UML - Class Diagrams

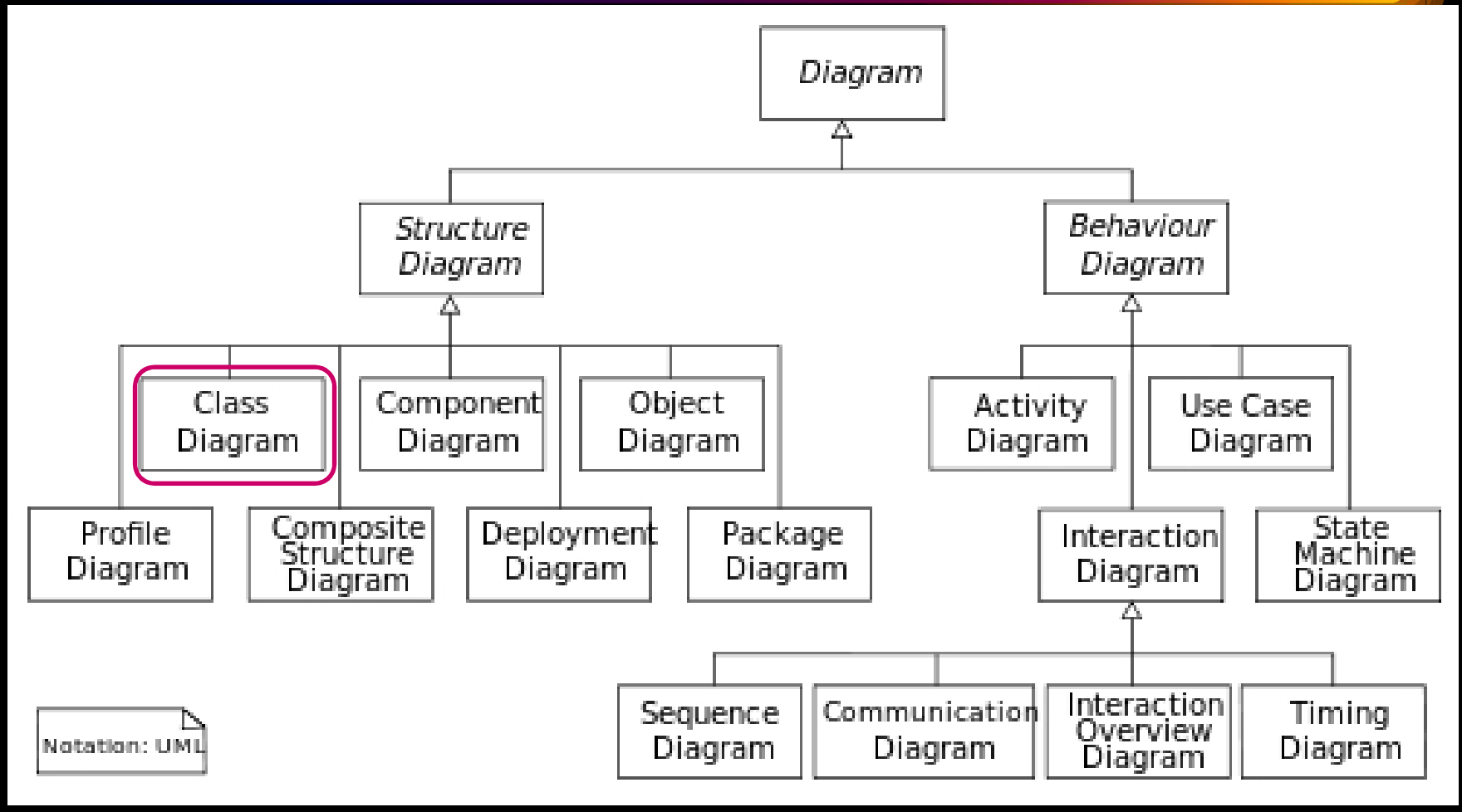
What is UML Diagram?

- Unified Modeling Language (UML)
- Standardized general-purpose **modeling language** in the field of **object-oriented software engineering**.
- The standard is managed, and was created, by the Object Management Group.

UML Diagram

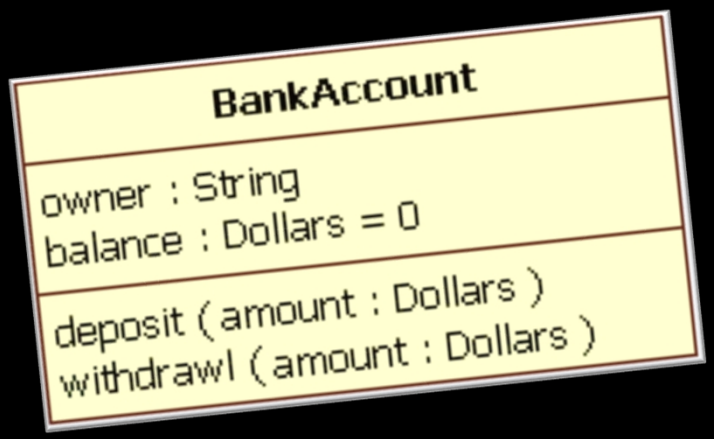
- UML 2.2 has **14 types of diagrams** divided into two categories.
- Seven diagram types represent **structural information**.
- Seven represent **general types of behavior**.

