Creating Your First Class and Objects

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Agenda

Understanding classes

Creating the Employee class

Using objects

Understanding Classes

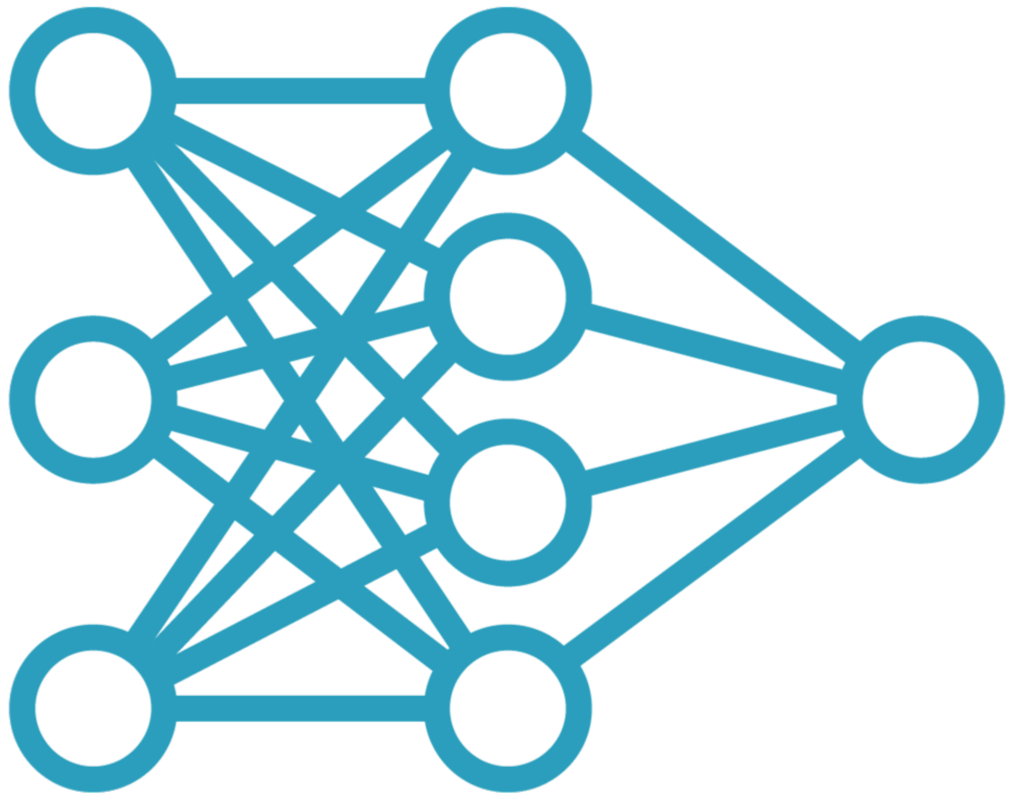
With just variables, we only get so far.

If we want to represent a structure, we need a custom type.

Typical models

- Employee
- Customer
- Message
- Transaction

Custom Types



Class

Most commonly used

Struct

Classes in C#

Blueprint of an object

Defines data and functionality to work on its data

Created using class keyword

Foundation of OO (object-orientation)

In C#, most code will live inside a class

Program.cs and Utilities class used up until now

Most code will live inside a class

The Class Template

```
public class MyClass
{
    public int a;
    public string b;

    public void MyMethod()
    {
        Console.WriteLine("Hello world");
    }
}
```

