# CS 635 Advanced Object-Oriented Design & Programming
Spring Semester, 2007
Doc 6 Strategy
Feb 15, 2007

## Reference

Design Patterns: Elements of Resuable Object-Oriented Software,
Gamma, Helm, Johnson, Vlissides, Addison-Wesley, 1995, pp. 315-324

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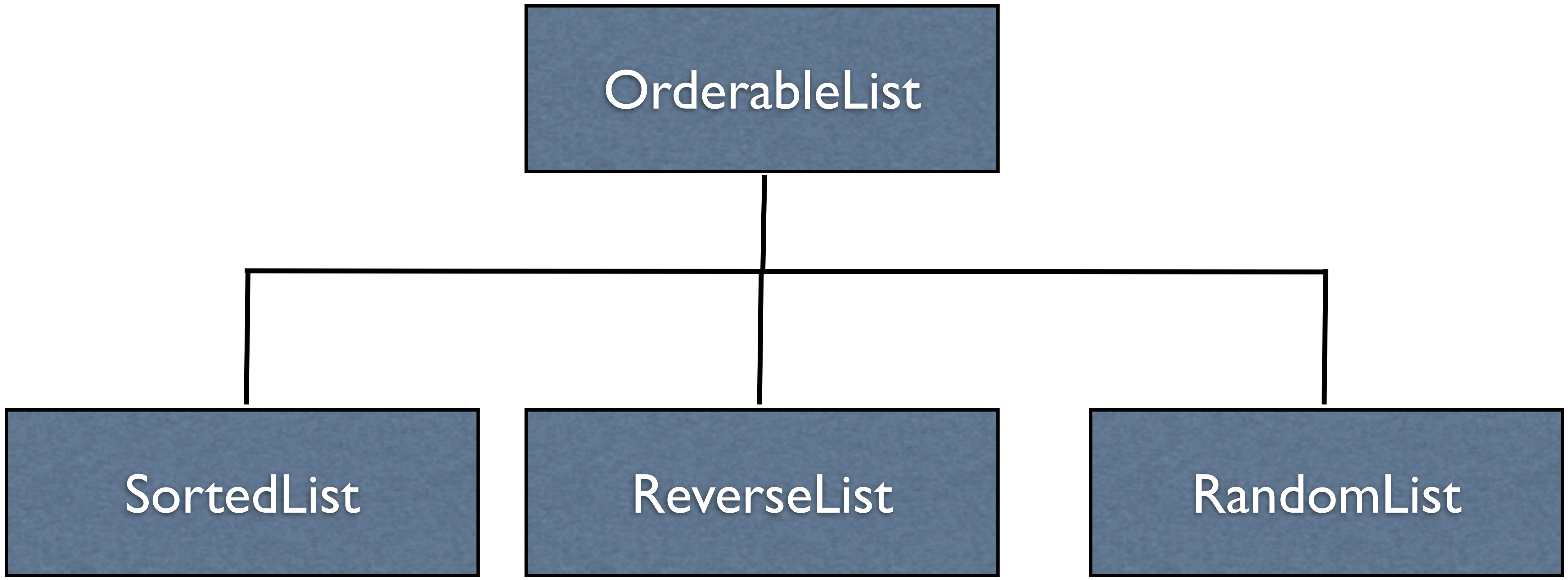
## Favor Composition over Inheritance

