Strategy:
A Behavioral Design Pattern

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What is a Design Pattern?

A design pattern deals with interactions between individual software components

They are recurring solutions to common problems of design!

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Types of Design Patterns

- Creational
- Structural
- Behavorial
  - **Strategy** is a behavioral design pattern
    - Also know **Policy pattern**

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Strategy

In a Strategy design pattern, you will:

- Define a family of algorithms
- Encapsulate each one
- Make them interchangeable

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You should use Strategy when:

- You have code with a lot of algorithms
- You want to use these algorithms at different times
- You have algorithm(s) that use data the client should not know about

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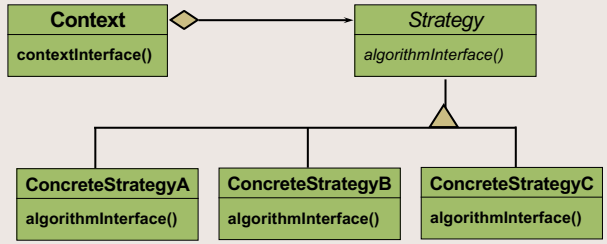
Strategy Class Diagram



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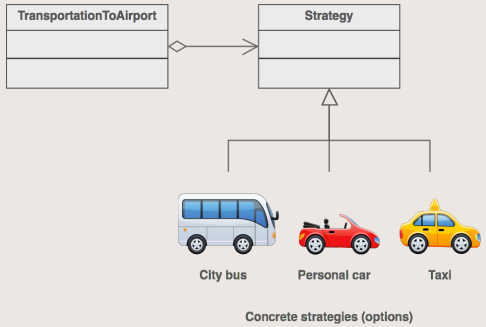
Example



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Strategy vs. Subclassing

- Strategy can be used in place of subclassing
- Strategy is more dynamic
- Multiple strategies can be mixed in any combination where subclassing would be difficult

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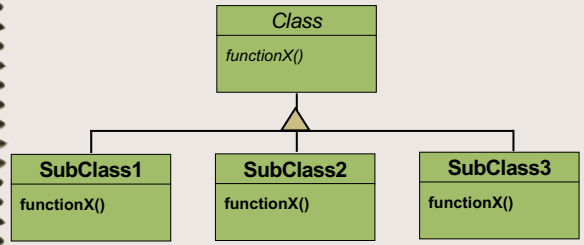
Subclassing



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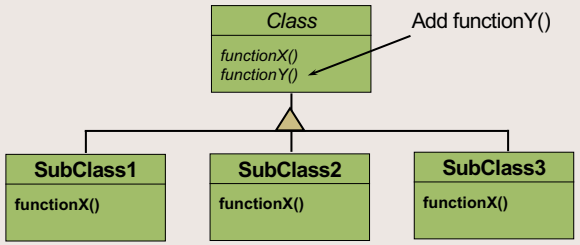
Add a function



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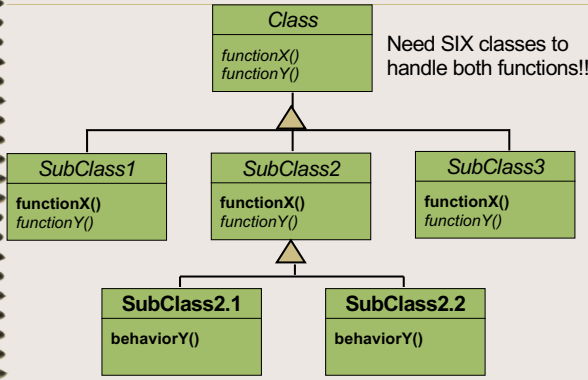
What happens?



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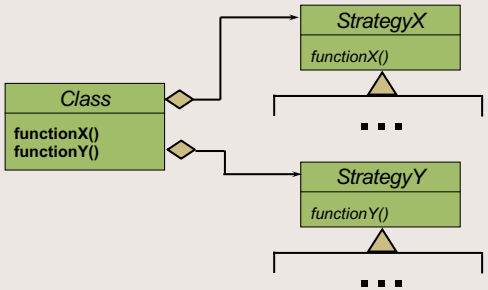
Strategy makes this easy!



