

Inheritance

...

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Lecture #8 out of 8

90 minutes

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Subtyping

Read and Watch

Chapter #1:
Subtyping

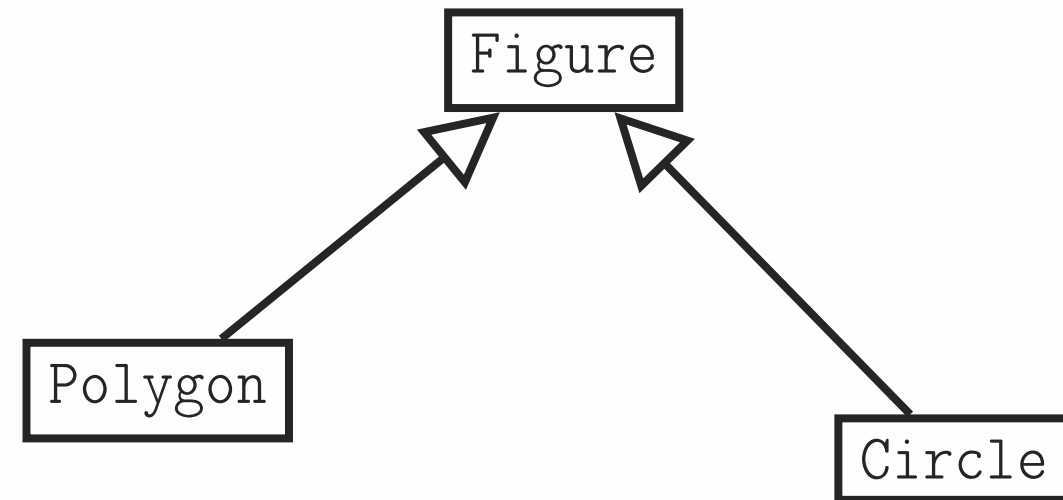


“If for each object o_1 of type S there is an object o_2 of type T such that for all programs P defined in terms of T , the behavior of P is unchanged when o_1 is substituted for o_2 , then S is a subtype of T ”

— Barbara Liskov, Keynote Address: Data Abstraction and Hierarchy, Addendum to the Proceedings on Object-oriented Programming Systems, Languages and Applications, 1987

Subtyping (Polymorphism)

```
1 interface Figure
2     float surface();
3
4 interface Circle extends Figure
5     float perimeter();
6
7 interface Polygon extends Figure
8     int sides();
9
10 void paint(Figure f)
11     float s = f.surface();
12     // ...
```



Circle \sqsubseteq Figure

Circle <: Figure

Parametric Polymorphism (Generics)

```
1 class StackOfStrings {  
2     push(String str) // ...  
3     String pop() // ...  
4  
5 class StackOfIntegers {  
6     push(Integer num) // ...  
7     Integer pop() // ...  
8  
9 var s1 = new StackOfStrings();  
10 s1.push("Hello, world!");  
11  
12 var s2 = new StackOfIntegers();  
13 s2.push(42);
```

```
1 class <T> Stack<T> {  
2     push(T item) // ...  
3     T pop() // ...  
4 }  
5  
6 var s1 = new Stack<String>();  
7 s1.push("Hello, world!");  
8  
9 var s2 = new Stack<Integer>();  
10 s2.push(42);
```

implementation inheritance vs subtyping

final classes – not welcome to extend

code reuse via composition vs reuse via inheritance

liskov substitution principle

two meanings of the word "inherit", per the dictionary

Inheriting means “receive (money, property, or a title) as an heir at the death of the previous holder.” Who is dead, you ask? An object is dead if it allows other objects to inherit its encapsulated code and data.

Chapter #2:

Read and Watch

Why extends is evil by Allen Holub (2003)

Inheritance Is a Procedural Technique for Code Reuse by me (2016)

Inheritance vs. Subtyping (Webinar #24) by me (2017)