# Exercise: OOP Overview

This exercise is part of the [“Databases Frameworks” course @ SoftUni](https://softuni.bg/courses/databases-advanced-hibernate).

## Count Working Days

Write a program that **reads two dates** in formatdd-MM-yyyy and prints the **number of working days** between these two dates **inclusive**. Non-working days are:

* All days that are **Saturday** or **Sunday**.
* All days that are **official holidays** in Bulgaria:
  + New Year Eve (**1 Jan**)
  + Liberation Day (**3 March**)
  + Worker’s day (**1 May**)
  + Saint George’s Day (**6 May**)
  + Saints Cyril and Methodius Day (**24 May**)
  + Unification Day (**6 Sept**)
  + Independence Day (**22 Sept**)
  + National Awakening Day (**1 Nov**)
  + Christmas (**24**, **25** and **26 Dec**)

All days not mentioned above are **working** and should count.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 11-04-2016  14-04-2016 | 4 |
| 11-04-2016  22-04-2016 | 10 |
| 20-12-2015  31-12-2015 | 7 |

### Hints

* Read **start date** and **end date** from Console.
* **Create** two objects of type Date – startDate and endDate.
* Create an **array of type** Date and add **all official holidays** in it.
* Loop from startDate to endDate. Add **1 day** at each iteration.
* Get the **current da**y in the loop and check whether is **Saturday**, **Sunday** or it is **contained** **in the holidays array**. If it is not, increment the workingDaysCounter.

## Advertisement Message

Write a program that **generate random fake advertisement message** to extol some product. The messages must consist of 4 parts: laudatory **phrase** + **event** + **author** + **city**. Use the following predefined parts:

* **Phrases** – {“Excellent product.”, “Such a great product.”, “I always use that product.”, “Best product of its category.”, “Exceptional product.”, “I can’t live without this product.”}
* **Events** – {“Now I feel good.”, “I have succeeded with this product.”, “Makes miracles. I am happy of the results!”, “I cannot believe but now I feel awesome.”, ”Try it yourself, I am very satisfied.”, “I feel great!”}
* **Author** – {“Diana”, “Petya”, “Stella”, “Elena”, “Katya”, “Iva”, “Annie”, “Eva”}
* **Cities** – {“Burgas”, “Sofia”, “Plovdiv”, “Varna”, “Ruse”}

The format of the output message is: **{phrase} {event} {author} – {city}**.

As an input you take the **number of messages** to be generated. Print each random message at a separate line.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3 | Such a great product. Now I feel good. Elena – Ruse  Excelent product. Makes miracles. I am happy of the results! Katya – Varna  Best product of its category. That makes miracles. Eva - Sofia |

### Hints

* Hold the phrases, events, authors and towns in 4 arrays of strings.
* Create Random object and **generate** **4 random numbers** each in its range:
  + phraseIndex 🡪 ­(0, phrases.Length)
  + eventIndex 🡪 (0, events.Length)
  + authorIndex 🡪 (0, authors.Length)
  + townIndex 🡪 (0, towns.Length)
* Get one **random element** from each of the four arrays and **compose a message** in the required format.

## Last Digit Name

Write a class **Number** that will hold an integer number. Write a **method** in the class that returns the **English name** of the last digit of the given number. Write a program that reads an integer and prints the returned value from this method.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 1024 | four |  | 512 | two |

## Number in Reversed Order

Write a class **DecimalNumber** that has a method that **prints all its digits** in **reversed order**.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 256 | 652 |  | 1.12 | 21.1 |

## Intersection of Circles

Create class Circle with properties center and radius. The center is a point with coordinates X and Y (make a class Point). Write a method boolean intersect(Circle c1, Circle c2) that tells whether the two given circles **intersect or not**. Write a program that tells if two circles intersect.

The input lines will be in format: **{X} {Y} {Radius}**. Print as output “Yes” or “No”.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Visualization** |
| 4 4 2  8 8 1 | No |  |
| 3 3 2  4 3 6 | Yes |  |
| 1 1 4  4 2 5 | Yes |  |

### Hints

* Calculate d = **distance between the circle centers**.
* If the d ≤ r1 + r2 (the sum of radiuses**) 🡪** the circles **intersect** (or one of the circles is inside the other or the circles have one common point when d = r1 + r2).
* If the d > r1 + r2 **🡪** the circles do **not intersect** (they have not common shared point).

## Shopping Spree

Create two classes: class **Person** and class **Product**. Each person should have a **name**, **money** and a **bag of products**. Each product should have **name** and **cost**. Name **cannot be** an empty string. Money **cannot be** a negative number.