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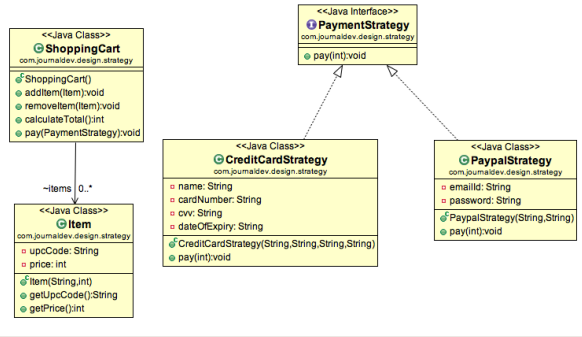
Example: Payment strategy



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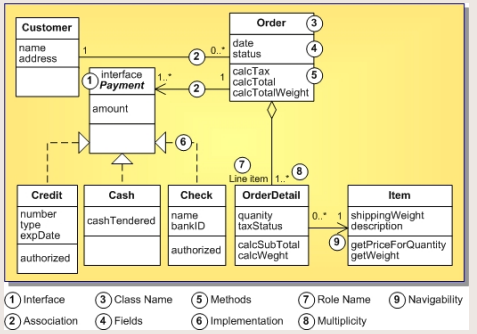
Payment strategy: More…



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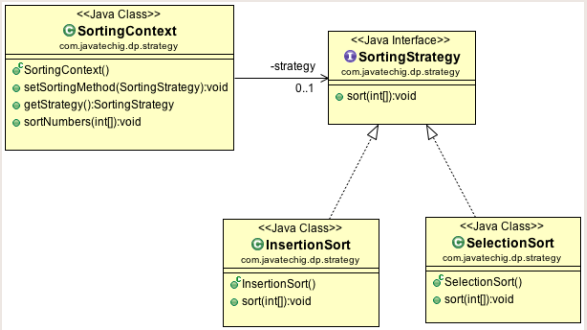
Example: Sort strategy



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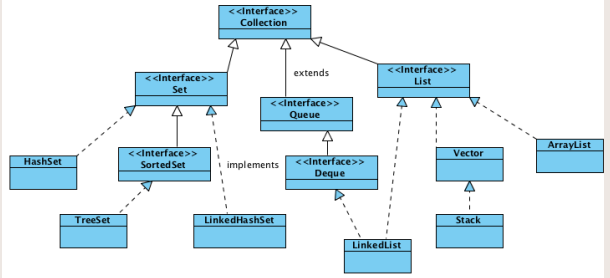
Example: Java API collection Strategy for sorting???



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Benefits of Strategy

- Eliminates conditional statements
  - Can be more efficient than case statements
- Choice of implementation
  - Client can choose among different implementations with different space and time trade-offs

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Benefits of Strategy

- Families of related algorithms
- Alternative to subclassing
  - This lets you vary the algorithm dynamically, which makes it easier to change and extend
  - You also avoid complex inheritance structures

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Drawbacks of Strategy

- Clients must be aware of different strategies
  - Clients must know how strategies differ so it can select the appropriate one
- Communication overhead between strategy and context
  - Sometimes the context will create and initialize parameters that are never used

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Drawbacks of Strategy

- Increased number of objects
  - if the algorithm differences are simple, the extra classes add extra complexity

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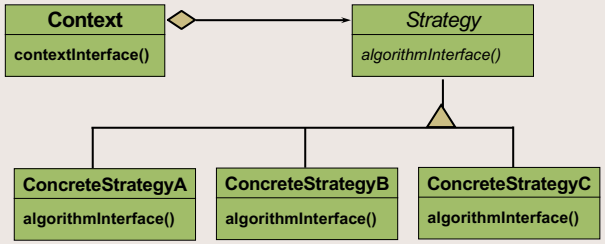
Implementation Issues



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Implementation Issues

- Concrete Strategy needs efficient access to data
- Should you use a template?
- Should you make strategy objects optional?

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Thank you to

Provider of the PowerPoint graphs:

http://vik.ktu.lt/moduliai/

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What have we learned today about strategy?

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