Contents of a Class

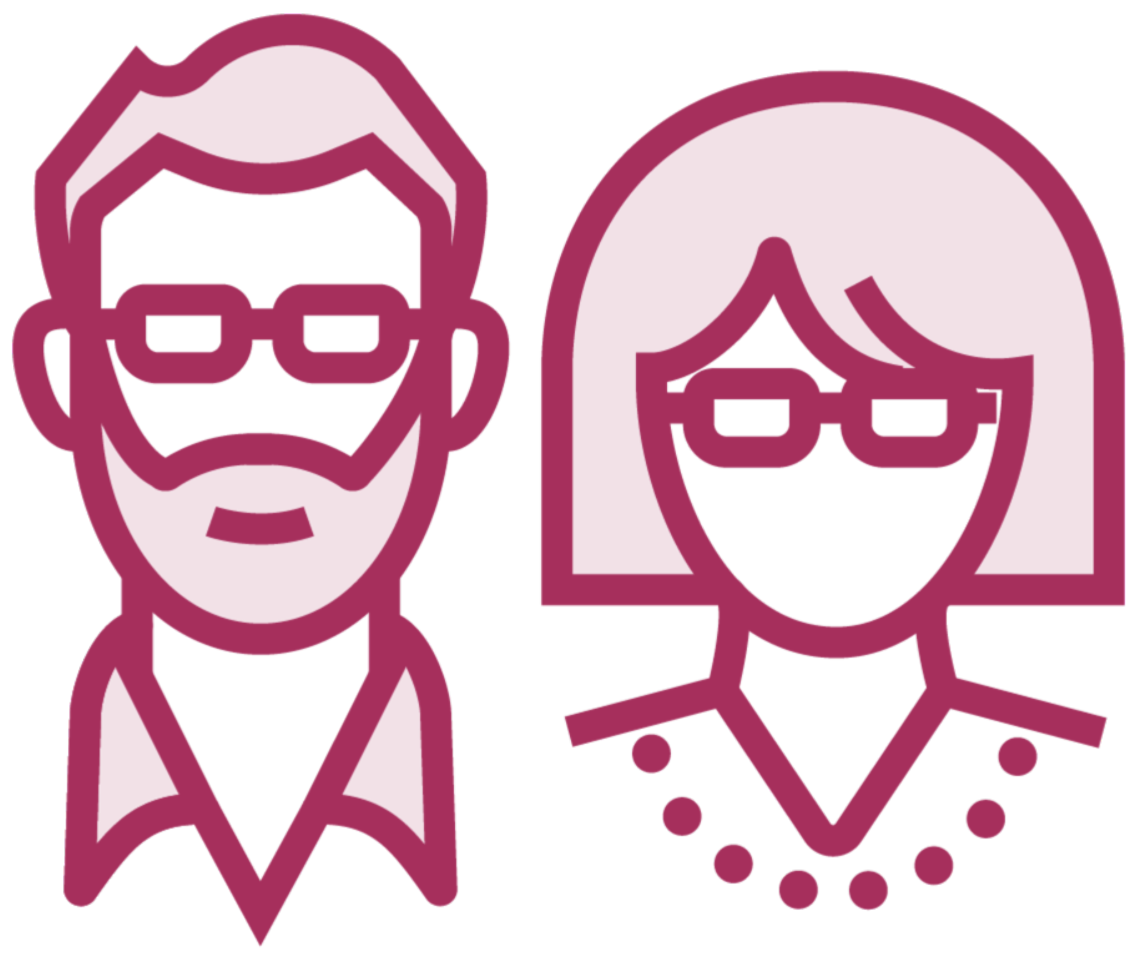
Fields

Methods

Properties

Events

Creating the Employee Class



Thinking of an Employee in real life

- Identity: Name
- Attributes: Age, Wage
- Behaviors: Get paid, Perform work

```java
public class Employee
{
    //class code will come here
}
```

Creating the Employee Class

Adding Fields

Class-level variables

Contain value

Adding the Employee Fields

```
public class Employee
{
     public string firstName;
     public int age;
}
```

Adding Methods

Perform actions

Often change the state

Adding Methods

```
public class Employee
{
    public string firstName;
    public int age;

    public void PerformWork()
    {
        //method code goes here
    }
}
```