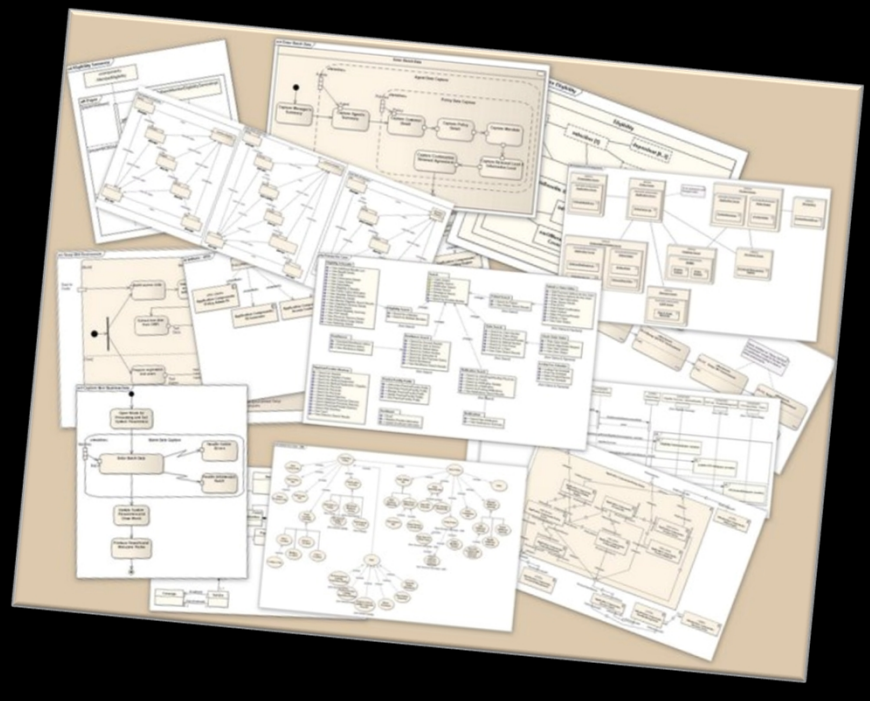
UML Diagram Types



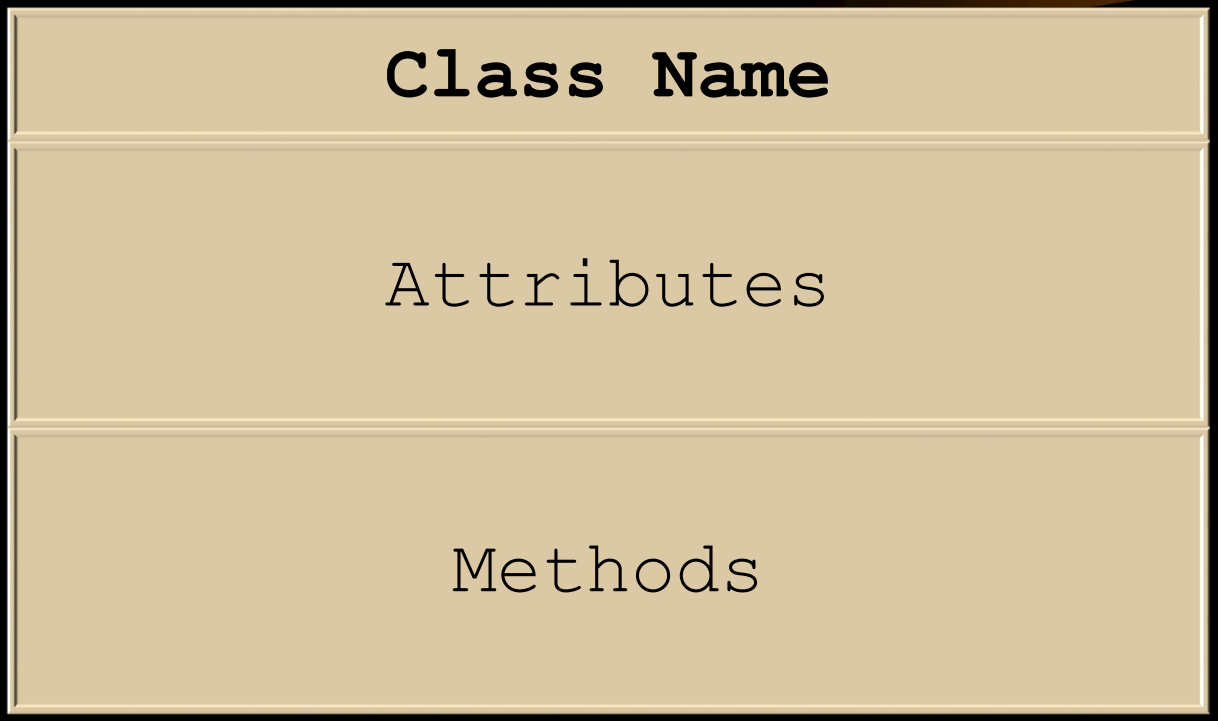
What is class diagram?

- Is a type of **static structure diagram** that **describes the structure** of a system **by showing** the **system's classes**, their **attributes**, operations (or **methods**), and **the relationships** among the classes.





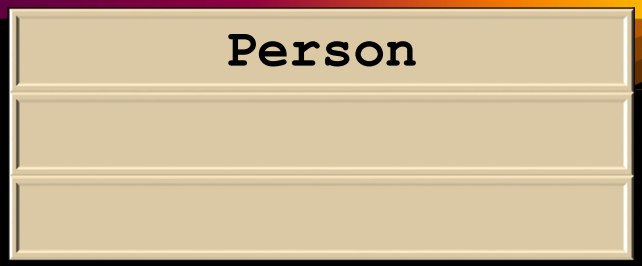
Class Diagram Models



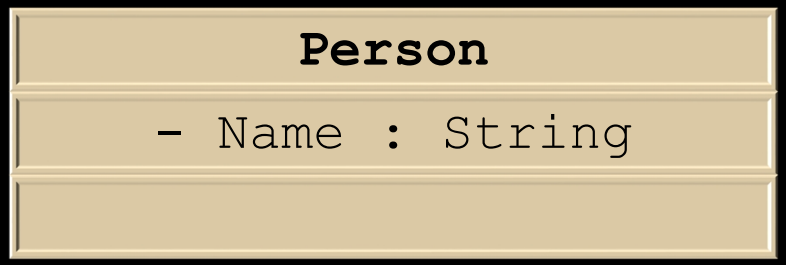
Example:
CD Models (Class and Attribute)

