Module 4.3:
"Composite"

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Agenda

- Introductory Example: Wincuburger Combos
- Challenges
- Implementing the Composite Pattern
- Pattern: Composite
- Overview of Composite Pattern

Introductory Example: Wincuburger Combos

```
class SingleItem
{
    public string Description { get; set; }
    public decimal Price { get; set; }
    public override string ToString() => $"{Description} [DKK {Price}]";
}
```

```
SingleItem burger = new SingleItem
  { Description = "Mic Bag Burger", Price = 25 };
...
SingleItem[] order = { burger, fries, drink, wrap, shake };

foreach (SingleItem item in order)
{
    Console.WriteLine( item );
}
```

Challenges

- How do we incorporate combos?
- Need a way to structure a recursive tree of elements and sub-elements

- Could we even support combo of combos?

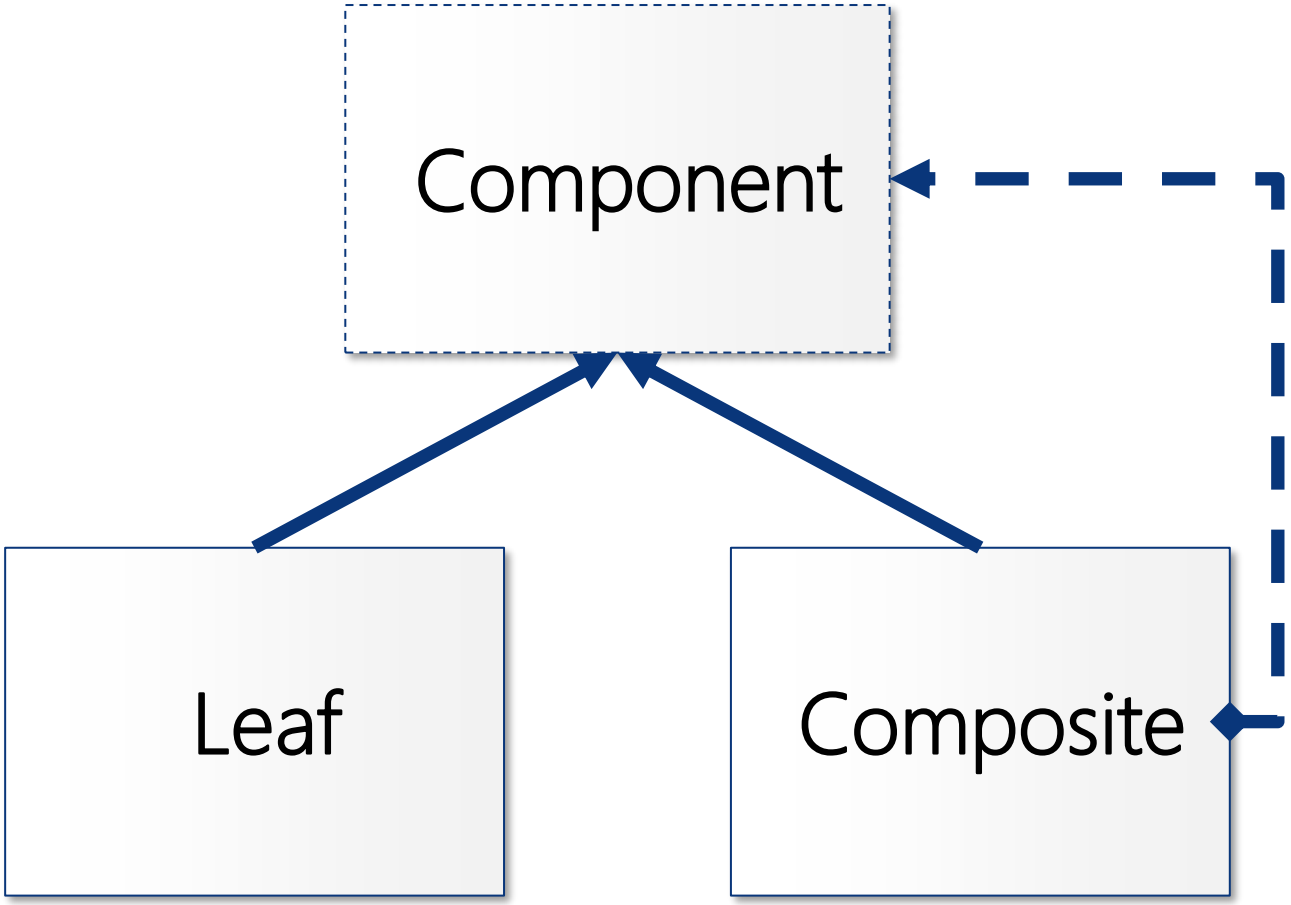
Pattern: Composite

- *Compose objects into tree structures to present part/whole hierarchies. Composite lets clients treat individual objects and compositions of objects uniformly.*

- Outline
  - Define the elements of a recursive tree-like structure
  - Treats elements and groups of elements alike

- Origin: Gang of Four

Overview of Composite Pattern



Overview of Composite Pattern

- Component
  - Interface or abstract base class
  - Contains elements common to Leaf and Composite instances
- Leaf
  - Contains a “basic” element with no sub-elements
- Composite
  - Contains a “composite” element sub-elements

Extensions

- The Composite Pattern can easily be generalized
  - Several distinct (or richer) Composite classes
  - Several distinct (or richer) Leaf classes
- Use the Iterator Pattern to “flatten” tree-like structure to sequences of Leaf instances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