

Revision of the OOP basic concepts (Objects and Classes)

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CHAPTER 9

Objects and Classes

Before Begin

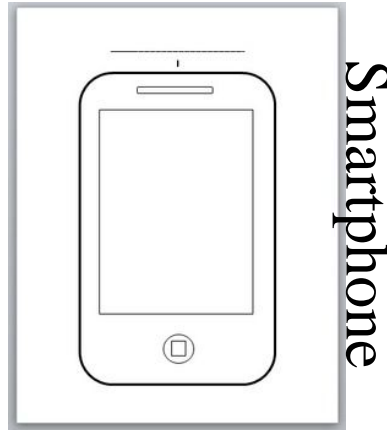
Everything in the real world is object



Objects of the same Kind

Objects of the same type are defined using a common class

Smartphone Class



iphone



nokia



samsung

Objects of the same Kind

Objects of the same type are defined using a common class

Animal Class



Objects of the same Kind

Objects of the same type are defined using a common class

Vehicle Class



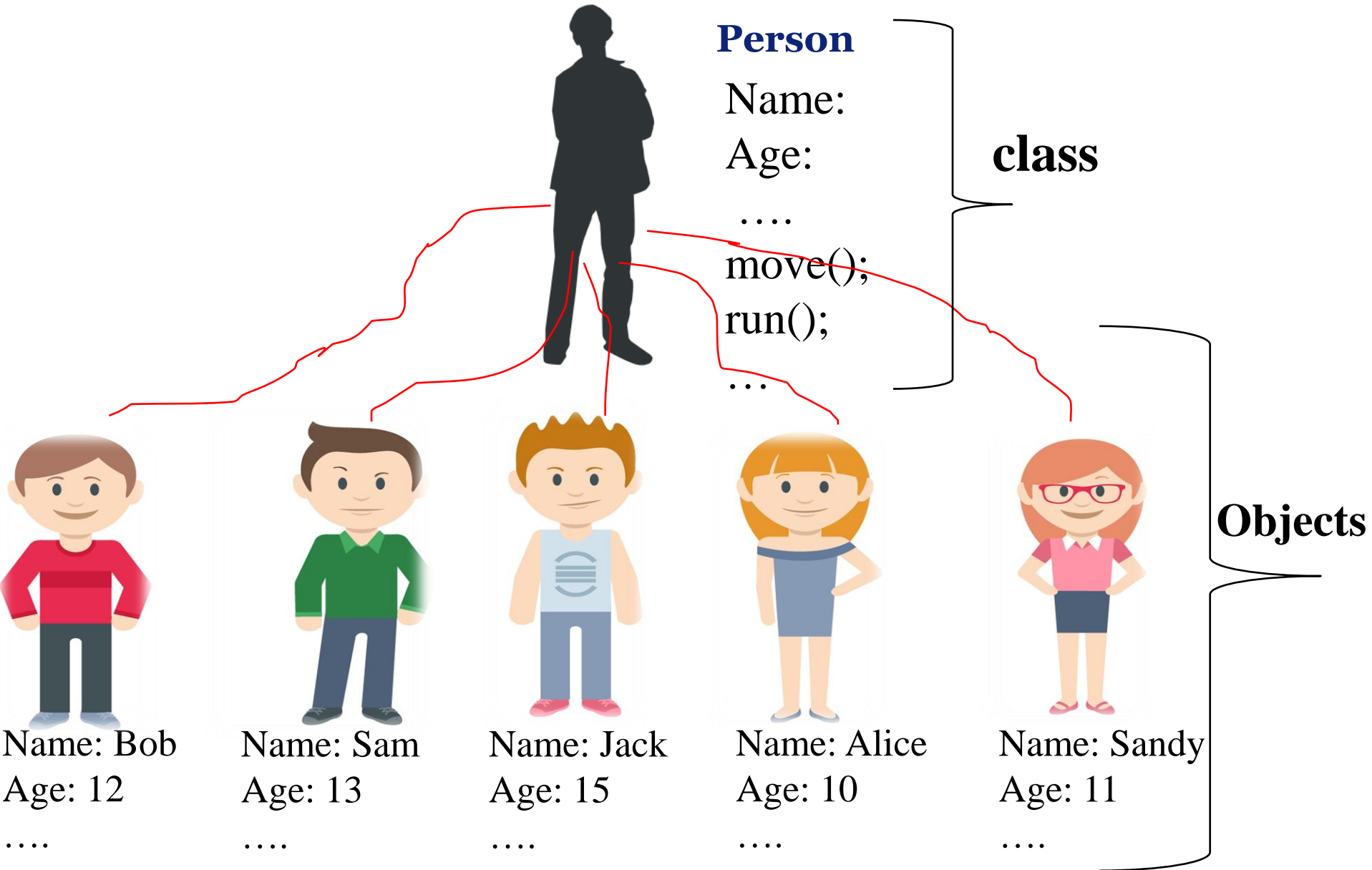
Vehicle class

Object

Object = ID + State + Behavior

- **Identity:** is the variable name when instantiated.
- **State of an object:** Consists of a set of *data fields* (also known as *properties*, *data value*, *attributes*)
- **Behavior of an object:** is defined by a set of *methods* (functions).

Objects of the same Kind



Examples

```
class Person{
```

```
    // attributes
```

```
    int age;
```

```
    String firstName;
```

```
    String lastName;
```

```
    ...
```

```
    // methods
```

```
    void speak(){
```

```
    }
```

```
    void listen(){
```

```
    }
```

```
    .....
```

```
}
```

```
class Vehicle{
```

```
    // attributes
```

```
    String name;
```

```
    int model;
```

```
    double speed;
```

```
    ...
```

```
    // methods
```

```
    void changeDirection(){
```

```
    }
```

```
    void move(){
```

```
    }
```

```
    void stop(){
```

```
    }
```

```
    .....
```

```
}
```

Class & Object

- A *class* is a template, blueprint, or *contract* that defines **what an object's data fields and methods** will be.
- An object is an instance of a class. You can **create many instances of a class**.
