EGCO 213

Group Project 1 – Salesperson Payment

The project can be done in a group of <= 4 students. Each group must do the project by themselves

- **Everyone involved in cheating, either as source or copier, will get ZERO point.**
- If I suspect that you don't do the project all by yourself (taking code from ChatGPT is counted as not doing the project by yourself), I may ask you to do programming quizzes about the suspicious points in person, in front of me, and all by yourself.

1. Implement **class Product** that represents an individual product read from products.txt. The first line of the file contains column names: product code, product name, unit price, commission rates in % (flat rate and rates for quarter 1-4 sales).

```
code, name,             unit price, flat comm, q1 comm, q2 comm, q3 comm, q4 comm
AC,   Air Conditioners, 32000,      15,        15,      15,      20,      30
ST,   Smart TVs,        25000,      15,        25,      20,      20,      25
RV,   Robot Vacuums,    18000,      12,        12,      12,      15,      20
```

- Your class should have variables to keep total sales, and methods for summarization (see 4.3)
- Don't hard code product information. I may change values in some columns when grading. I may also add or remove a few products (#products is not fixed).

2. Implement **class Reimbursement** that represents an individual reimbursement scheme read from reimbursements.txt. The first line of the file contains column names: type of salesperson, travel limit, mobile limit.

```
type, travel limit, mobile limit
c,    50000,        6000
s,    10000,        6000
```

- Don't hard code reimbursement information. I may change limit values when grading. But there are always only 2 reimbursement schemes, i.e. 2 lines: c for commission type, s for salary+ type.

3. Implement **class Salesperson** that represents an individual salesperson read from salespersons.txt. The first line of the file contains column names: type of salesperson (c for commission, s for salary+), name, product code, sales amount in quarters 1-4, salary (only for salary+ type). For simplicity, all names in this file are unique.

```
type, name,  product, q1,  q2,  q3,  q4, salary
c,    Annie, AC,      20, 100,  20,  10
s,    Betty, AC,      20,   0,  30,   0, 40000
c,    Carol, ST,      50,  50,  50,  50
s,    David, RV,      30,  30,  30,  30, 22000
```

- Your class should have variables to keep product (each salesperson sells 1 product), reimbursement scheme (each salesperson is under 1 scheme), total sales; and methods for payment calculation (see 4.2).
- Don't hard code salesperson information. I may change values in some columns when grading. I may also add or remove a few salespersons (#salesperson is not fixed).

4. Also read salesperson expenses from expenses.txt. The first line of the file contains column names: salesperson names, travel expense, mobile expense.

```
name,  travel, mobile
Annie,  25000,   1200
Betty,  18000,   5000
```

- Don't hard code expense information. I may change values in some columns when grading. I may also add or remove a few expense lines (#expense lines is not fixed).
- Lines containing identical names are expenses of the same persons (e.g. Annie has 3 expense lines).
- Some salespersons may not have any expense line (e.g. Frodo).
- Names in some lines may not exist in salespersons.txt (e.g. Olive). You can just ignore it.

4. Implement main class with main method
   4.1 Read data from all input files
   4.2 **Calculate annual payment** of each salesperson (put calculation details in appropriate classes).
      4.2.1 For salesperson under "s" scheme, calculate total salary.
      4.2.2 For salesperson under "s" scheme, calculate total commission.
         - Calculate total sales in cash (= sales amount * unit price) from all quarters.
         - Calculate total commission from flat commission rate (%) of total sales in cash.
      4.2.3 For salesperson under "c" scheme, calculate total commission.
         - Calculate quarterly commission from quarterly commission rate (%) of quarterly sales in cash.
         - Calculate total commission from all quarters.
      4.2.4 Calculate total travel expense and total mobile expense. Each type of salesperson has limited amount of travel and mobile reimbursements. Calculate excessive expenses that can't be claimed.
      4.2.5 Calculate total payment from salary + commission – excessive travel and mobile expenses.
      4.2.6 Report result for each salesperson. The output format is up to your design. But show at least: sales data read from salespersons.txt (so I can check whether your calculation is correct), total salary, total sales units, total commission, total travel expense, total mobile expense, and total payment.