Create a program in which each command corresponds to a person buying a product. If the person can afford a product **add it to his bag** and print message in format **"[Person name] bought [Product name]"**. If a person doesn’t have enough money, print an appropriate message **("[Person name] can't afford [Product name]").**

On the first two lines you are given all people and all products. After all purchases print every person **in the order of appearance** and all products that **he has bought** **also in** **order of appearance**. If nothing is bought, print the name of the person followed by "**Nothing bought**".

Read commands till you find line with **"END"** command. In case of invalid input (negative money exception message: "**Money cannot be negative**") or empty name: (empty name exception message "**Name cannot be empty**") break the program with an appropriate message. See the examples below:

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Pesho=11;Gosho=4  Bread=10;Milk=2;  Pesho Bread  Gosho Milk  Gosho Milk  Pesho Milk  END | Pesho bought Bread  Gosho bought Milk  Gosho bought Milk  Pesho can't afford Milk  Pesho - Bread  Gosho - Milk, Milk |
| Mimi=0  Kafence=2  Mimi Kafence  END | Mimi can't afford Kafence  Mimi – Nothing bought |
| Jeko=-3  Chushki=1;  Jeko Chushki  END | Money cannot be negative |

## Average Grades

Define a class Student, which holds the following information about students: **name**, **list of grades** and **average grade** (calculated property, read-only). A single grade will be in range [2…6], e.g. 3.25 or 5.50.

Read a **list of students** and print the students that have **average grade ≥ 5.00** ordered **by name** (ascending), then by **average** **grade** (descending). Print the student name and the calculated average grade.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3  Ivan 3  Todor 5 5 6  Diana 6 5.50 | Diana -> 5.75  Todor -> 5.33 |
| 6  Petar 3 5 4 3 2 5 6 2 6  Mitko 6 6 5 6 5 6  Gosho 6 6 6 6 6 6  Ani 6 5 6 5 6 5 6 5  Iva 4 5 4 3 4 5 2 2 4  Ani 5.50 5.25 6.00 | Ani -> 5.58  Ani -> 5.50  Gosho -> 6.00  Mitko -> 5.67 |

### Hints

* Create class Student with properties name (String), grades (double[]), and property averageGrade (calculated by Stream as Arrays.stream(grades).avarege().getAsDouble(), read-only).
* Make a **list of students** and filter **with** STREAMall students that has average grade >= 5.00.
* Print the filtered students **ordered by name** in ascending order, then by **average grade** in descending order.

## \*Book Library

To model a **book library**, define classes to hold a **book** and a **library**. The library must have a **name** and a **list of books**. The books must contain the **title**, **author**, **publisher**, **release date**, **ISBN-number** and **price.**

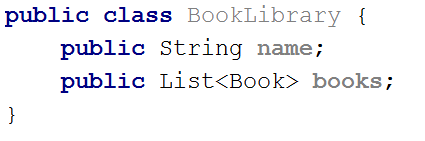
Read a **list of books**, add them to the library and print the **total sum of prices by author**,ordered **descending by price** and **then by author’s name lexicographically**.

Books in the input will be in format **{title} {author} {publisher} {release date} {ISBN} {price}**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  LOTR Tolkien GeorgeAllen 29.07.1954 0395082999 30.00  Hobbit Tolkien GeorgeAll 21.09.1937 0395082888 10.25  HP1 JKRowling Bloomsbury 26.06.1997 0395082777 15.50  HP7 JKRowling Bloomsbury 21.07.2007 0395082666 20.00  AC OBowden PenguinBooks 20.11.2009 0395082555 14.00 | Tolkien -> 40.25  JKRowling -> 35.50  OBowden -> 14.00 |

### Hints

* Create classes Book and Library with all the mentioned above properties: 
* **Create** an object of type Library.
* **Read the input** and create a Bookobject for each book in the input.
* Create a **STREAM** query that will **sum the prices by author**, **order the results** as requested.
* **Print** the results.

## Students

Define class **Student**. Add **string field** for a student’s **name** that you are going to receive as a console input. Then add a **static Integer field** to **keep track of how many students’ instances are created**. Initialize the static field with **0 (zero)** and **increment in the constructor**. When you receive command **“End”** stop reading more students names and print their total count on the console.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| Atanas  Atanas  End | 2 |  | Minka  End | 1 |

## Beer Counter

Define class **BeerCounter** holding static field **beerInStock** that shows how many beers you bought and static field **beersDrankCount** that shows how many beers you have drunk. Manipulate the static fields through static methods **BuyBeer(int bottlesCount)** and **DrinkBeer(int bottlesCount)**. On every input line you will get pair of beers you **bought** and beers you **drank**, until you receive command **“End”.**

* **BuyBeer** – add beers to the beers in stock
* **DrinkBeer** – add beers to the drunk beers counter and subtract beers in stock

After that print **beersInStock** and **beersDrankCount** on the same line separated by 1 space.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 50 49  9 10  End | 0 59 |