights   >> Single Room (  3)    Twin Room (  6)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast ( 15)
Available cashback = 0          >> Total room price++  =   173,019.00    with service charge and VAT
                                >> Total meal price    =    37,500.00
                                >> Total bill          =   210,519.00    redeem = 0
                                >> Final bill          =   210,519.00    cashback for next booking = 8,650

Booking  8, Annie,  4 nights   >> Single Room (  0)    Twin Room (  1)    Triple Room (  5)    Single Dorm Bed ( 15)    Breakfast ( 31)
Available cashback = 7,062      >> Total room price++  =   107,342.40    with service charge and VAT
                                >> Total meal price    =    31,000.00
                                >> Total bill          =   138,342.40    redeem = 7,062
                                >> Final bill          =   131,280.40    cashback for next booking = 5,367

Booking  9, Cathy,  3 nights   >> Single Room (  0)    Twin Room (  4)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast (  0)
Available cashback = 0          >> Total room price++  =    25,423.20    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =    25,423.20    redeem = 0
                                >> Final bill          =    25,423.20    cashback for next booking = 1,271

Booking 10, Frodo,  6 nights   >> Single Room (  2)    Twin Room (  3)    Triple Room (  0)    Single Dorm Bed (  4)    Breakfast ( 12)
Available cashback = 0          >> Total room price++  =    73,444.80    with service charge and VAT
                                >> Total meal price    =    18,000.00
                                >> Total bill          =    91,444.80    redeem = 0
                                >> Final bill          =    91,444.80    cashback for next booking = 3,672

Booking 11, Ellen,  1 nights   >> Single Room (  2)    Twin Room (  0)    Triple Room (  0)    Single Dorm Bed (  0)    Breakfast (  2)
Available cashback = 5,267      >> Total room price++  =     3,060.20    with service charge and VAT
                                >> Total meal price    =       500.00
                                >> Total bill          =     3,560.20    redeem = 1,780
                                >> Final bill          =     1,780.20    cashback for next booking = 3,640

Booking 12, Ginny,  3 nights   >> Single Room (  2)    Twin Room ( 10)    Triple Room (  2)    Single Dorm Bed (  0)    Breakfast (  0)
Available cashback = 0          >> Total room price++  =    89,687.40    with service charge and VAT
                                >> Total meal price    =         0.00
                                >> Total bill          =    89,687.40    redeem = 0
                                >> Final bill          =    89,687.40    cashback for next booking = 4,484


===== Room Summary =====
Twin Room          total sales =   159 rooms        336,857.40 Baht
Single Dorm Bed    total sales =   114 rooms         80,506.80 Baht
Single Room        total sales =    85 rooms        130,058.50 Baht
Triple Room        total sales =    81 rooms        228,808.80 Baht


===== Meal Summary =====
Breakfast          total sales =   578 heads        144,500.00 Baht


------------------------------------------------------------------------
```