***J a va SE 8 Pr ogr ammi ng La ngua ge***

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# Objective:

After finishing the following exercises, trainees will:

* Understand and practice with Classes, Object, Constructors.
* Understand and practice with Control-of-flow statements.
* Understand and practice with Assertion.
* Understand and practice with Exception.

# Product Architecture

N/A

# Technologies

The software product is developed based on:

* Java Core (OOP, control statements, exception, assertion…)

# Assignment Description

## Exercise 1

Create a class called **Flower** to represent a flower. A flower should include the following information such as:

* + length (type of integer)
  + species (type of String)

Your class should have a constructor that initializes the instance variables that are mentioned above, with conditions **species must have content** and **initial length must be greater than 0,** if wrong condition throw IllegalArgumentException with corresponding message.

Provide a **getLengthIncrease** private method with parameter is current length that return the length increase depends on the current length (current length >10 => return 2 otherwise return 1) and you should use assertion to ensure current length and increase length >0

Provide a **grow** method that increase the length by at least one unit by using **getLengthIncrease** method, you should store the old length and use assertion for verifying **current length > old length**. Provide a **wither** method that decrease the length by one unit, but only if the resulting length will still be greater than 0, you should store old length and use assertion to verify **current length <= old length.**

Provide a method named **randomGrowOrWither** that randomly select one of three actions (0 - do nothing, 1

– grow, 2 – wither), otherwise throw AssertionError.

Overide toString method for displaying Flower information (**ex: Flower: Species=Tulip Length=3**)

Write a class named **FlowerTest** then create one flower object, call all methods and print out the flower object after execute each.

## Exercise 2

You are asked to write a discount system for a car store, which provides services and sells car accessories. It offers 3 types of memberships: Premium, Gold and Silver. Premium, gold and silver members receive a discount of 20%, 15%, and 10%, respectively, for all services provided. Customers without membership receive no discount. Your system shall consist of two classes: **Customer and DiscountRate.**

Each **customer** has **name** (String), **member**(boolean), **memberType**(String), constructor with three parameters Customer(String name, boolean member, String memberType).

Class **DiscountRate** has a method double getServiceDiscountRate(String type) that use switch case for input type to return the corresponding discount, you can place an assertion in the default clause of a switch statement to add extra protection with message “Default case reached”.

Write a class named **TestDiscountSystem** then create two objects customer with valid and invalid member type, after that printout service discount rate of each customer.