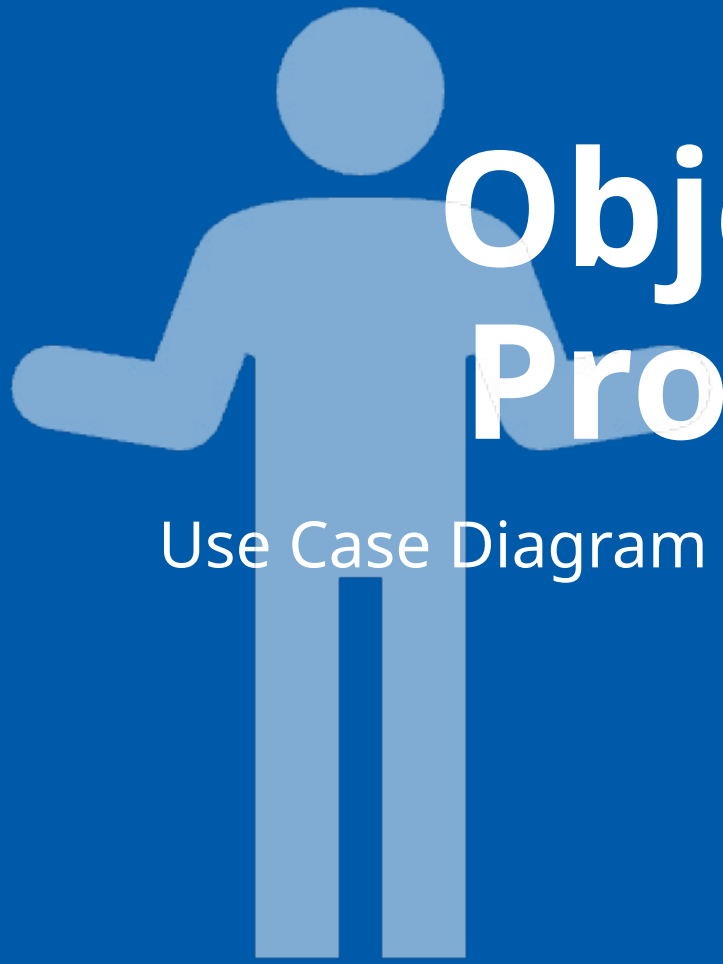

Object-Oriented Programming 2

Use Case Diagram & Inheritance en Abstracte klasse • Week 1

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IDOARRT

- **Intention**
- Covering the Use Case Diagram and why we are creating it;
  - Dealing with inheritance and the abstract class.

- **Desired Outcome**
- The student has the knowledge of the Use Case Diagram and can draw up one on their ow;
  - The student can apply inheritance in his projects.

- **Time**
  45 minutes.

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IDOARRT • Agenda

Why a Use Case Diagram?

- What does it look like?

What is inheritance?

What are the benefits?

Abstract class

- Demo

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Design

Use Case Diagram

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Why a Use Case Diagram?

- Different users in the system
- What Use Cases are in the system
  - What is the system supposed to do?

