

## Design Patterns II Summary

- Chain of Responsibility Pattern
- Composite Pattern

April 4, 2009

Slides by Mark Hancock  
(adapted from notes by Craig Schock)

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You will also be able to describe a **chain of responsibility** design pattern and a **composite** design pattern.

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## Chain of Responsibility

- Basic idea: a **request** is passed to the first object in a chain. The first object either **handles** the request, or **passes** it to the next object. If it's passed, the second object either handles it or passes it to the third...
- If no object handles the request, an error may occur.

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## Chain of Responsibility



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What kind of collection would you use for this set of objects?

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What do all of the objects have in common?

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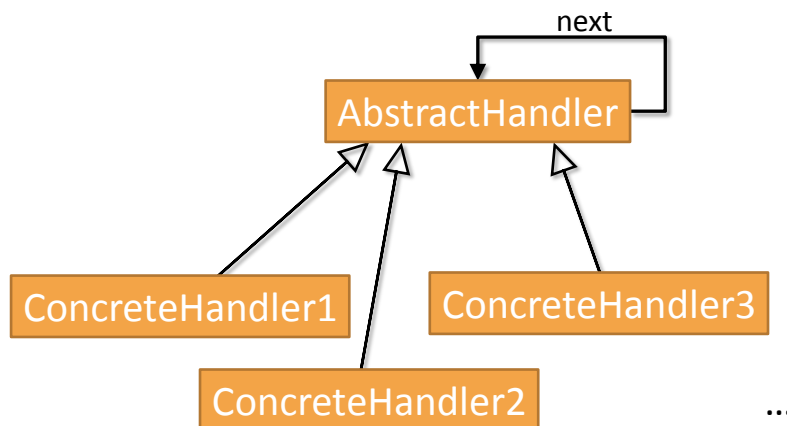
How could you generalize this commonality?

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## Class Model



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Is this design pattern **creational**, **behavioural**,  
or **structural**?

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**Exercise:** Work in groups and identify the chain  
of responsibility within the Display class for  
assignment #4.

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# Composite Design Pattern

- Basic idea: groups of objects can be treated in the same way as individual objects.
- Imposes a **hierarchy** on the object model

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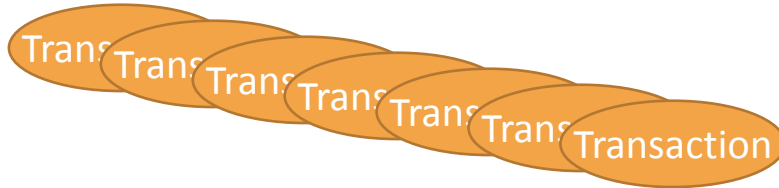
Has anyone ever used the “group” or “ungroup” functionality in a drawing program, or even PowerPoint/Word?

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## Example: Transactions per Day



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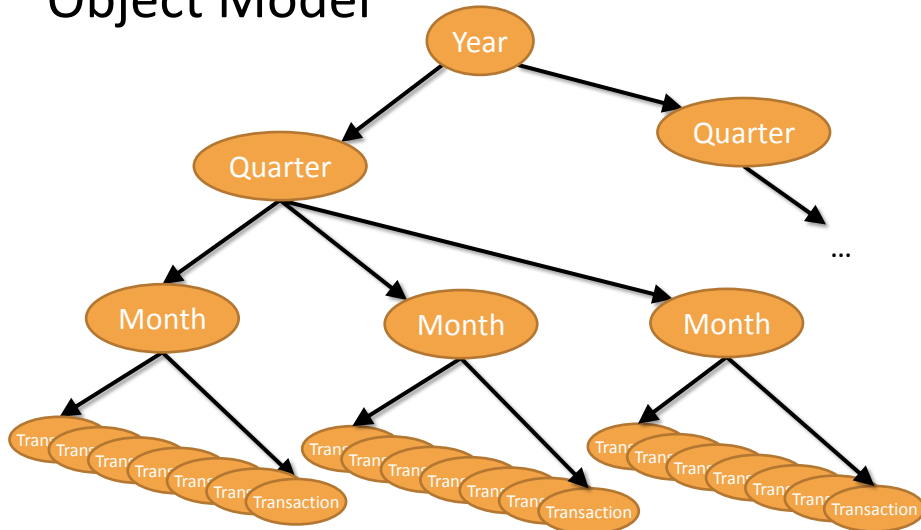
How would you compute the revenue for that day?

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## Object Model



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How would you calculate the revenue for a month, quarter, or year?

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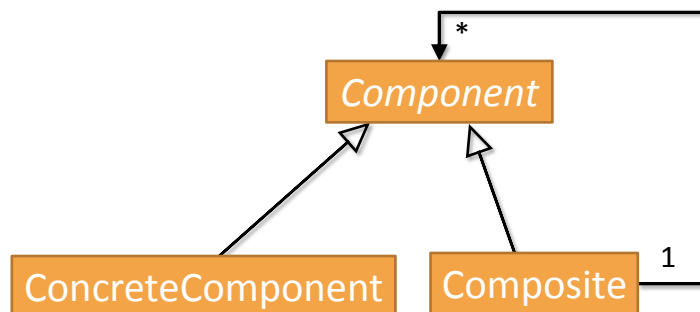
What can we generalize from the month, day,  
and year classes?

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## Class Model



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**Exercise:** In groups, use the composite design pattern to create a program that can calculate the amount of energy being used by a specific electronic device, a specific home, a specific building, and/or the city of Calgary.

**Part 1:** draw the object model

**Part 2:** create the Java classes for your program (don't implement each method)

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## Assignment #4 Discussion

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## Display class

- Important Methods:
  - Display constructor
  - pause
  - drawReactor
- You will have to write code that continually performs simulation steps on each reactor component.

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## Next Class

- Multi-Threading

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