EGCI 213

Group Project 1 – Tour Price Calculation

The project can be done in a group of <= 5 students. Each group must do the project by themselves:

- **Everyone involved in cheating, either as a source or copier, will get ZERO point.**
- If late submitting group copies code from a graded group, the graded group will still be penalized.
- **In case of AI usage, you must write your own prompts and perform your own acquisition with the AI.** Due to the dynamic nature of generative AI, it is very unlikely that any 2 groups will get identical generated code even when using identical prompts.
  - Therefore, submitting identical code will be counted as cheating.
  - Don't use generated content obtained by other groups as your own.
  - Don't share generated content you get from the AI with other groups.
  - If any suspicious arises, I may ask both groups to show their chat history with the AI. Failure to do so will result in cheating penalty.
- And remember, you must be able to orally explain every line of the code you submit, regardless of its origin.

1. Implement **class Tour** representing an individual Tour (group tour or holiday package) read from tours.txt. Lines beginning with "#" = descriptions – don't remove them. You may also implement child classes e.g. GroupTour and HolidayPackage since their payments will be calculated differently.

```
# tour(GT = group tour),      rate1(15-20),  rate2(21-30),  rate3(>=31), single supplement
# tour(HP = holiday package), rate1(single), rate2(double)
# ...
# All prices already include service charge + VAT
# Assuming no input error, no missing column, no duplicate code
#
GT1, 36000, 35500, 33000,  8000
GT2, 68000, 67000, 65000, 12000
...
HP1, 45500, 42000
HP2, 33000, 30500
```

- Don't hard code rates. I may change some of them when grading. The number of each tour is also not fixed – I may add or remove a few group tours or holiday packages. But each line will not contain any input error, missing column, or duplicate code.

2. Implement **class Customer** representing an individual customer. Customer ID are read from bookings.txt. Your class should have a variable to keep cashback from bookings.

3. Implement **class Booking** representing an individual booking read from bookings.txt. Lines beginning with "#" = descriptions – don't remove them.

```
# booking, customer, tour GP, persons, single requests
# booking, customer, tour HP, singles, doubles
#
# May have input errors as in bookings_errors.txt
#
B1,  C1,  GT1,  24,  4
B2,  C1,  HP1,   1,  1
B3,  C1,  GT2,  19,  2
B4,  C2,  GT4,  40,  9
```

- In B1: total persons = 24 4 of them request single room
- In B2: total persons = 3 i.e. 1 single package (1 person) + 1 double package (2 persons)

To process each booking:

3.1 Calculate total persons and single rooms & double rooms required. Note that for group tour, a double room can accommodate 2-3 persons. For example,
B3 requires 2 single rooms + 8 double rooms (1 of them accommodates 3 persons)

3.2 Calculate total payment from rate, total persons, and extra payment (if applicable).

3.3 Calculate future cashback = total payment * 0.01. This cashback can be used to pay the last installment of the next booking.

3.4 Split the total payment into installments (see 4). Only the last installment can be paid by current cashback.

- For new customer, current cashback = 0.
- For existing customer, current cashback is accumulated from previous bookings.
- Update the customer's cashback = current – payment for last installment + future

3.5 Show output of 3.1-3.4 as in the demo.

- Don't hard code booking information. I may change values in some columns when grading. I may also add or remove a few bookings, i.e. number of bookings is not fixed.

4. Implement another class to handle **Installments calculation**. Percentages of installments except the last one are read from installments.txt. Lines beginning with "#" = descriptions – don't remove them.

```
# installment(except last), % of total
# last installment = remaining total
#
# Assuming no input error, no missing column, sum of percentages always <100
#
1, 10
2, 25
3, 60
```

- Don't hard installment percentages. I may change some of them when grading. The number of installments is also not fixed – I may add or remove a few lines. But each line will not contain any input error or missing column, and the sum of percentages is always <100.

5. Implement main class with main method.

5.1 Read data from all input files.

5.2 **Process each booking** (put calculation details in appropriate classes): see 3.1 – 3.5 and 4.

5.3 **Report summary of group tours and holiday packages** (put calculation details in appropriate classes):

- For each tour, list all booking IDs. Also report total travelers (sum of persons) and total revenue (sum of total payments) from all bookings.
- Each type of tour must be sorted in decreasing order of total travelers, total revenue (if equal travelers), and by alphabetical order of code (if all are equal).