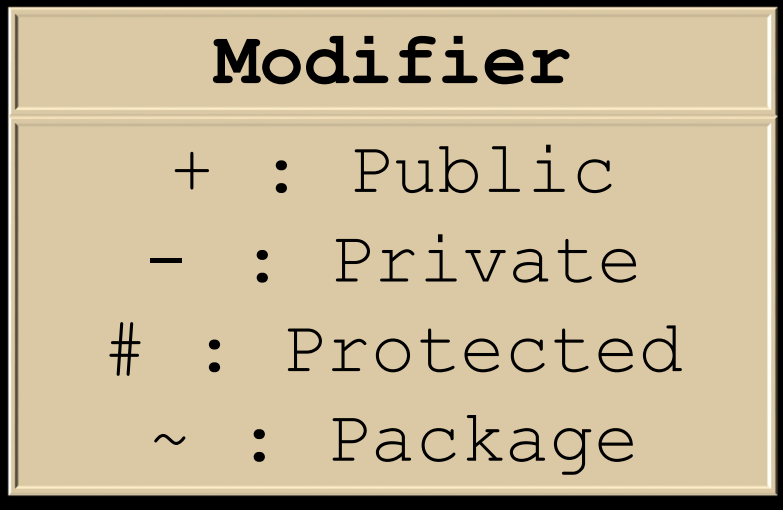
```
public class Person{

}
```




```
public class Person{
    private String name;
}
```

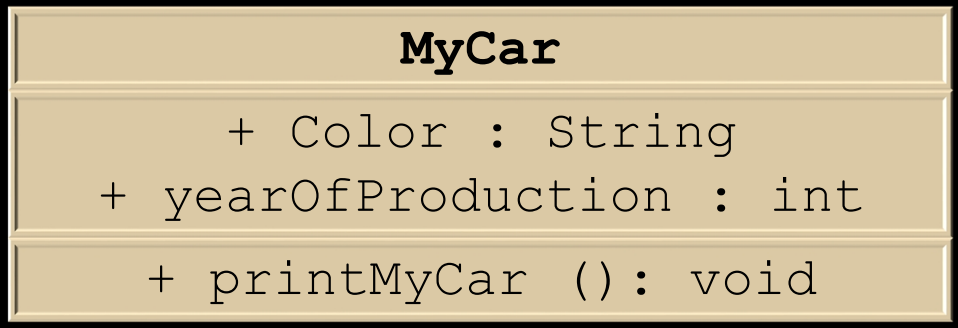




Example 2:
CD Models (Class, Attributes, Method)

MyCar.java

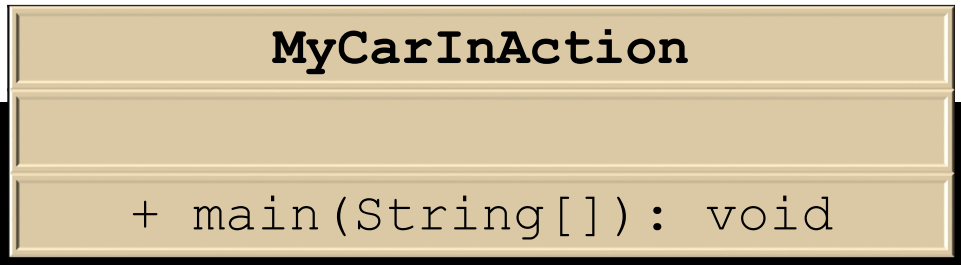
```
1  public class MyCar{
2      public String Color;
3      public int yearOfProduction;
4      public void  printMyCar(){
5          System.out.println("Color: " + Color);
6          System.out.println("Year Of production: " + yearOfProduction);
7      }
8  }
```



Example 3:
CD Models (Class with main method)

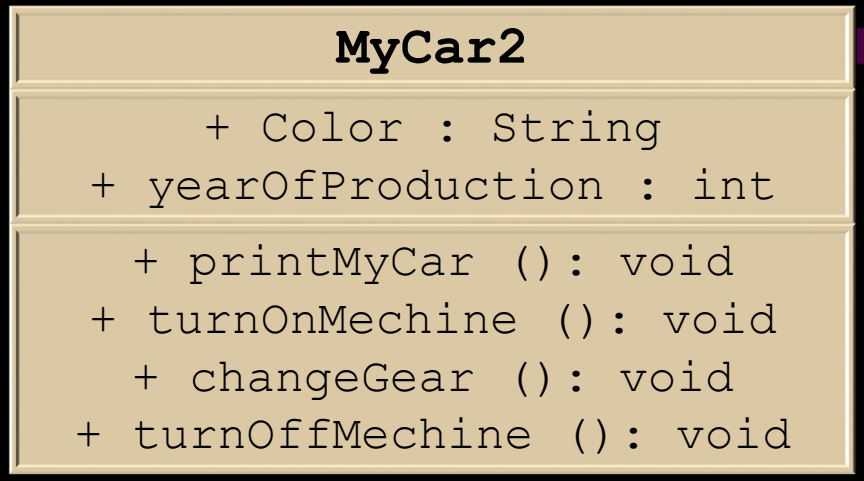
MyCar.java | MyCarInAction.java

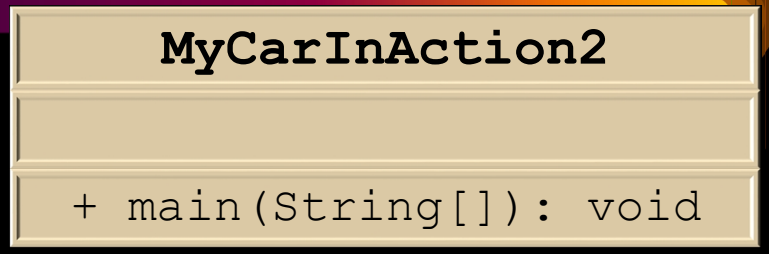
```
1  public class MyCarInAction{
2      public static void main(String[] args){
3          MyCar myCar = new MyCar();
4
5          myCar.Color = "Black";
6          myCar.yearOfProduction = 2006;
7          myCar.printMyCar();
8      }
9  }
```