- Creating an instance is referred to as *instantiation*

Examples : State & Behavior

Person class

Attributes of Person :

- 1.Name of Person
- 2.Gender
- 3.Skin Color
- 4.Hair Color

Behaviors of Person:

1. Talking
2. Walking
3. Eating

Vehicle class

Attributes of Vehicle:

1. Color
2. name
3. Model
4. Speed
5. Mileage

Behaviors of Vehicle

1. Turn left
2. Turn right
3. Press break

Examples : State & Behavior

Animal class

Attributes of Animal :

1. Color
2. name
3. height
4. age

Behaviors of Animal :

1. eating
2. Sleeping
3. ..

OO Programming Features

1. Encapsulation
2. Inheritance
3. Polymorphism
4. Abstraction

Later !

OO Programming Concepts

Object-oriented programming (OOP) involves programming using objects. An *object* represents an entity in the real world that can be distinctly identified. For example, a student, a desk, a circle, a button, and even a loan can all be viewed as objects. An object has a unique identity, state, and behaviors.

- The *state* of an object consists of a set of *data fields* (also known as *properties*) with their current values.
- The *behavior* of an object is defined by a set of *methods*.

Classes

- *Classes* are constructs that **define objects of the same type**.
- A Java class uses **variables to define data fields** and **methods to define behaviors**.
- A class provides a special type of methods, known as **constructors**, which are invoked to construct objects from the class.

Examples

```
class Person{
```

```
    // Data fields
```

```
    int age;
```

```
    String firstName;
```

```
    String lastName;
```

```
    ...
```

```
    // Behaviors
```

```
    void speak(){
```

```
    }
```

```
    void listen(){
```

```
    }
```

```
    .....
```

```
}
```

Variables to define
data fields



Methods to define
behaviors