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

6.1 Missing files – if any input file is missing. For all input files, don't remove the first lines but skip them when reading the files.

6.2 There may be input errors in bookings.txt as in bookings_errors.txt, but no input error in other files.

- Missing values in some columns.
- Format errors, e.g. "O (oh)" instead of "0 (zero)".
- Invalid values, e.g. non-existing tour code, double or negative value for amount.

You may handle these errors by:

- Skipping the whole line. If exceptions are due to invalid or missing values. Values in the skipped lines must not be added in the calculation.
- Exceeding columns, zero amount, or nonconforming booking/customer IDs that don't cause exception or wrong calculation can just be ignored. Lines containing these can be treated as normal lines.
- All exceptions must be reported, so I can check whether your calculation is correct.

6.3 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.

7. Package and folder structure must be correct

7.1 Your source files (.java) must be in folder Project1_XXX where XXX = full 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.

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

7.3 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

3	points	requirements + correct results	(#persons, #rooms, total payment, cashback, installments)
2	points	correct summary reports	(booking IDs, total travelers, total revenue, sorting)
1	points	proper exception handling	(missing files, input errors)
4	points	proper design & programming in OOP style	

Late submission: -0.5 points for <1 week late; -1 point for each 1 full week late

Demo 1: no exception

```
Read from src/main/java/Project1/tours.txt
Group Tours: price per person
-------------------------------------------------------------------------
Code   15-20 persons   21-30 persons   >=31 persons   Single Supplement
-------------------------------------------------------------------------
GT1          36,000          35,500         33,000           8,000
GT2          68,000          67,000         65,000          12,000
GT3          20,500          20,000         19,000           5,000
GT4          84,000          82,000         79,500          15,000

Holiday Packages: price per person
-----------------------------------------
Code   1 person(Single)   2 persons(Double)
-----------------------------------------
HP1          45,500            42,000
HP2          33,000            30,500
HP3          72,000            68,000
HP4          15,000            13,500

Read from src/main/java/Project1/installments.txt
4 installments of payment
  (1)  10.0 % of total
  (2)  25.0 % of total
  (3)  60.0 % of total
  (4)  remaining total
```

```
Read from src/main/java/Project1/bookings.txt

===== Booking Processing =====
Booking  B1, customer  C1, current cashback = 0.00
             program  GT1, 24 persons (4 single + 10 double rooms)
             total payment     =    884,000.00    future  cashback (  8,840.00)
               installment 1   =     88,400.00
               installment 2   =    221,000.00
               installment 3   =    530,400.00
               installment 4   =     44,200.00   -current cashback (      0.00) =    44,200.00

Booking  B2, customer  C1, current cashback = 8,840.00
             program  HP1, 3 persons (1 single + 1 double rooms)
             total payment     =    129,500.00    future  cashback (  1,295.00)
               installment 1   =     12,950.00
               installment 2   =     32,375.00
               installment 3   =     77,700.00
               installment 4   =      6,475.00   -current cashback (  6,475.00) =         0.00

Booking  B3, customer  C1, current cashback = 3,660.00
             program  GT2, 19 persons (2 single + 8 double rooms)
             total payment     =  1,316,000.00    future  cashback ( 13,160.00)
               installment 1   =    131,600.00
               installment 2   =    329,000.00
               installment 3   =    789,600.00
               installment 4   =     65,800.00   -current cashback (  3,660.00) =    62,140.00

Booking  B4, customer  C2, current cashback = 0.00
             program  GT4, 40 persons (9 single + 15 double rooms)
             total payment     =  3,315,000.00    future  cashback ( 33,150.00)
               installment 1   =    331,500.00
               installment 2   =    828,750.00
               installment 3   =  1,989,000.00
               installment 4   =    165,750.00   -current cashback (      0.00) =   165,750.00

Booking  B5, customer  C3, current cashback = 0.00
             program  HP2, 4 persons (0 single + 2 double rooms)
             total payment     =    122,000.00    future  cashback (  1,220.00)
               installment 1   =     12,200.00
               installment 2   =     30,500.00
               installment 3   =     73,200.00
               installment 4   =      6,100.00   -current cashback (      0.00) =     6,100.00

Booking  B6, customer  C4, current cashback = 0.00
             program  HP3, 5 persons (3 single + 1 double rooms)
             total payment     =    352,000.00    future  cashback (  3,520.00)
               installment 1   =     35,200.00
               installment 2   =     88,000.00
               installment 3   =    211,200.00
               installment 4   =     17,600.00   -current cashback (      0.00) =    17,600.00

Booking  B7, customer  C2, current cashback = 33,150.00
             program  HP4, 1 persons (1 single + 0 double rooms)
             total payment     =     15,000.00    future  cashback (    150.00)
               installment 1   =      1,500.00
               installment 2   =      3,750.00
               installment 3   =      9,000.00
               installment 4   =        750.00   -current cashback (    750.00) =         0.00

Booking  B8, customer  C3, current cashback = 1,220.00
             program  GT3, 60 persons (10 single + 25 double rooms)
             total payment     =  1,190,000.00    future  cashback ( 11,900.00)
               installment 1   =    119,000.00
               installment 2   =    297,500.00
               installment 3   =    714,000.00
               installment 4   =     59,500.00   -current cashback (  1,220.00) =    58,280.00

Booking  B9, customer  C4, current cashback = 3,520.00
             program  HP2, 4 persons (0 single + 2 double rooms)
             total payment     =    122,000.00    future  cashback (  1,220.00)
               installment 1   =     12,200.00
               installment 2   =     30,500.00
               installment 3   =     73,200.00
               installment 4   =      6,100.00   -current cashback (  3,520.00) =     2,580.00

Booking B10, customer  C5, current cashback = 0.00
             program  HP2, 7 persons (1 single + 3 double rooms)
             total payment     =    216,000.00    future  cashback (  2,160.00)
               installment 1   =     21,600.00
               installment 2   =     54,000.00
               installment 3   =    129,600.00
               installment 4   =     10,800.00   -current cashback (      0.00) =    10,800.00
```