## Orderable List

Sorted
Reverse Sorted
Random


OrderableList
SortedList
ReverseList
RandomList

## One size does not fit all

# Issue 1 - Orthogonal Features

Order

Sorted

Reverse Sorted

Random

Threads

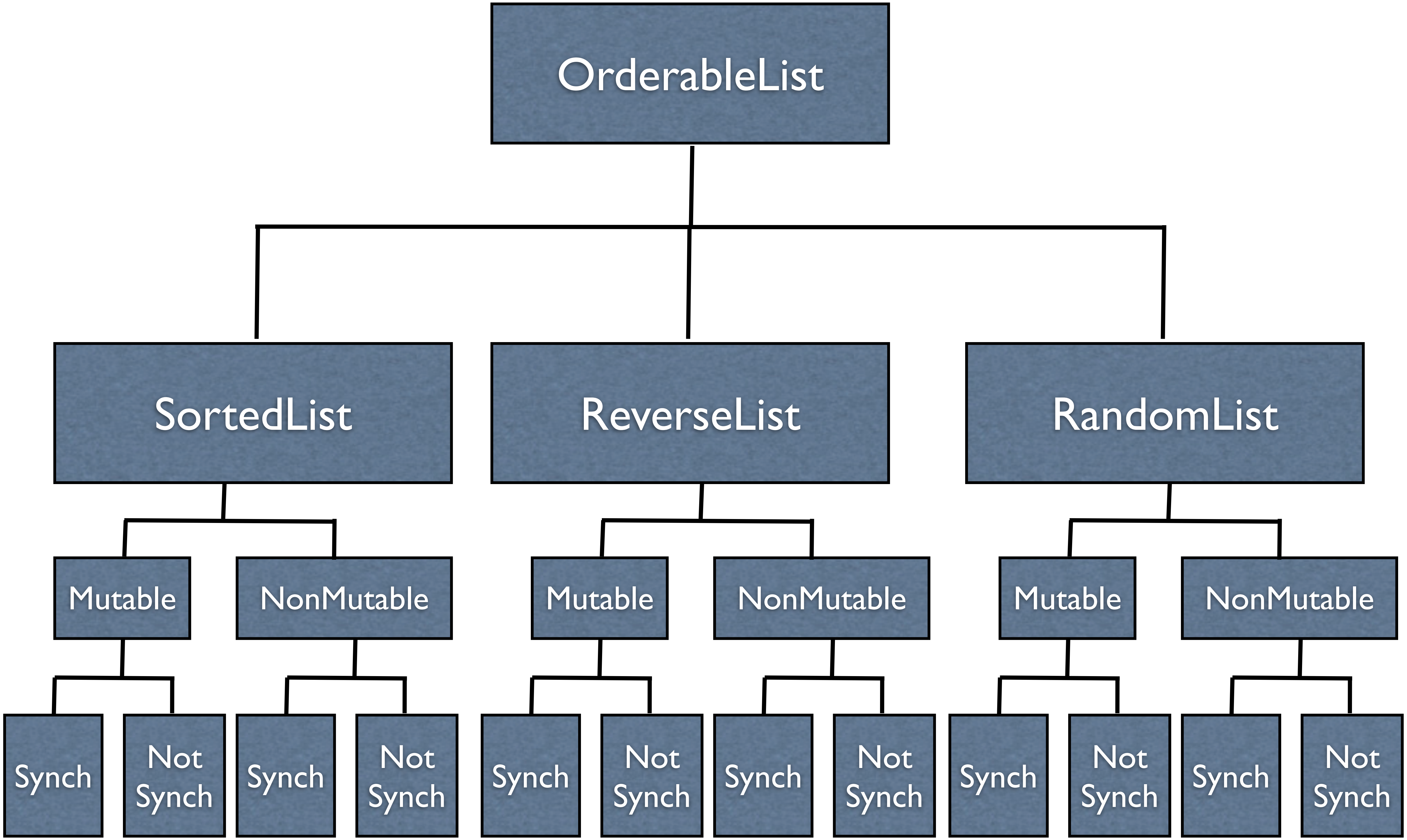
Synchronized

Unsynchronized

Mutability

Mutable

Non-mutable


OrderableList
SortedList
ReverseList
RandomList
Mutable
NonMutable
Mutable
NonMutable
Mutable
NonMutable
Synch
Not Synch
Synch
Not Synch
Synch
Not Synch
Synch
Not Synch
Synch
Not Synch
Synch
Not Synch

## Issue 2 - Flexibility

]