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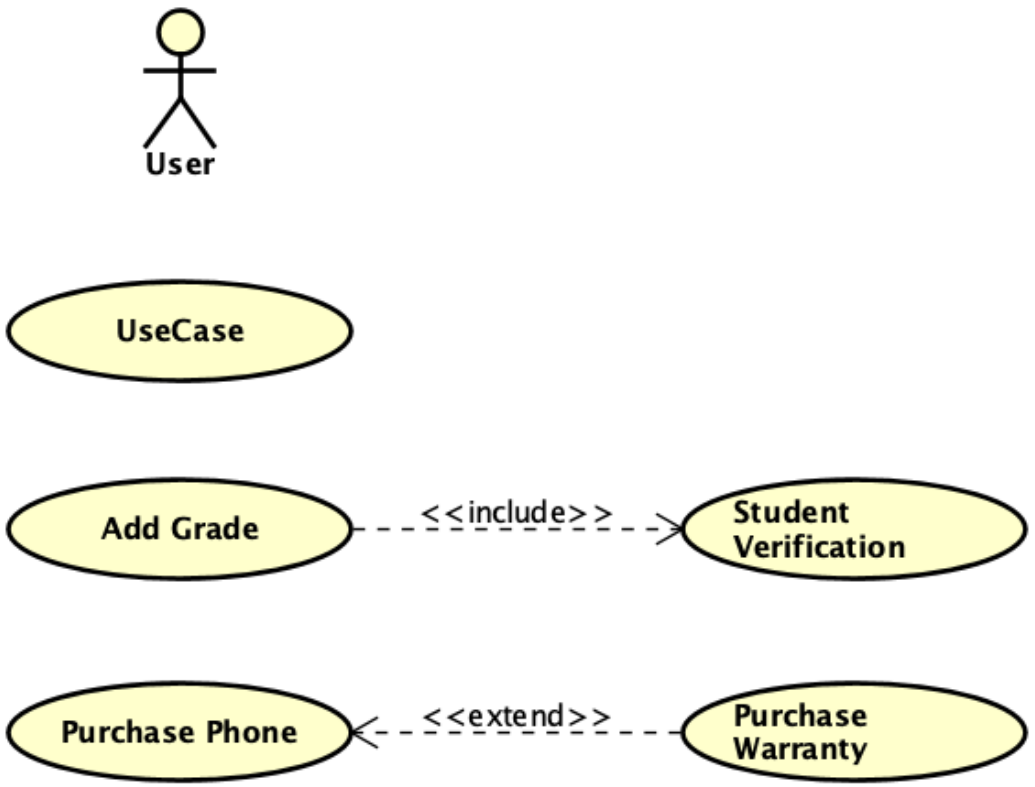
The Components



- **Actor**
  External entities that interact with the system (e.g. customers, administrators, but also other external systems/APIs).
- **Use Case**
  A process in the application.
- **Include**
  Use case that uses a different use case.
- **Exclude**
  Use case that optionally uses another use case.

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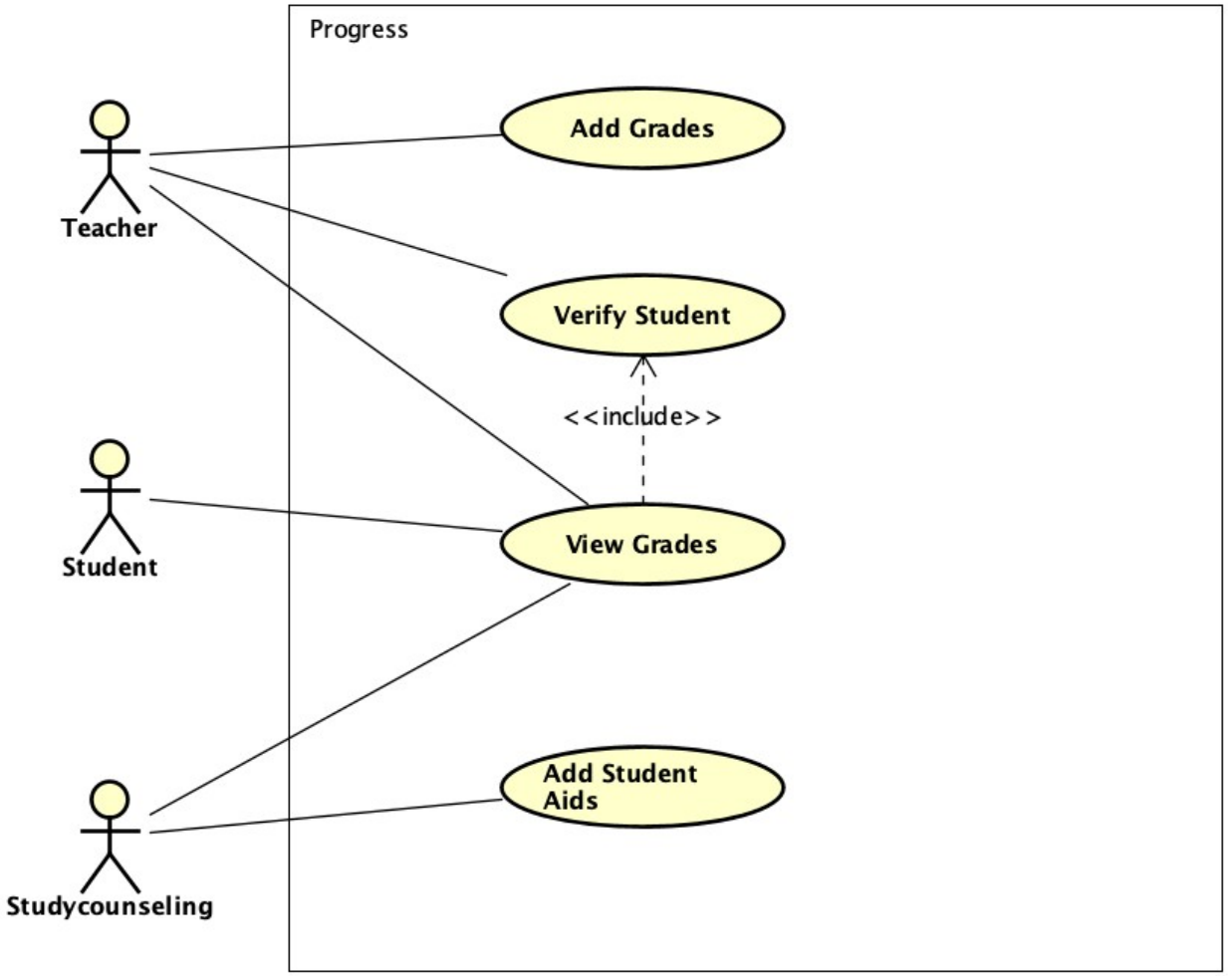
Example