First booking of this customer

Total payment = (24 * 35,500) + (4 * 8,000)

Eligible for the last installment of next bookings

Total payment = (1 * 45,500) + (1 * 2 * 42,000)

Cashback from previous booking = 8,440 - 6,475 + 1,295

```
Booking B11, customer  C6, current cashback = 0.00
             program  GT3, 27 persons (0 single + 13 double rooms)
             total payment     =    540,000.00    future  cashback (  5,400.00)
               installment 1   =     54,000.00
               installment 2   =    135,000.00
               installment 3   =    324,000.00
               installment 4   =     27,000.00   -current cashback (      0.00) =    27,000.00

Booking B12, customer  C1, current cashback = 13,160.00
             program  GT1, 31 persons (0 single + 15 double rooms)
             total payment     =  1,023,000.00    future  cashback ( 10,230.00)
               installment 1   =    102,300.00
               installment 2   =    255,750.00
               installment 3   =    613,800.00
               installment 4   =     51,150.00   -current cashback ( 13,160.00) =    37,990.00

Booking B13, customer  C2, current cashback = 32,550.00
             program  GT4, 15 persons (2 single + 6 double rooms)
             total payment     =  1,290,000.00    future  cashback ( 12,900.00)
               installment 1   =    129,000.00
               installment 2   =    322,500.00
               installment 3   =    774,000.00
               installment 4   =     64,500.00   -current cashback ( 32,550.00) =    31,950.00

Booking B14, customer  C3, current cashback = 11,900.00
             program  HP1, 10 persons (0 single + 5 double rooms)
             total payment     =    420,000.00    future  cashback (  4,200.00)
               installment 1   =     42,000.00
               installment 2   =    105,000.00
               installment 3   =    252,000.00
               installment 4   =     21,000.00   -current cashback ( 11,900.00) =     9,100.00

Booking B15, customer  C4, current cashback = 1,220.00
             program  HP1, 6 persons (6 single + 0 double rooms)
             total payment     =    273,000.00    future  cashback (  2,730.00)
               installment 1   =     27,300.00
               installment 2   =     68,250.00
               installment 3   =    163,800.00
               installment 4   =     13,650.00   -current cashback (  1,220.00) =    12,430.00

Booking B16, customer  C5, current cashback = 2,160.00
             program  HP4, 18 persons (2 single + 8 double rooms)
             total payment     =    246,000.00    future  cashback (  2,460.00)
               installment 1   =     24,600.00
               installment 2   =     61,500.00
               installment 3   =    147,600.00
               installment 4   =     12,300.00   -current cashback (  2,160.00) =    10,140.00

Booking B17, customer  C6, current cashback = 5,400.00
             program  GT3, 28 persons (4 single + 12 double rooms)
             total payment     =    580,000.00    future  cashback (  5,800.00)
               installment 1   =     58,000.00
               installment 2   =    145,000.00
               installment 3   =    348,000.00
               installment 4   =     29,000.00   -current cashback (  5,400.00) =    23,600.00

Booking B18, customer  C6, current cashback = 5,800.00
             program  HP2, 6 persons (4 single + 1 double rooms)
             total payment     =    193,000.00    future  cashback (  1,930.00)
               installment 1   =     19,300.00
               installment 2   =     48,250.00
               installment 3   =    115,800.00
               installment 4   =      9,650.00   -current cashback (  5,800.00) =     3,850.00

===== Group-Tour Summary =====
GT3     total travelers =  115    total revenue =  2,310,000.00    bookings = [B8  , B11 , B17 ]
GT4     total travelers =   55    total revenue =  4,605,000.00    bookings = [B4  , B13 ]
GT1     total travelers =   55    total revenue =  1,907,000.00    bookings = [B1  , B12 ]
GT2     total travelers =   19    total revenue =  1,316,000.00    bookings = [B3  ]

===== Holiday-Package Summary =====
HP2     total travelers =   21    total revenue =    653,000.00    bookings = [B5  , B9  , B10 , B18 ]
HP1     total travelers =   19    total revenue =    822,500.00    bookings = [B2  , B14 , B15 ]
HP4     total travelers =   19    total revenue =    261,000.00    bookings = [B7  , B16 ]
HP3     total travelers =    5    total revenue =    352,000.00    bookings = [B6  ]
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

Demo 2: with exceptions