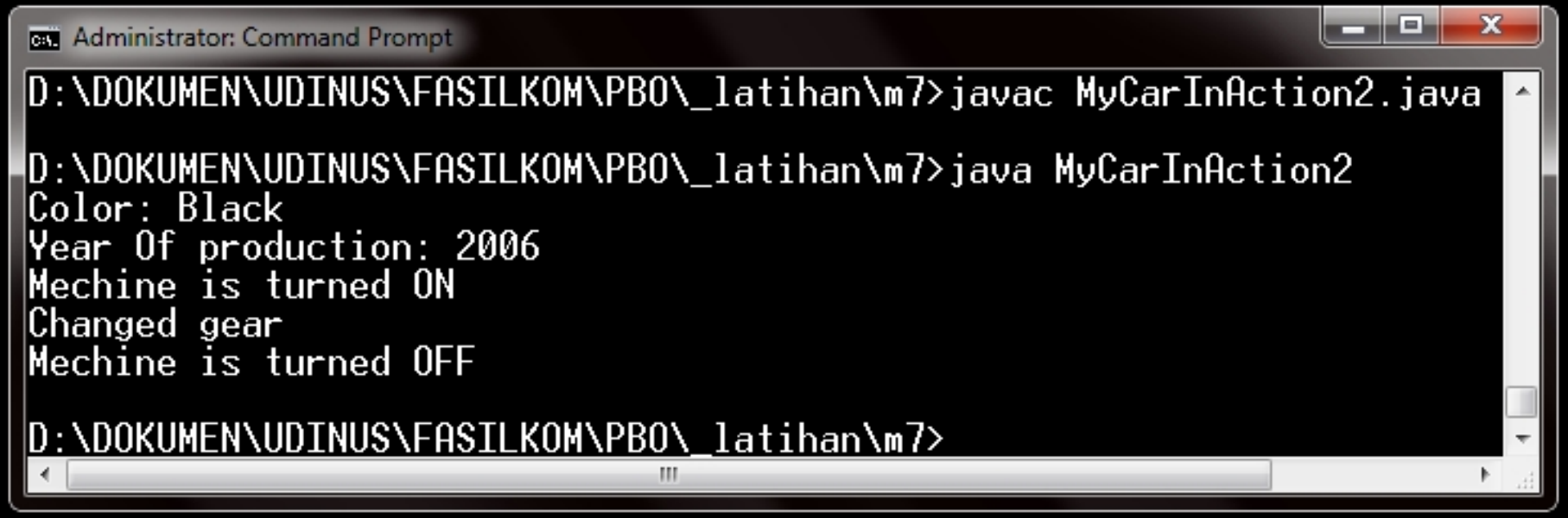


Exercise 1:

Create code from UML class diagram below!

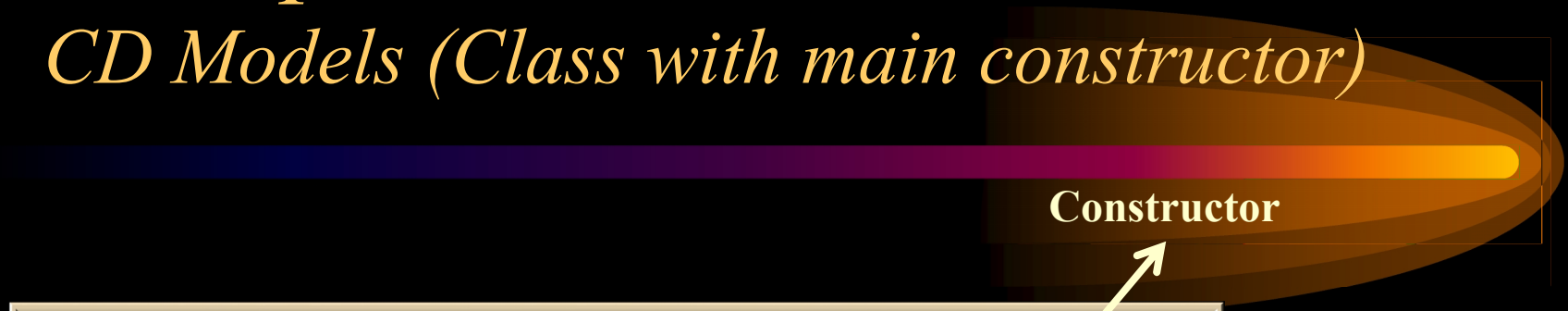






Example 4:

CD Models (Class with main constructor)



Students
- nim : String - nama : String
+ Students(nim : String, nama : String) + getNim (): String + getNama (): String

