

Object Oriented Programming

Abstract Class, Abstract Method, Inheritence and Polymorphism

Abstract Class and Method

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```
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 00P concept.");
```

Cont...

Abstract Class:

- Must be declared with abstract keyword
- Can have abstract and non-abstract method
- Can not be instantiated
- Can have constructor and static method also
- Can have final methods which will force the subclass not to change the body of the method

Inheritence

Object Fact:

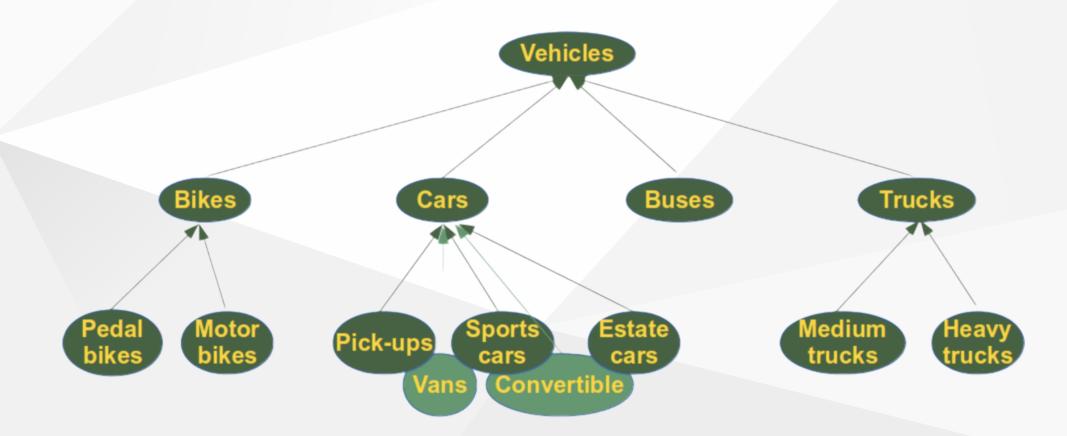
- Object are often very similar. They share common logic.
- But, they're not entirely the same

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" 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

```
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;
```

Cont...

Pre save word **SUPER**

SUPER is used to returns a proxy object that delegates method all to a parent or sibling class of type.

Method overriding is used to overriding parent method

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

```
public interface Vehicle {
    void topSpeed();
public class Lamborghini implements Vehicle {
    @Override
    public void topSpeed() {
        System.out.println("350 km/h");
public class <u>Fuso</u> implements <u>Vehicle</u> {
    @Override
    public void topSpeed() {
        System.out.println("80 km/h");
```

Cont...

```
public class Avanza implements Vehicle {
    @Override
    public void topSpeed() {
        System.out.println("150 km/h");
public class <u>Skyline</u> implements <u>Vehicle</u> {
    @Override
    public void topSpeed() {
        System.out.println("320 km/h");
```

Task Abstract Class & Abstract Method

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

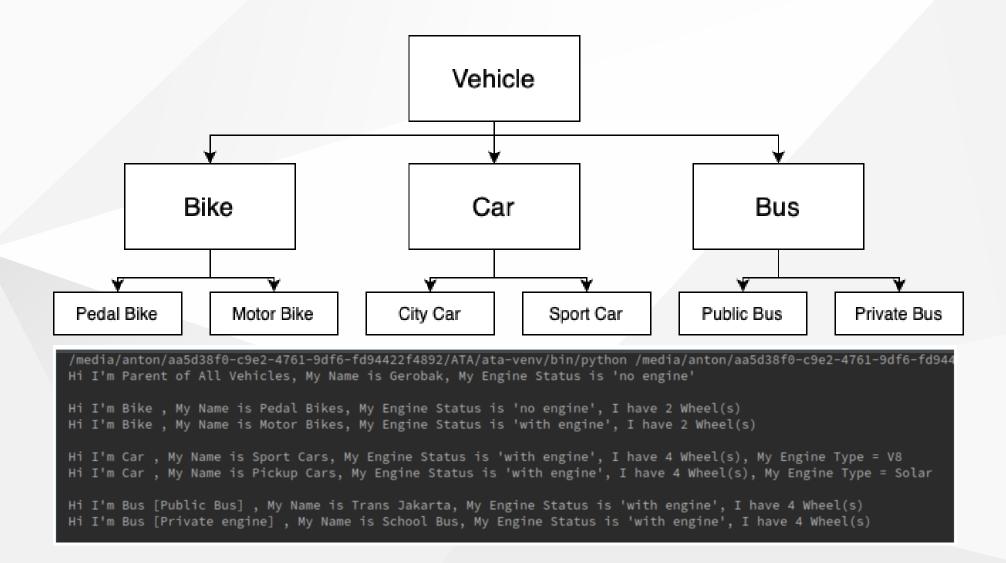
Take advantage of the input() function in Java to enter the desired 2 numbers and 1 number in the form of an operation choice.

Print the result of the operation at the end of the section like demo on the next slide.

```
1: Open Calculator
99: Exit
Masukkan pilihan anda:
   Masukkan Value 1 : 5
Masukkan Value 2 : 3
Please Enter Calculation Operation:
1. Add Value
2. Sub Value
3. Multiply Value
4. Divide Value
Pilihan Anda : 1
Pilihan Anda: 1
Hasil: 8
```

Task Inheritence & Polymorphism (Vehicles)

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



Task Inheritence & Polymorphism (Animal)

- Animal is a parent of all existing classes. And have property:
 - o 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 next slide