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Realise

Inheritance & Abstracte klasse

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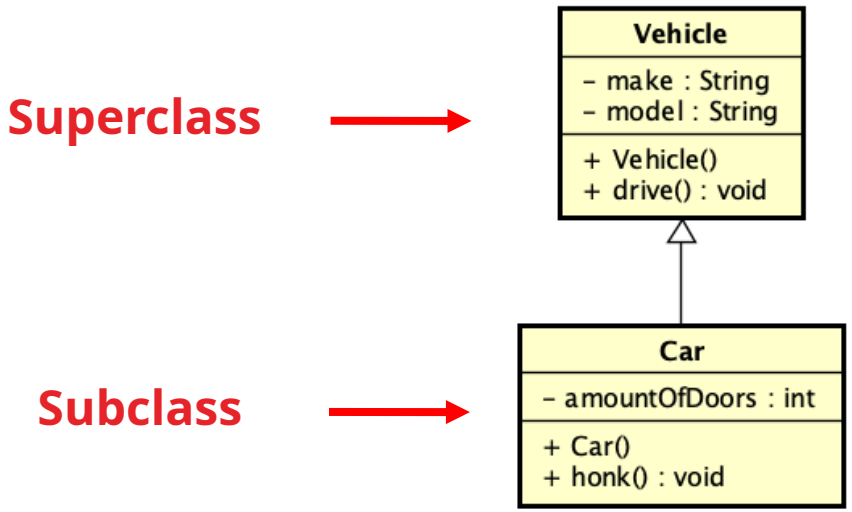
What is inheritance?

- Inheritance



Advantages of inheritance

- Reuse code
- Hierarchy
- Polymorphism
  - Assign subclass instance to a superclass (in a field or parameter)

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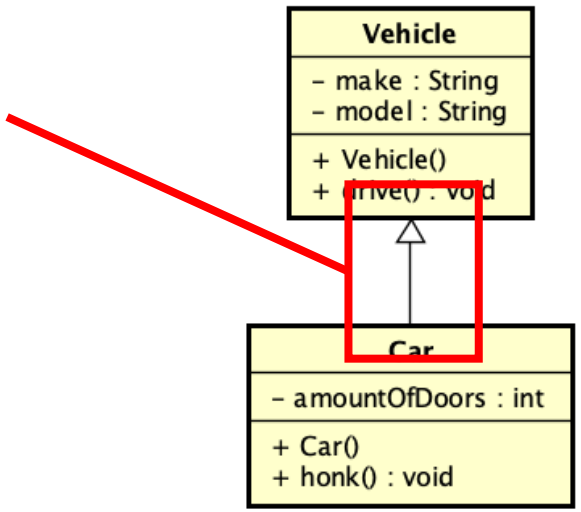
Inheritance in the class diagram

Generalization
relation.
In the direction of the superclass.