StudentsCard
+ main(String[]): void

Example 4:
CD Models (Class with constructor) Result

Students.java | StudentsCard.java

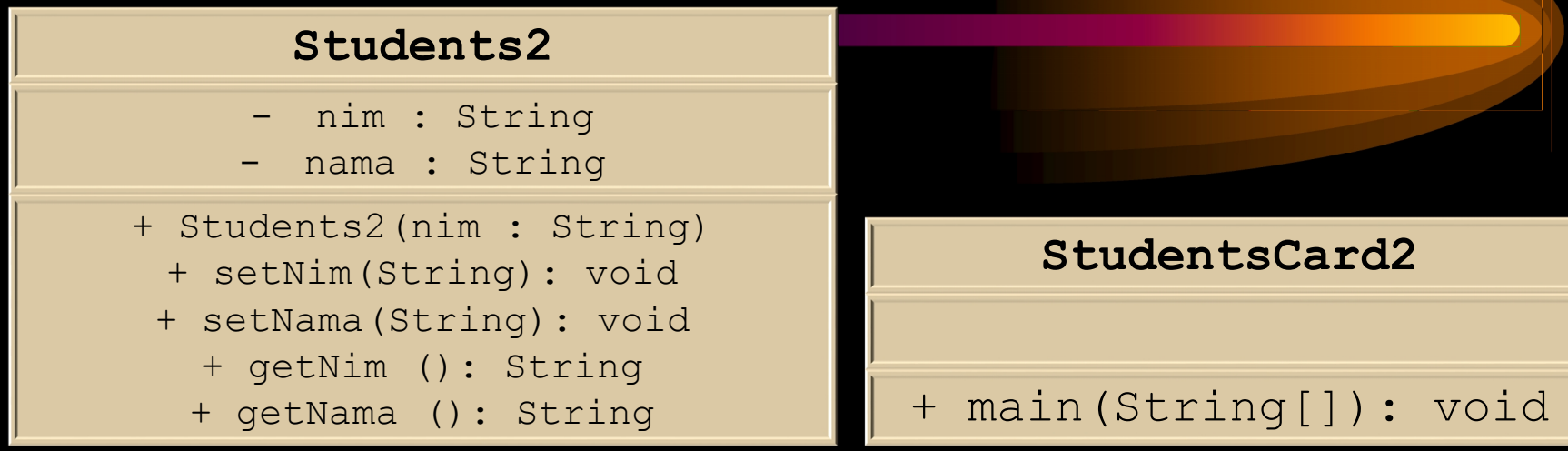
```
1  public class Students{
2      private String nim;
3      private String nama;
4
5      public Students(String nim, String nama){
6          this.nim=nim;
7          this.nama=nama;
8      }
9
10     public String getNim(){
11         return nim;
12     }
13
14     public String getNama(){
15         return nama;
16     }
17 }
```

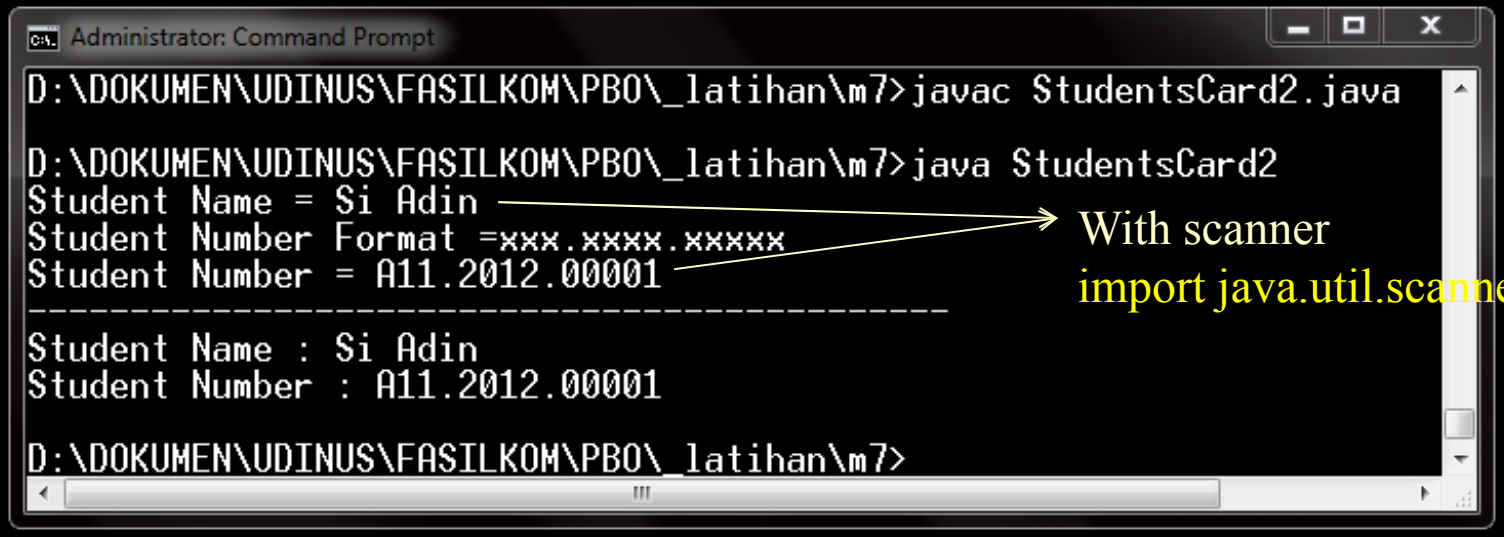
Students.java | StudentsCard.java

```
1  public class StudentsCard{
2      public static void main(String[] args){
3          Students SiAdin = new Students("A11.2012.0001","SiAdin");
4          System.out.println("Student Name : " +SiAdin.getNama());
5          System.out.println("Student Number : " +SiAdin.getNim());
6      }
7  }
```