   4.3 **Report product summary** (put calculation details in appropriate classes).
      4.3.1 Report total sales in units and in cash of all products, sorted by unit sales in decreasing order.
      4.3.2 For each product, also list salespersons who have highest unit sales.

5. The program must be able to handle the following errors/exceptions
   5.1 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.
   5.2 There may be input errors in salespersons.txt as in salespersons_errors.txt, but no input error in other files (except that some names in expenses.txt may not exist in salespersons file).
      - Missing values, e.g. only 3 instead of 4 quarterly amounts in a line
      - Format errors, e.g. "O (oh)" instead of "0 (zero)"
      - Invalid values, e.g. negative price/amount, invalid salesperson type/product code

      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.
      - But exceeding columns that don't cause exception or wrong calculation can just be ignored (i.e. lines containing exceeding columns can be treated as normal lines).
      - All exceptions 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 = 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.
   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

3.5 points	requirements + correct results	(total salary, commission, expenses, payment)
2 points	correct summary report	(sorted total sales, top salespersons)
1.5 points	proper exception handling	(missing files, input errors)
3 points	proper design & programming in OOP style	

```
Read from src/main/java/Project1/products.txt
Air Conditioners (AC)    unit price = 32,000     commissions  >>  flat = 15%   Q1 = 15%   Q2 = 15%   Q3 = 20%   Q4 = 30%
Smart TVs        (ST)    unit price = 25,000     commissions  >>  flat = 15%   Q1 = 25%   Q2 = 20%   Q3 = 20%   Q4 = 25%
Robot Vacuums    (RV)    unit price = 18,000     commissions  >>  flat = 12%   Q1 = 12%   Q2 = 12%   Q3 = 15%   Q4 = 20%

Read from src/main/java/Project1/reimbursements.txt
commission      travel limit = 50,000     mobile limit =  6,000
salary+         travel limit = 10,000     mobile limit =  6,000

Read from src/main/java/Project1/salespersons.txt

Read from src/main/java/Project1/expenses.txt
Annie,  25000,   1200   >>   total = 25,000,  1,200
Betty,  18000,   5000   >>   total = 18,000,  5,000
Carol,  72000,   5500   >>   total = 72,000,  5,500
Olive,  60000,   6000   >>   not exist
David,  22000,   1500   >>   total = 22,000,  1,500
Kevin,  50000,   5000   >>   total = 50,000,  5,000
Jacob,      0,   8500   >>   total =      0,  8,500
Ellen,   8500,   6500   >>   total =  8,500,  6,500
Annie,  30000,      0   >>   total = 55,000,  1,200
Ginny,  65000,   6200   >>   total = 65,000,  6,200
David,      0,   5000   >>   total = 22,000,  6,500
Irene,  45000,   6000   >>   total = 45,000,  6,000
Jacob,   9800,      0   >>   total =  9,800,  8,500
Annie,  30000,   7000   >>   total = 85,000,  8,200
Kevin,  25000,   1000   >>   total = 75,000,  6,000
Leona,  10000,   7000   >>   total = 10,000,  7,000
Nolan,  72000,   7500   >>   total = 72,000,  7,500
Betty,   8000,   1500   >>   total = 26,000,  6,500
Kevin,  15000,   1200   >>   total = 90,000,  7,200

========== Process Payments ==========

Annie   commission   >> total  salary     =          0 baht
                     >> Air Conditioners                      Q1( 20)   Q2(100)   Q3( 20)   Q4( 10)
                     >> total  commission =    800,000 baht   total  =    150 units
                     >> travel expense    =     85,000 baht   excess = 35,000 baht
                     >> mobile expense    =      8,200 baht   excess =  2,200 baht
                     >> total  payment    =    762,800 baht

Betty   salary+      >> total  salary     =    480,000 baht
                     >> Air Conditioners                      Q1( 20)   Q2(  0)   Q3( 30)   Q4(  0)
                     >> total  commission =    240,000 baht   total  =     50 units
                     >> travel expense    =     26,000 baht   excess = 16,000 baht
                     >> mobile expense    =      6,500 baht   excess =    500 baht
                     >> total  payment    =    703,500 baht

Carol   commission   >> total  salary     =          0 baht
                     >> Smart TVs                             Q1( 50)   Q2( 50)   Q3( 50)   Q4( 50)
                     >> total  commission =  1,125,000 baht   total  =    200 units
                     >> travel expense    =     72,000 baht   excess = 22,000 baht
                     >> mobile expense    =      5,500 baht   excess =      0 baht
                     >> total  payment    =  1,103,000 baht

David   salary+      >> total  salary     =    264,000 baht
                     >> Robot Vacuums                         Q1( 30)   Q2( 30)   Q3( 30)   Q4( 30)
                     >> total  commission =    259,200 baht   total  =    120 units
                     >> travel expense    =     22,000 baht   excess = 12,000 baht
                     >> mobile expense    =      6,500 baht   excess =    500 baht
                     >> total  payment    =    510,700 baht
```