Access Modifiers

public

private

protected

Demo

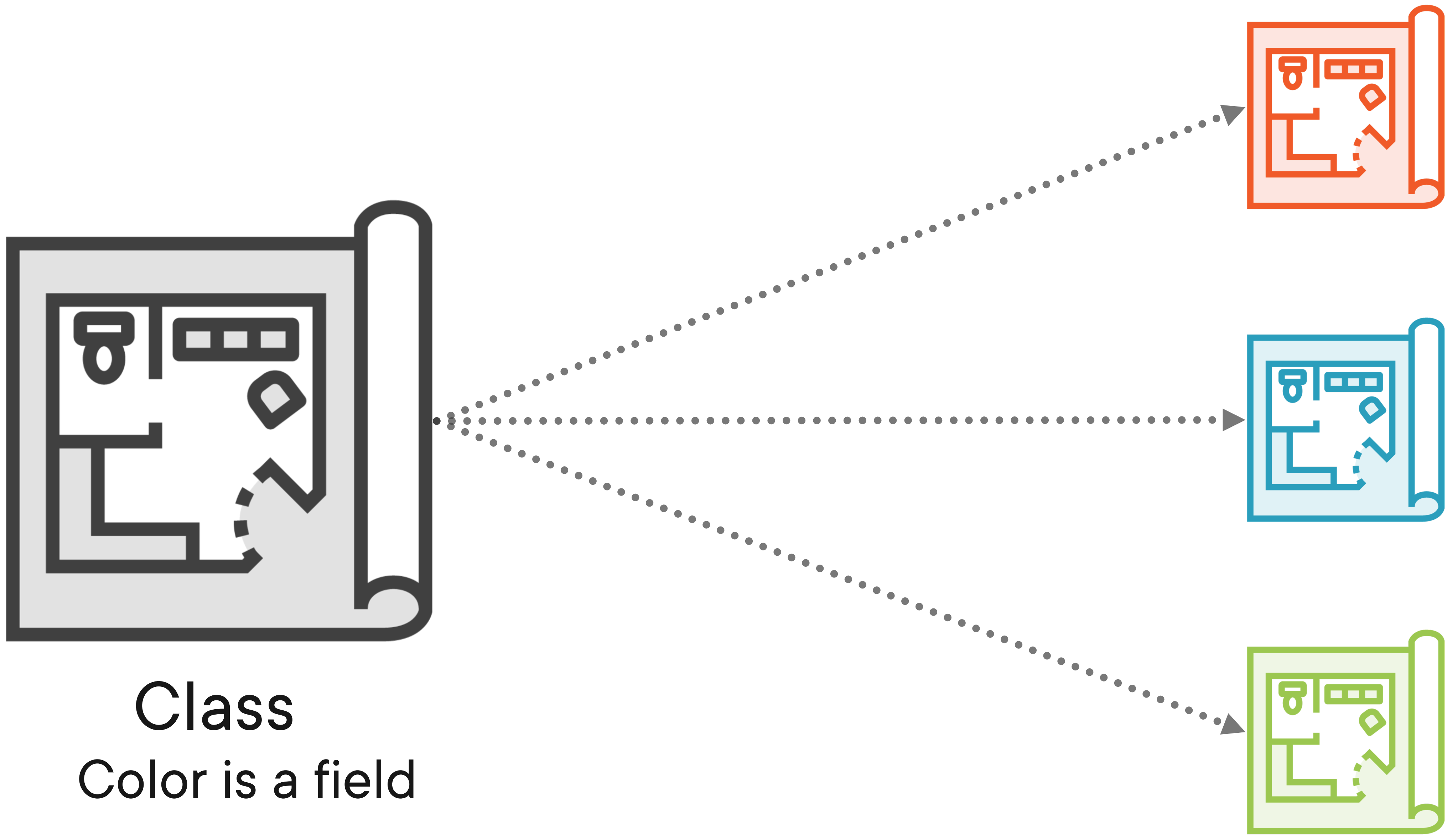
Creating the Employee class

Adding data using fields

Adding methods

Using Objects

Classes and Objects



Creating a New Object

$$\overbrace{\underbrace{\texttt{Employee}}_{\text{Variable type}}\ \underbrace{\texttt{employee}}_{\text{Variable name}}}^{\text{Create variable}}\ \overset{\text{Assignment operator}}{\texttt{=}}\ \overbrace{\texttt{new Employee();}}^{\text{Create object}}$$

Constructors

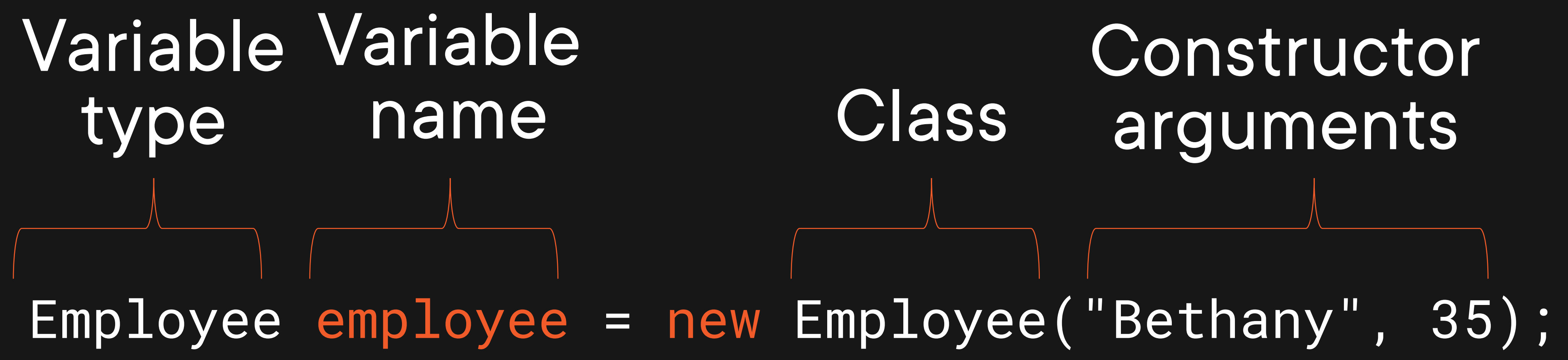
Called when instantiating an object happens

