Object Oriented Programming

Abstract Class, Abstract Method, Inheritence and Polymorphism

Abstract Class and Method

<div class="grid grid-cols-2 gap-4"> <div>

```
abstract class ProgrammingLanguage {
    abstract void describe();

    public void print() {
        System.out.println("Coding is fun!");
    }
}

public class Java extends ProgrammingLanguage {
    @Override
    public void describe() {
        System.out.println("Java use OOP concept.");
    }
}
```

Inheritence

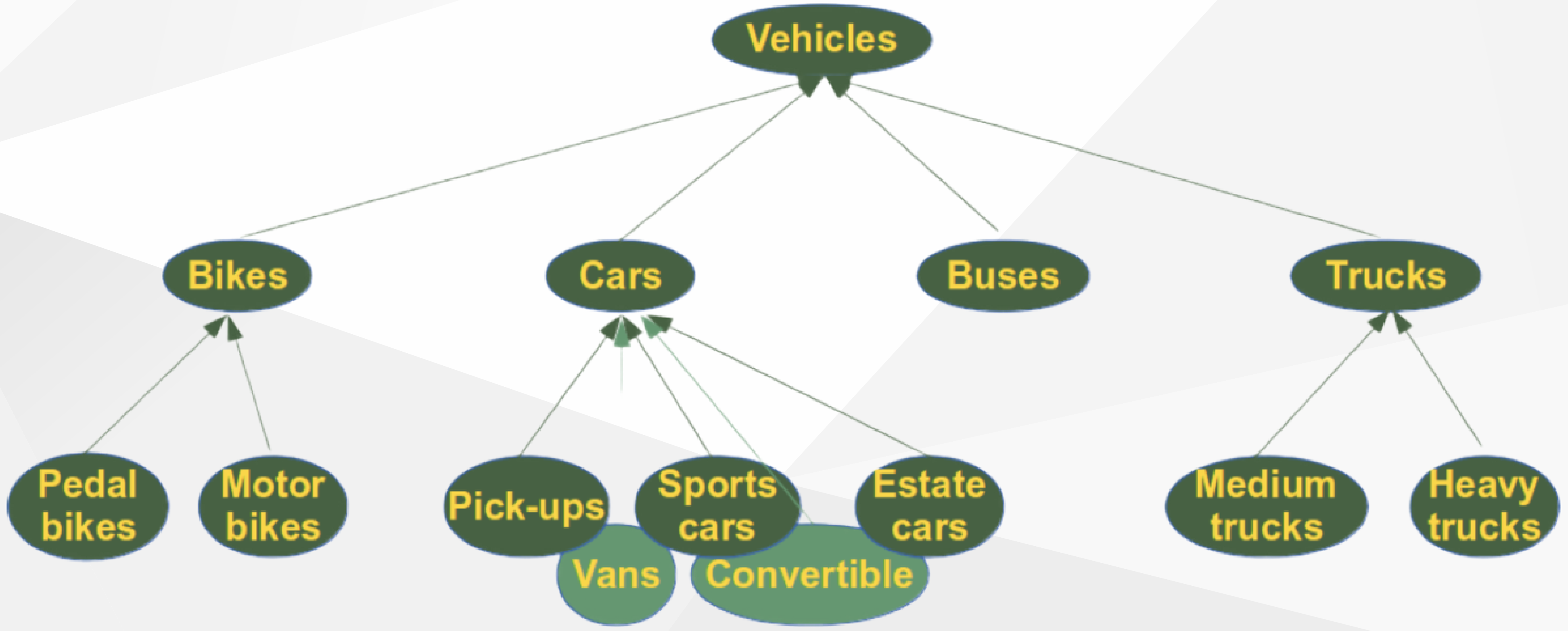
Object Fact :

- Object are often very similar. They share common logic.
- But, they're not entirely the same

<hr>

> “ ***What if we put common logic in one class, and unique logic of every object in their own class? Is that save your life from creating bunch of code in one class*** ”

