

## Group Project 1 – Salesperson Payment

The project can be done in a group of  $\leq 5$  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, I may ask you to do programming quizzes about the suspicious points in person, in front of me, and all by yourself (i.e. in presence of only group members).

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 codeYou 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
```

Demo 1 (no exception)

```
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
```

These values must be printed when processing each salesperson

```
===== 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
```

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

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BUILD SUCCESS  
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```
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: "40"
[c, Irene, RV, 60, 0, 20, 40] --> 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

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BUILD SUCCESS  
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