Demo 1 (no exception)

These values must be printed when processing each salesperson

```
Ellen   salary+      >> total  salary     =    300,000 baht
                    >> Air Conditioners                    Q1( 10)   Q2( 10)   Q3(  0)   Q4(  0)
                    >> total  commission =     96,000 baht      total  =     20 units
                    >> travel expense    =      8,500 baht      excess =      0 baht
                    >> mobile expense    =      6,500 baht      excess =    500 baht
                    >> total  payment    =    395,500 baht

Frodo   salary+      >> total  salary     =    360,000 baht
                    >> Smart TVs                           Q1( 20)   Q2( 20)   Q3( 20)   Q4( 20)
                    >> total  commission =    300,000 baht      total  =     80 units
                    >> travel expense    =          0 baht      excess =      0 baht
                    >> mobile expense    =          0 baht      excess =      0 baht
                    >> total  payment    =    660,000 baht

Ginny   commission   >> total  salary     =          0 baht
                    >> Smart TVs                           Q1( 20)   Q2( 20)   Q3( 20)   Q4( 20)
                    >> total  commission =    450,000 baht      total  =     80 units
                    >> travel expense    =     65,000 baht      excess = 15,000 baht
                    >> mobile expense    =      6,200 baht      excess =    200 baht
                    >> total  payment    =    434,800 baht

Helen   salary+      >> total  salary     =    240,000 baht
                    >> Air Conditioners                    Q1(  5)   Q2(  5)   Q3(  5)   Q4( 50)
                    >> total  commission =    312,000 baht      total  =     65 units
                    >> travel expense    =          0 baht      excess =      0 baht
                    >> mobile expense    =          0 baht      excess =      0 baht
                    >> total  payment    =    552,000 baht

Irene   commission   >> total  salary     =          0 baht
                    >> Robot Vacuums                       Q1( 60)   Q2(  0)   Q3( 20)   Q4( 40)
                    >> total  commission =    327,600 baht      total  =    120 units
                    >> travel expense    =     45,000 baht      excess =      0 baht
                    >> mobile expense    =      6,000 baht      excess =      0 baht
                    >> total  payment    =    327,600 baht

Jacob   salary+      >> total  salary     =    480,000 baht
                    >> Smart TVs                           Q1( 10)   Q2( 10)   Q3( 10)   Q4( 10)
                    >> total  commission =    150,000 baht      total  =     40 units
                    >> travel expense    =      9,800 baht      excess =      0 baht
                    >> mobile expense    =      8,500 baht      excess =  2,500 baht
                    >> total  payment    =    627,500 baht

Kevin   commission   >> total  salary     =          0 baht
                    >> Air Conditioners                    Q1( 50)   Q2(  0)   Q3( 50)   Q4( 50)
                    >> total  commission =  1,040,000 baht      total  =    150 units
                    >> travel expense    =     90,000 baht      excess = 40,000 baht
                    >> mobile expense    =      7,200 baht      excess =  1,200 baht
                    >> total  payment    =    998,800 baht

Leona   salary+      >> total  salary     =    420,000 baht
                    >> Robot Vacuums                       Q1(  0)   Q2( 20)   Q3( 20)   Q4(  0)
                    >> total  commission =     86,400 baht      total  =     40 units
                    >> travel expense    =     10,000 baht      excess =      0 baht
                    >> mobile expense    =      7,000 baht      excess =  1,000 baht
                    >> total  payment    =    505,400 baht

Nolan   commission   >> total  salary     =          0 baht
                    >> Air Conditioners                    Q1( 15)   Q2( 15)   Q3( 20)   Q4(100)
                    >> total  commission =  1,232,000 baht      total  =    150 units
                    >> travel expense    =     72,000 baht      excess = 22,000 baht
                    >> mobile expense    =      7,500 baht      excess =  1,500 baht
                    >> total  payment    =  1,208,500 baht


========== Summary ==========

Air Conditioners     total sales =  585 units   = 18,720,000 baht     highest sales by Annie, Kevin, Nolan
Smart TVs            total sales =  400 units   = 10,000,000 baht     highest sales by Carol
Robot Vacuums        total sales =  280 units   =  5,040,000 baht     highest sales by David, Irene
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