Inheritence Analogy



Inheritence **Example**

<div class="grid grid-cols-2 gap-4"> <div>

```java
public class Human {
    private String name;

    public Human(String name) {
        this.name = name;
    }
    // Setter getter block
}

public class Employee {
    private String nik;

    public Employee(String name, String nik) {
        super(name);
        this.nik = nik;
```

Polymorphism

- **Poly** = Many, **Morphism** = Form, **Polymorphism** is ability objects of different types to respond to functions of the same name
- **User** does not have to know the exact object in advance
- **The behavior** of object can be implemented at runtime

Polymorphism Example

<div class="grid grid-cols-2 gap-4"> <div>

```java
public interface Vehicle {
    void topSpeed();
}

public class Lamborghini implements Vehicle {
    @Override
    public void topSpeed() {
        System.out.println("350 km/h");
    }
}

public class Fuso implements Vehicle {
    @Override
    public void topSpeed() {
        System.out.println("80 km/h");
```

Task Abstract Class & Abstract Method

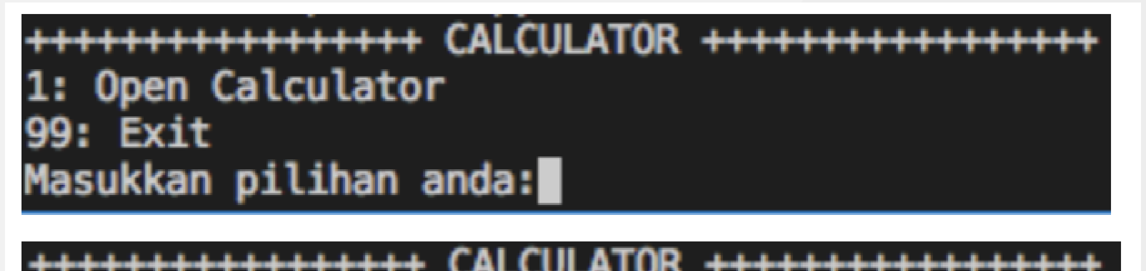
<div class="grid grid-cols-2 gap-4"> <div>

Create a simple calculator application with addition, subtraction, division and multiplication functions.

Take advantage of the `input()` function in Java to `enter the desired 2 numbers` and **1 number in the form of an operation choice**.

Print the result of the operation at the end of the section like demo on the right side.

</div> <div>



```
+++++++++++++++++ CALCULATOR +++++++++++++++++
1: Open Calculator
99: Exit
Masukkan pilihan anda:
```

```
+++++++++++++++++ CALCULATOR +++++++++++++++++
```

Task Inheritence & Polymorphism (Vehicles)

<div class="grid grid-cols-2 gap-4"> <div>

- `Vehicle` is a parent of all existing classes. And have property:
  - `name` : for object name
  - `isUseEngine` : flag object if has engine or not
- `Bike`, `Car` and `Bus` is a child from `Vehicle`
- Class `Bike`
  - `wheelCount` : number of wheels owned
- Class `Car`
  - `wheelCount`
  - `engineType` : type of engine
- Class `Bus`
  - `wheelCount`
  - `isPrivateBus` : flag bus is private or public
- Every class have method `identifyMySelf()` that **overrides** from `Vehicle` to print out like demo on the right side

</div> <div>

Task Inheritence & Polymorphism (Animal)

<div class="grid grid-cols-2 gap-4"> <div>

- `Animal` is a parent of all existing classes. And have property:
  - `name` : object name
  - `foodType` : type of food
  - `isSharpTeeth` : flag teeth is sharp or blunt
- `Herbivor`, `Carnivor` and `Omnivor` is a child from `Animal`
- Class `Herbivor`
  - Should eat plants
  - Should have blunt teeth
- Class `Carnivor`
  - Should eat meat
  - Should have sharp teeth
- Every class have method `identifyMySelf()` that **overrides** from `Animal` to print out like demo on the right side

</div> <div>