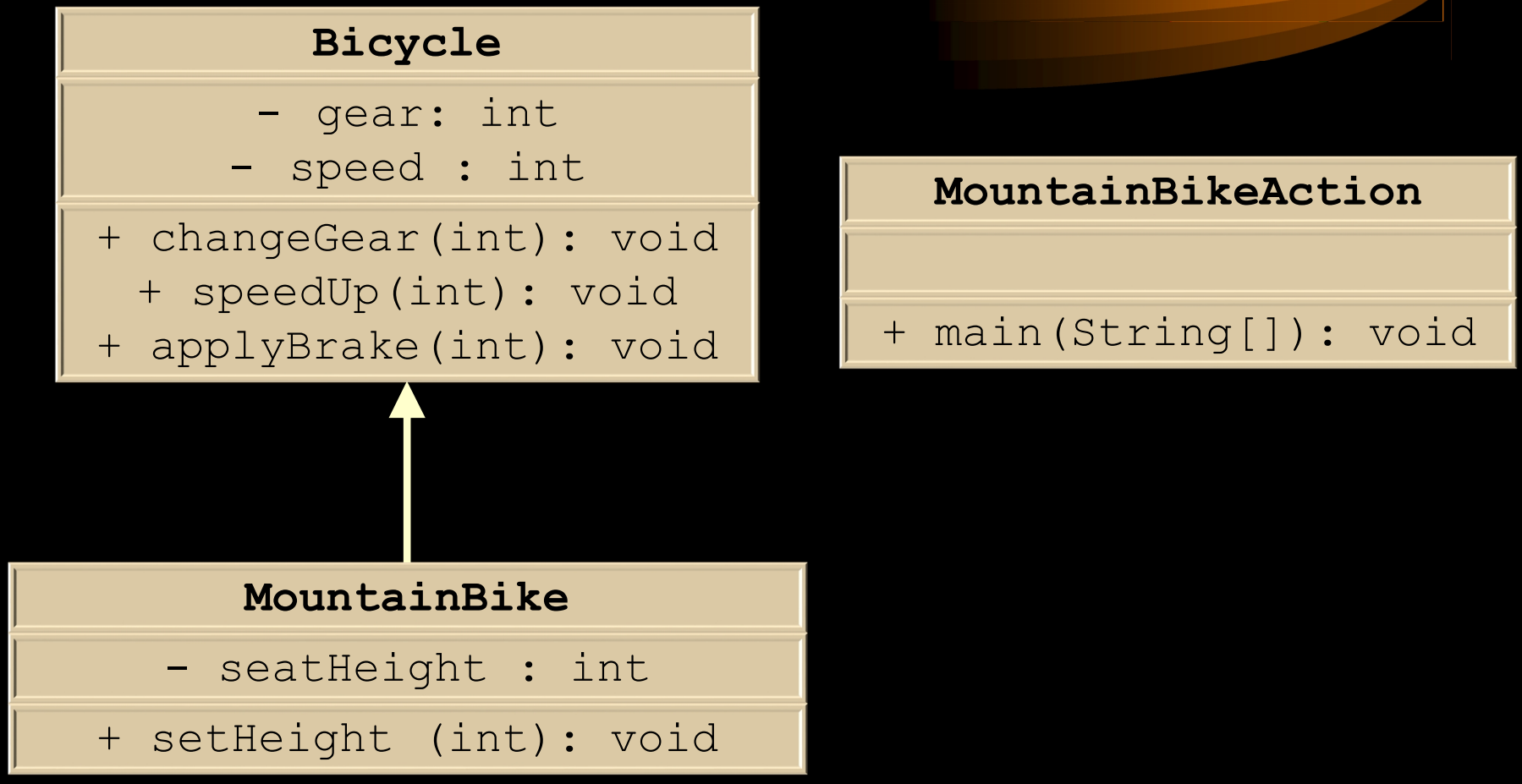
Exercise 2:

Create code from UML class diagram below!





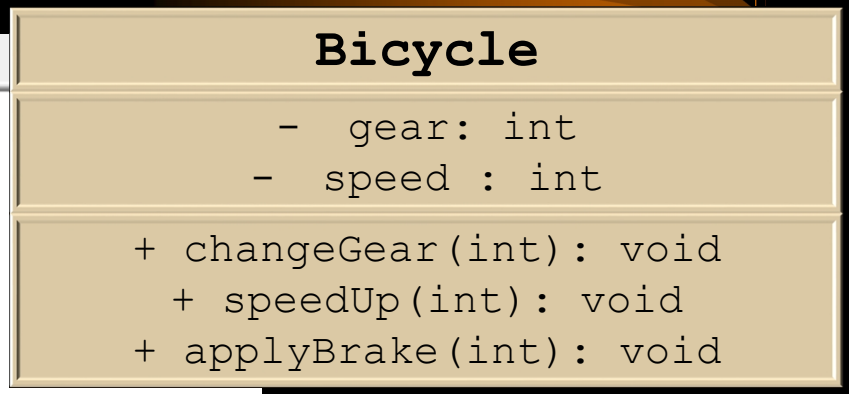
Example 5:
CD Models (Inheritence)



Example 5:
CD Models (Inheritence) Result

Bicycle.java | MountainBike.java | MountainBikeAction.java

```
1  public class Bicycle{
2      //state
3      private int speed ;
4      private int gear ;
5
6      // method
7      public void changeGear(int newValue) {
8          gear = newValue;
9          System.out.println("Gear:" + gear);
10     }
11     public void speedUp(int increment) {
12         speed = speed+ increment;
13         System.out.println("Speed:" + speed);
14     }
15     public void applyBrake(int decrement) {
16         speed -= decrement;
17         System.out.println("Speed:" + speed);
18     }
19 }
```



Example 5:
CD Models (Inheritence) Result cont'd

Bicycle.java | MountainBike.java | MountainBikeAction.java

```
1  class MountainBike extends Bicycle {
2      // the MountainBike subclass adds one f
3      private int seatHeight;
4
5      // the MountainBike subclass adds one m
6      public void setHeight(int newValue) {
7          seatHeight = newValue;
8          System.out.println("Seat height:" + seatHeight);
9      }
10 }
```