Default or custom

Used to set initial values

Adding a Constructor with Parameters

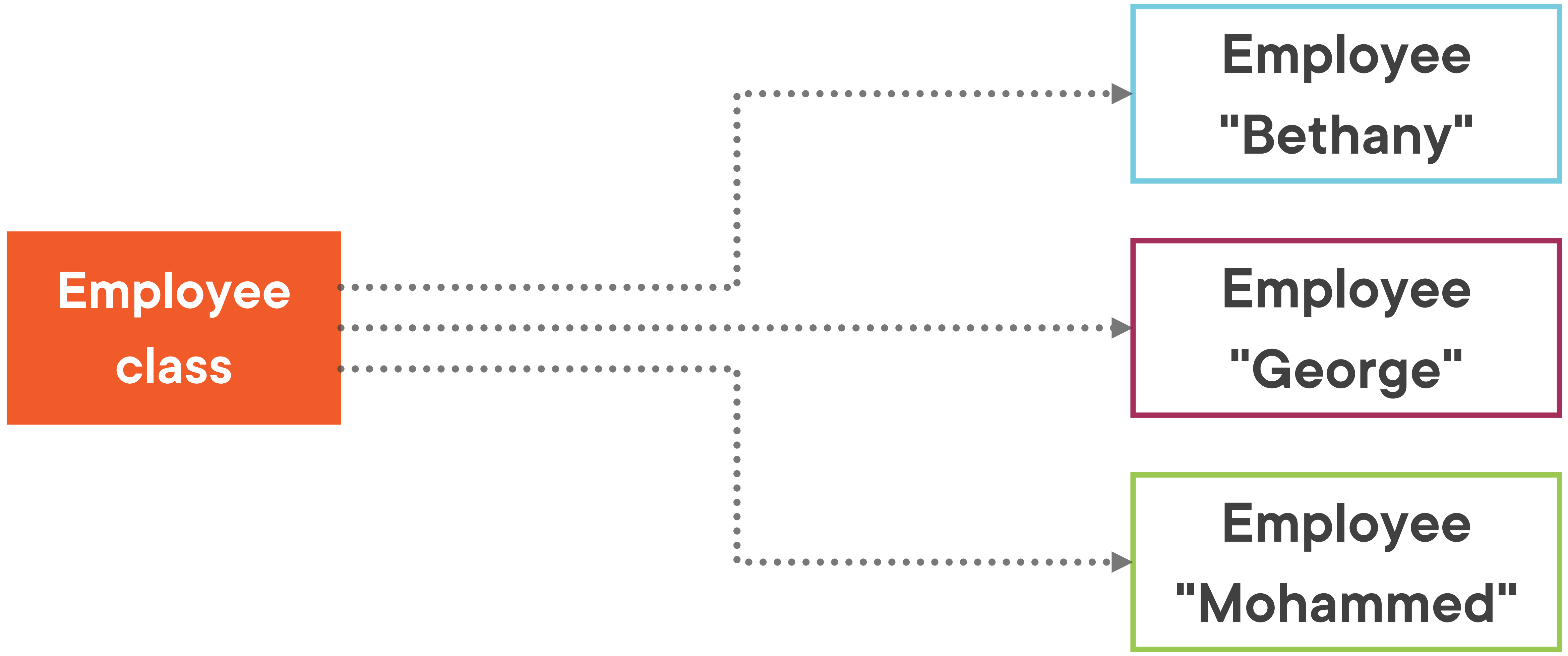
```
public class Employee
{
    public string firstName;
    public int age;

    public Employee(string name, int ageValue)
    {
        firstName = name;
        age = ageValue;
    }
}
```



```
Employee employee = new Employee("Bethany", 35);
```

Using the Constructor

Creating Objects Using the Constructor



The Default Constructor

```
public class Employee
{
    public Employee()
    { }
}
```

Is there always a default constructor?

No! Only if we define no other constructors!

```
Employee employee = new Employee();
```

◀ Instantiating the object

```
employee.PerformWork();
```

◀ Invoking a method

```
employee.firstName = "Bethany";
```

◀ Changing a field

```
int wage = employee.ReceiveWage();
```

◀ Returning a value from a method

Demo

Adding a constructor

Creating an object

Using the dot operator

Demo

Working with several objects

Summary

Classes are the main building block in C#

Define fields and methods

Are the blueprint for creation of objects

- Constructors

Up next:

Understanding value and reference types