```
java.io.FileNotFoundException: src\main\java\Project1\product.txt (The system cannot find the file specified)
Enter correct file name =
products
```

Demo 2 (with exceptions)

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

Missing products file

```
Read from src/main/java/Project1/products.txt
Air Conditioners (AC)    unit price = 32,000     commissions  >>  flat = 15%   Q1 = 15%   Q2 = 15%   Q3 = 20%   Q4 = 30%
Smart TVs        (ST)    unit price = 25,000     commissions  >>  flat = 15%   Q1 = 25%   Q2 = 20%   Q3 = 20%   Q4 = 25%
Robot Vacuums    (RV)    unit price = 18,000     commissions  >>  flat = 12%   Q1 = 12%   Q2 = 12%   Q3 = 15%   Q4 = 20%

java.io.FileNotFoundException: src\main\java\Project1\reimbursement.txt (The system cannot find the file specified)
Enter correct file name =
reimbursements.txt
```

Missing reimbursements file

```
Read from src/main/java/Project1/reimbursements.txt
commission      travel limit = 50,000     mobile limit =  6,000
salary+         travel limit = 10,000     mobile limit =  6,000

java.io.FileNotFoundException: src\main\java\Project1\salesperson.txt (The system cannot find the file specified)
Enter correct file name =
salespersons_errors
```

Missing salespersons file

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

Read from src/main/java/Project1/salespersons_errors.txt
Project1.InvalidInputException: For input: "5"
[5,    Betty, AC,      20,   0,  30,   0, 40000]  -->  skip this line

java.lang.ArrayIndexOutOfBoundsException: Index 6 out of bounds for length 6
[c,    Carol, ST,      50,  50,  50]  -->  skip this line

java.lang.ArrayIndexOutOfBoundsException: Index 7 out of bounds for length 7
[s,    David, RV,      30,  30,  30,  30]  -->  skip this line

Project1.InvalidInputException: For input: "-10"
[s,    Ellen, AC,     -10,  10,   0,   0, 25000]  -->  skip this line

Project1.InvalidInputException: For input: "XX"
[s,    Frodo, XX,      20,  20,  20,  20, 30000]  -->  skip this line

Project1.InvalidInputException: For input: "-20000"
[s,    Helen, AC,       5,   5,   5,  50, -20000]  -->  skip this line

java.lang.NumberFormatException: For input string: "4O"
[c,    Irene, RV,      60,   0,  20,  4O]  -->  skip this line
```

Lines with exceptions must be reported

```
java.io.FileNotFoundException: src\main\java\Project1\expense.txt (The system cannot find the file specified)
Enter correct file name =
expenses.txt
```