```
java.io.FileNotFoundException: src\main\java\Project1\tour.txt (The system cannot find the
Enter correct file name =
tours

java.io.FileNotFoundException: src\main\java\Project1\tours (The system cannot find the fil
Enter correct file name =
alltours.txt

java.io.FileNotFoundException: src\main\java\Project1\alltours.txt (The system cannot find
Enter correct file name =
tours.txt

Read from src/main/java/Project1/tours.txt
Group Tours: price per person
-------------------------------------------------------------------
Code   15-20 persons   21-30 persons   >=31 persons   Single Supplement
-------------------------------------------------------------------
GT1          36,000          35,500         33,000           8,000
GT2          68,000          67,000         65,000          12,000
GT3          20,500          20,000         19,000           5,000
GT4          84,000          82,000         79,500          15,000

Holiday Packages: price per person
-----------------------------------------
Code   1 person(Single)   2 persons(Double)
-----------------------------------------
HP1          45,500            42,000
HP2          33,000            30,500
HP3          72,000            68,000
HP4          15,000            13,500
```

Missing files handling

```
java.io.FileNotFoundException: src\main\java\Project1\installment.txt (The system cannot fi
Enter correct file name =
install.txt

java.io.FileNotFoundException: src\main\java\Project1\install.txt (The system cannot find t
Enter correct file name =
installments.txt

Read from src/main/java/Project1/installments.txt
4 installments of payment
  (1)  10.0 % of total
  (2)  25.0 % of total
  (3)  60.0 % of total
  (4)  remaining total

java.io.FileNotFoundException: src\main\java\Project1\bookings_error.txt (The system cannot
Enter correct file name =
bookings_errs

java.io.FileNotFoundException: src\main\java\Project1\bookings_errs (The system cannot find
Enter correct file name =
bookings_errors

java.io.FileNotFoundException: src\main\java\Project1\bookings_errors (The system cannot fi
Enter correct file name =
bookings_errors.txt

Read from src/main/java/Project1/bookings_errors.txt
Project1.InvalidInputException: For tour code: "GTx"
B1,  C1,  GTx,  24,  4          --> skip this booking

Project1.InvalidInputException: For amount in col5: "-1"
B2,  C1,  HP1,   1, -1          --> skip this booking

java.lang.NumberFormatException: For input string: "1.9"
B3,  C1,  GT2, 1.9,  2          --> skip this booking