MountainBike
- seatHeight : int
+ setHeight (int): void

Bicycle.java | MountainBike.java | MountainBikeAction.java

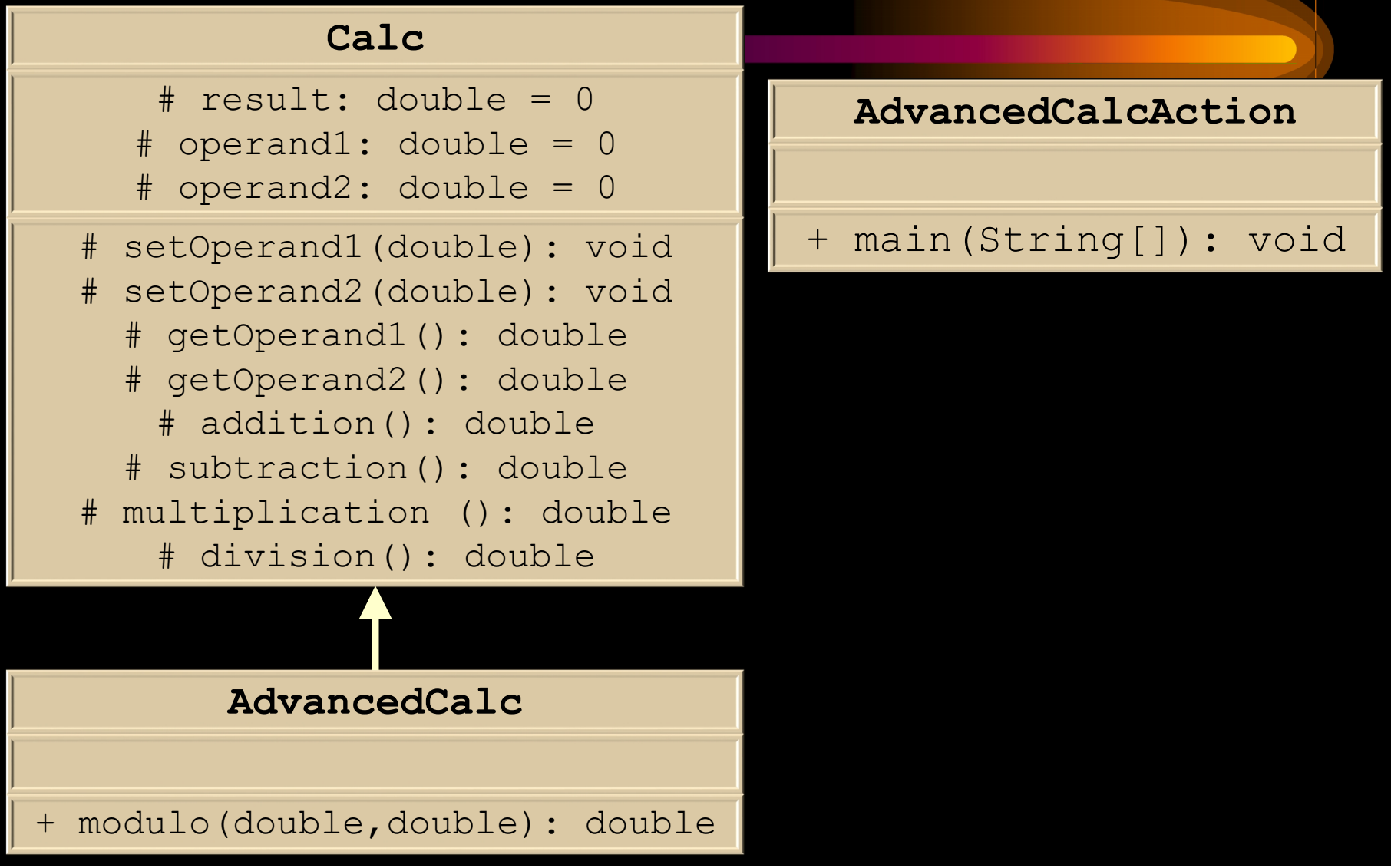
```
1  class MountainBikeAction {
2      public static void main(String[] args) {
3          // Create a object
           MountainBike mBike= new MountainBike();

           // Calling method
           mBike.speedUp(10);
           mBike.changeGear(2);
9          mBike.setHeight(20);
10         }
11 }
```

MountainBikeAction
+ main(String[]): void

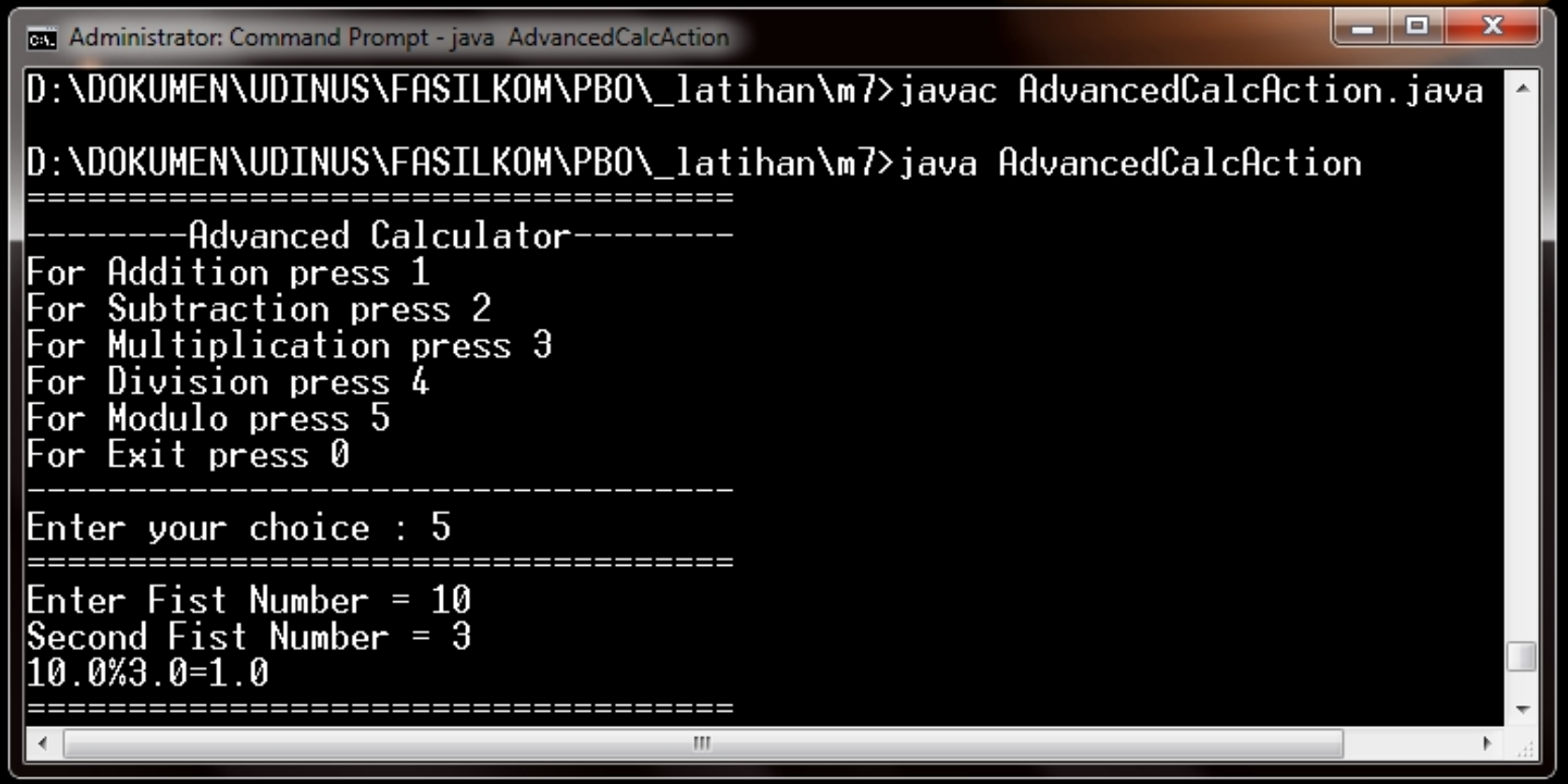
Exercise 3:

Create code from UML class diagram below!

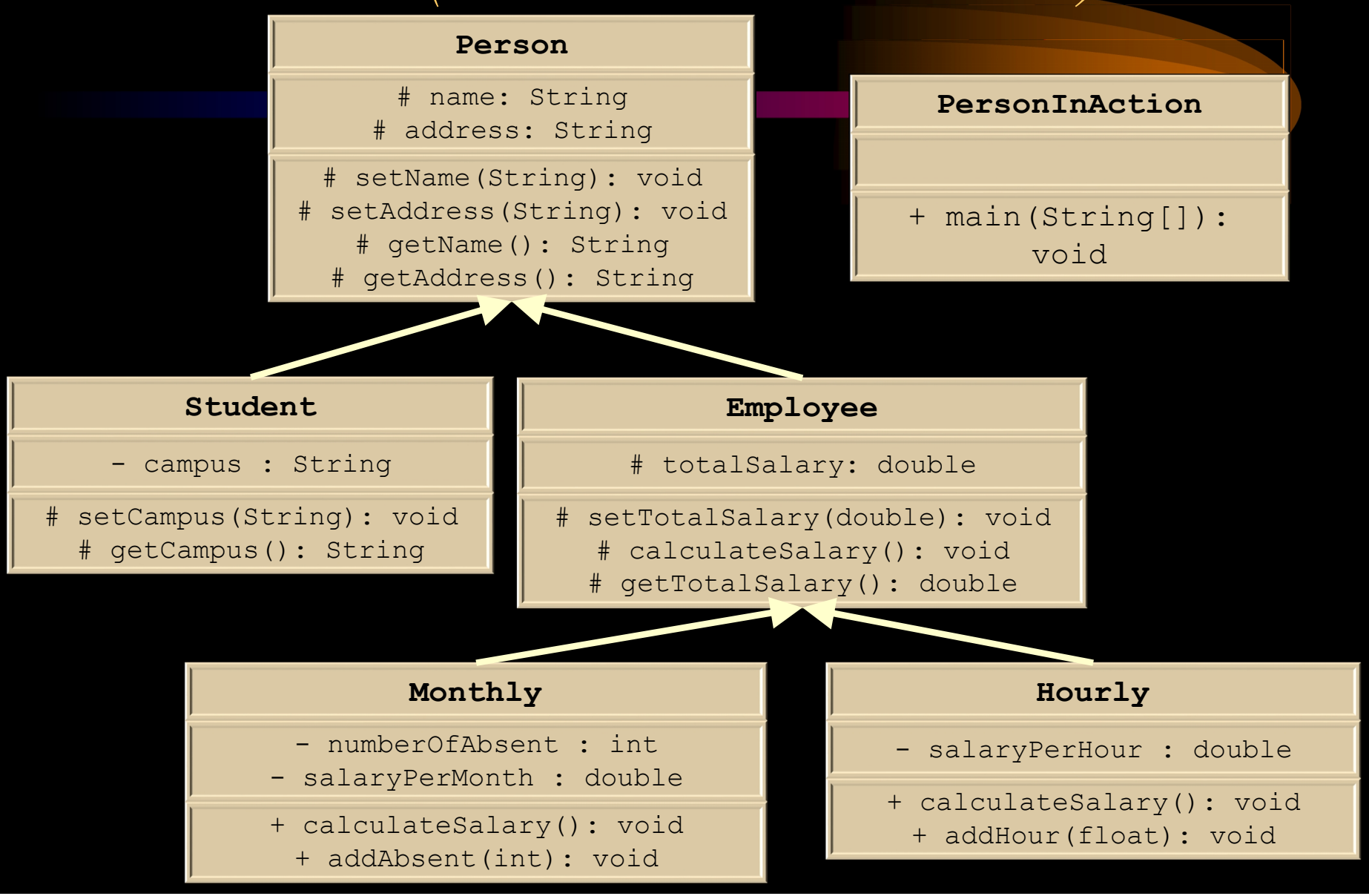


Exercise 3:

Result



Example 6:
CD Models (Multilevel Inheritance)



Exercise 4:

Create code from class diagram in the previous slide

- Clue:
  - calculateSalary is polymorhism method
  -

```
public class Person{
}

public class Student extends Person{
}

public class Employee extends Person{
}

public class Monthly extends Employee{
}

public class Hourly extends Employee{
}
```

THANKS