A Brief Introduction

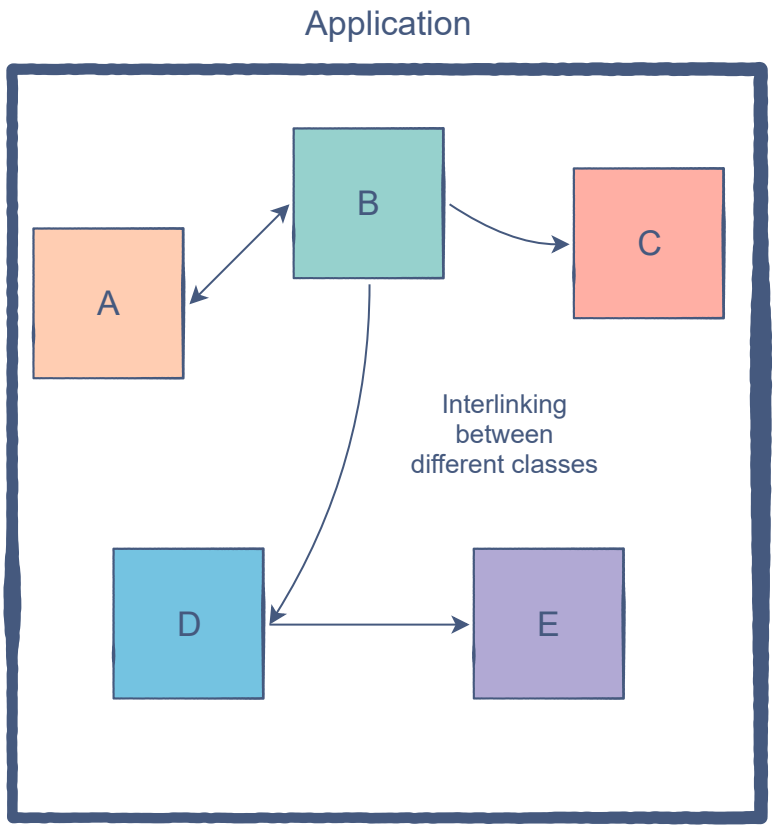
In this lesson, we will learn about different relationships between classes.

WE'LL COVER THE FOLLOWING

Interaction Between Class Objects

By now, we've learned all we need to know about the definition and the behavior of a class. The concepts of **inheritance** and **polymorphism** taught us how to create dependent classes out of a base class. While inheritance represents a relationship between **classes**, there are situations where there are relationships between **objects**.

The next step for us is to use different class objects to create the design of an application. This means that independent class objects would have to find a way to interact with each other.

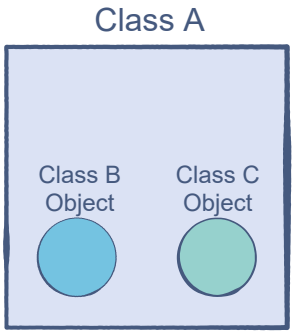


Relationships Between Classes

There are three main class relationships we need to know. We have studied the **IS A** relation in the Inheritance chapter. We'll study the other two below:

Part-of

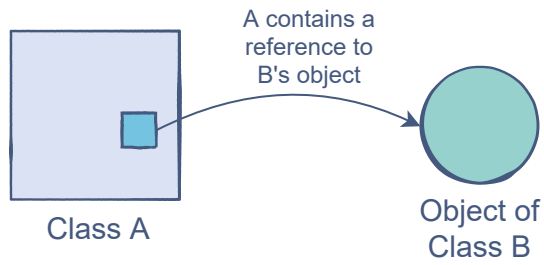
In this relationship, one class object is a **component** of another class object. Given two classes, *class A* and *class B*, they are in a **part-of** relation if a *class A* object is a *part of class B* object, or vice-versa.



Class A contains objects of Class B and C.

An instance of the component class can only be created inside the main class. In the example to the right, *class B* and *class C* have their own implementations, but their objects are only created once a class A object is created. Hence, **part-of** is a

dependent relationship.



The object of class exists independent of A.

Has-a

This is a slightly less concrete relationship between two classes. *Class A* and *class B* have a **has-a** relationship if one or both need the other's object to perform an operation, but both class objects can exist independently of each other.

This implies that a class **has-a** reference to an object of the other class but does not decide the lifetime of the other class's referenced object.

> Since Python compiles from top to bottom, make sure you have defined the class **before** creating an object of that class.

Association

In object-oriented programming, **association** is the common term for both the **has-a** and **part-of** relationships but is not limited to these. When we say that two objects are in an association relationship, this is a generic statement which means that we don't worry about the lifetime dependency between the objects.

In the next couple of lessons, we will dive into the specialized forms of association: aggregation and composition.

In the next lesson, you will learn about a technique for relating objects in Python: aggregation.