Project1.InvalidInputException: For tour code: "3"
B6,  C4;  HP3,   3,  1          --> skip this booking

java.lang.ArrayIndexOutOfBoundsException: Index 4 out of bounds for length 4
B7,  C2,  HP4,   1              --> skip this booking

java.lang.NumberFormatException: For input string: "O"
B9,  C4,  HP2,   O,  2          --> skip this booking
```

Input errors handling

Nonconforming code, not causing crash/wrong calculation
(except previous/future cashback)

```
===== Booking Processing =====
Booking  B4, customer  Cx, current cashback = 0.00
             program  GT4, 40 persons (9 single + 15 double rooms)
             total payment     =  3,315,000.00    future  cashback ( 33,150.00)
               installment 1   =    331,500.00
               installment 2   =    828,750.00
               installment 3   =  1,989,000.00
               installment 4   =    165,750.00   -current cashback (      0.00) =   165,750.00

Booking  Bx, customer  C3, current cashback = 0.00
             program  HP2, 4 persons (0 single + 2 double rooms)
             total payment     =    122,000.00    future  cashback (  1,220.00)
               installment 1   =     12,200.00
               installment 2   =     30,500.00
               installment 3   =     73,200.00
               installment 4   =      6,100.00   -current cashback (      0.00) =     6,100.00

Booking  B8, customer  C3, current cashback = 1,220.00  Exceeding column is ignored
             program  GT3, 60 persons (10 single + 25 double rooms)
             total payment     =  1,190,000.00    future  cashback ( 11,900.00)
               installment 1   =    119,000.00
               installment 2   =    297,500.00
               installment 3   =    714,000.00
               installment 4   =     59,500.00   -current cashback (  1,220.00) =    58,280.00

Booking B10, customer  C5, current cashback = 0.00
             program  HP2, 7 persons (1 single + 3 double rooms)
             total payment     =    216,000.00    future  cashback (  2,160.00)
               installment 1   =     21,600.00
               installment 2   =     54,000.00
               installment 3   =    129,600.00
               installment 4   =     10,800.00   -current cashback (      0.00) =    10,800.00
...
Booking B15, customer  C4, current cashback = 0.00
             program  HP1, 6 persons (6 single + 0 double rooms)
             total payment     =    273,000.00    future  cashback (  2,730.00)
               installment 1   =     27,300.00
               installment 2   =     68,250.00
               installment 3   =    163,800.00
               installment 4   =     13,650.00   -current cashback (      0.00) =    13,650.00

Booking B16, customer  C5, current cashback = 2,160.00
             program  HP4, 18 persons (2 single + 8 double rooms)
             total payment     =    246,000.00    future  cashback (  2,460.00)
               installment 1   =     24,600.00
               installment 2   =     61,500.00
               installment 3   =    147,600.00
               installment 4   =     12,300.00   -current cashback (  2,160.00) =    10,140.00

Booking B17, customer  C6, current cashback = 5,400.00
             program  GT3, 28 persons (4 single + 12 double rooms)
             total payment     =    580,000.00    future  cashback (  5,800.00)
               installment 1   =     58,000.00
               installment 2   =    145,000.00
               installment 3   =    348,000.00
               installment 4   =     29,000.00   -current cashback (  5,400.00) =    23,600.00

Booking B18, customer  C6, current cashback = 5,800.00
             program  HP2, 6 persons (4 single + 1 double rooms)
             total payment     =    193,000.00    future  cashback (  1,930.00)
               installment 1   =     19,300.00
               installment 2   =     48,250.00
               installment 3   =    115,800.00
               installment 4   =      9,650.00   -current cashback (  5,800.00) =     3,850.00


===== Group-Tour Summary =====
GT3     total travelers =  115    total revenue =  2,310,000.00    bookings = [B8  , B11 , B17 ]
GT4     total travelers =   55    total revenue =  4,605,000.00    bookings = [B4  , B13 ]
GT1     total travelers =   31    total revenue =  1,023,000.00    bookings = [B12 ]
GT2     total travelers =    0    total revenue =          0.00    bookings = []

===== Holiday-Package Summary =====
HP4     total travelers =   18    total revenue =    246,000.00    bookings = [B16 ]
HP2     total travelers =   17    total revenue =    531,000.00    bookings = [Bx  , B10 , B18 ]
HP1     total travelers =   16    total revenue =    693,000.00    bookings = [B14 , B15 ]
HP3     total travelers =    0    total revenue =          0.00    bookings = []
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

Values from skipped bookings are not added