## Change behavior at runtime

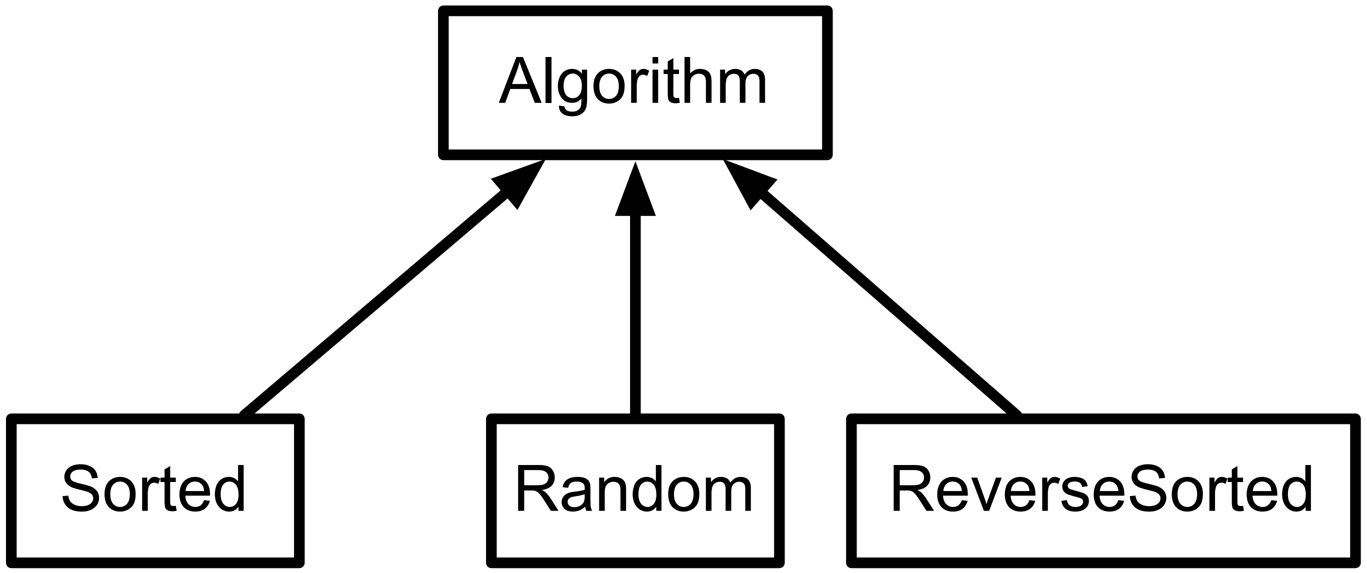
```
OrderableList x = new OrderableList();
x.makeSorted();
x.add(foo);
x.add(bar):
x.makeRandom();
```

## Configure objects behavior at runtime

## Strategy Pattern

```
class OrderableList {
        private Object[ ] elements;
        private Algorithm orderer;


        public OrderableList(Algorithm x) {
                orderer = x;
        }
```



The algorithm is the operation

Context contains the data

How does this work?

## Example - Java Layout Manager

```
import java.awt.*;
class  FlowExample  extends Frame  {

    public FlowExample( int  width, int height ) {
        setTitle( "Flow Example" );
        setSize( width, height );
        setLayout( new FlowLayout( FlowLayout.LEFT) );

        for ( int label = 1; label < 10; label++ )
            add( new Button( String.valueOf( label ) ) );
        show();
    }

    public  static  void  main( String  args[] ) {
        new  FlowExample( 175, 100 );
        new  FlowExample( 175, 100 );
    }
}
```

## Example - Smalltalk Sort blocks

```
| list |
list := #( 1 6 2 3 9 5 ) asSortedCollection.
Transcript
	print: list;
	cr.
list sortBlock: [:x :y | x > y].
Transcript
	print: list;
	cr;
	flush.
```

## Costs

Clients must be aware of different Strategies

Communication overhead between Strategy and Context

Increase number of objects

## Benefits

Alternative to subclassing of Context

Eliminates conditional statements

Replace in Context code like:

```
switch  ( flag ) {
    case A: doA(); break;
    case B: doB(); break;
    case C: doC(); break;
}
```

With code like:

```
strategy.do();
```

Gives a choice of implementations