Missing expense file

```
Read from src/main/java/Project1/expenses.txt
Annie,  25000,   1200   >>   total = 25,000,  1,200
Betty,  18000,   5000   >>   not exist
Carol,  72000,   5500   >>   not exist
Olive,  60000,   6000   >>   not exist
David,  22000,   1500   >>   not exist
Kevin,  50000,   5000   >>   total = 50,000,  5,000
Jacob,      0,   8500   >>   total =      0,  8,500
Ellen,   8500,   6500   >>   not exist
Annie,  30000,      0   >>   total = 55,000,  1,200
Ginny,  65000,   6200   >>   total = 65,000,  6,200
David,      0,   5000   >>   not exist
Irene,  45000,   6000   >>   not exist
Jacob,   9800,      0   >>   total =  9,800,  8,500
Annie,  30000,   7000   >>   total = 85,000,  8,200
Kevin,  25000,   1000   >>   total = 75,000,  6,000
Leona,  10000,   7000   >>   total = 10,000,  7,000
Nolan,  72000,   7500   >>   total = 72,000,  7,500
Betty,   8000,   1500   >>   not exist
Kevin,  15000,   1200   >>   total = 90,000,  7,200
```

Exceeding salary column in Ginny line (commission type) is ignored because it doesn't cause runtime exception or wrong calculation

```
========== Process Payments ==========

Annie   commission   >> total  salary     =          0 baht
                     >> Air Conditioners                        Q1( 20)   Q2(100)   Q3( 20)   Q4( 10)
                     >> total  commission =    800,000 baht     total  =    150 units
                     >> travel expense    =     85,000 baht     excess = 35,000 baht
                     >> mobile expense    =      8,200 baht     excess =  2,200 baht
                     >> total  payment    =    762,800 baht

Ginny   commission   >> total  salary     =          0 baht
                     >> Smart TVs                               Q1( 20)   Q2( 20)   Q3( 20)   Q4( 20)
                     >> total  commission =    450,000 baht     total  =     80 units
                     >> travel expense    =     65,000 baht     excess = 15,000 baht
                     >> mobile expense    =      6,200 baht     excess =    200 baht
                     >> total  payment    =    434,800 baht

Jacob   salary+      >> total  salary     =    480,000 baht
                     >> Smart TVs                               Q1( 10)   Q2( 10)   Q3( 10)   Q4( 10)
                     >> total  commission =    150,000 baht     total  =     40 units
                     >> travel expense    =      9,800 baht     excess =      0 baht
                     >> mobile expense    =      8,500 baht     excess =  2,500 baht
                     >> total  payment    =    627,500 baht

Kevin   commission   >> total  salary     =          0 baht
                     >> Air Conditioners                        Q1( 50)   Q2(  0)   Q3( 50)   Q4( 50)
                     >> total  commission =  1,040,000 baht     total  =    150 units
                     >> travel expense    =     90,000 baht     excess = 40,000 baht
                     >> mobile expense    =      7,200 baht     excess =  1,200 baht
                     >> total  payment    =    998,800 baht

Leona   salary+      >> total  salary     =    420,000 baht
                     >> Robot Vacuums                           Q1(  0)   Q2( 20)   Q3( 20)   Q4(  0)
                     >> total  commission =     86,400 baht     total  =     40 units
                     >> travel expense    =     10,000 baht     excess =      0 baht
                     >> mobile expense    =      7,000 baht     excess =  1,000 baht
                     >> total  payment    =    505,400 baht

Nolan   commission   >> total  salary     =          0 baht
                     >> Air Conditioners                        Q1( 15)   Q2( 15)   Q3( 20)   Q4(100)
                     >> total  commission =  1,232,000 baht     total  =    150 units
                     >> travel expense    =     72,000 baht     excess = 22,000 baht
                     >> mobile expense    =      7,500 baht     excess =  1,500 baht
                     >> total  payment    =  1,208,500 baht


========== Summary ==========   Values from skipped lines must not be added

Air Conditioners     total sales =  450 units   = 14,400,000 baht     highest sales by Annie, Kevin, Nolan
Smart TVs            total sales =  120 units   =  3,000,000 baht     highest sales by Ginny
Robot Vacuums        total sales =   40 units   =    720,000 baht     highest sales by Leona
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```