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Inheritance in code

```
1  public class Vehicle
2  {
3    protected String make;
4    protected String model;
5
6    public Vehicle(String make, String model)
7    {
8      this.make = make;
9      this.model = model;
10   }
11
12   public void drive()
13   {
14     // Do something to drive the vehicle
15   }
16 }
```

```
1  Vehicle vehicle = new Vehicle("Volkwagen", "Golf");
2  vehicle.drive();
3  vehicle.honk(); // Not available
```

```
1  public class Car extends Vehicle
2  {
3    private int amountOfDoors;
4
5    public Car(String make, String model, int
amountOfDoors)
6    {
7      super(make, model);
8      this.amountOfDoors = amountOfDoors;
9    }
10
11   public void honk()
12   {
13     // Do something to honk
14   }
15 }
```

```
1  Car car = new Car("Volkwagen", "Golf", 4);
2  car.drive(); // Available from Vehicle
3  car.honk()
```

Polymorfisme

```
1  Vehicle vehicle = new Car("Volkwagen", "Golf", 4);
2  vehicle.drive(); // Available from Vehicle
3  vehicle.honk(); // Not available
4
5  Car car = new Vehicle("Volkswagen", "Golf")
   // Not possible
```

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Inheritance override

```
1  public class Car extends Vehicle
2  {
3    private int amountOfDoors;
4
5    public Car(String make, String model, int amountOfDoors)
6    {
7      super(make, model);
8      this.amountOfDoors = amountOfDoors;
9    }
10
11   @Override
12   public void drive()
13   {
14     super.drive(); // Call functionality from Vehicle, not mandatory
15
16     // Override functionality from Vehicle
17   }
18
19   public void honk()
20   {
21     // Do something to honk
22   }
23 }
```

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Abstract class

- Cannot be initialized

- Can contain an abstract method
- This one has no body!
  - Forces subclasses to implement this method

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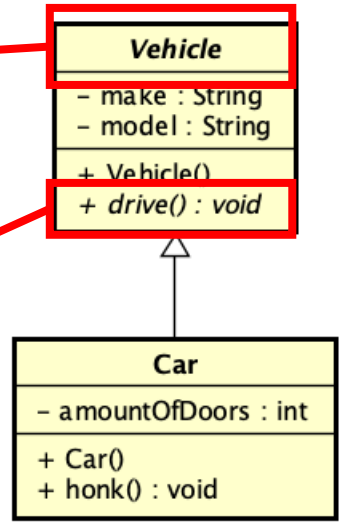
Abstract class in the class diagram

Class name in *italic.*

Abstract methods in *italic.*



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Abstract class in code

```java
public abstract class Vehicle
{
  protected String make;
  protected String model;

  public Vehicle(String make, String model)
  {
    this.make = make;
    this.model = model;
  }

  public abstract void drive();
}
```

```java
Vehicle vehicle = new Vehicle("Volkwagen", "Golf");
// Not possible, because Vehicle is abstract
```

```java
public class Car extends Vehicle
{
  private int amountOfDoors;

  public Car(String make, String model, int amountOfDoors)
  {
    super(make, model);
    this.amountOfDoors = amountOfDoors;
  }

  @Override
  public void drive()
  {
    // Do something to make it drive
  }

  public void honk()
  {
    // Do something to honk
  }
}
```

```java
Car car = new Car("Volkwagen", "Golf", 4);
car.drive();
car.honk()
```

Polymorfisme

```java
Vehicle vehicle = new Car("Volkwagen", "Golf", 4);
vehicle.drive(); // Available from Vehicle
```

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Demo

Questions