CSE12 - Lecture 25 - B00

Monday, November 28, 2022 9:00 AM

PA6 Late/Resubmit → due tomorrow

PA7/PA8 Late/Resubmit → due Friday

Final Exam → Saturday @ 8am

Wed Lecture → Extra Credit → quiz beginning of lecture

Composition over Inheritance

Design Patterns
https://en.wikipedia.org/wiki/Design_Patterns
https://en.wikipedia.org/wiki/Software_design_pattern

Familiar Design Patterns

Iterator - Provide a way to access the elements of an object sequentially without exposing its underlying representation.

Adapter (Wrapper) Pattern - Convert the interface of a class into another interface clients expect.

Queues Stacks → Array List

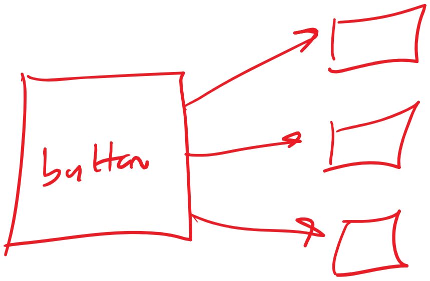
Object Pool - Avoid expensive acquisition and release of resources by recycling objects that are no longer in use.

Factory Method - create objects by calling a factory method rather than by calling a constructor.

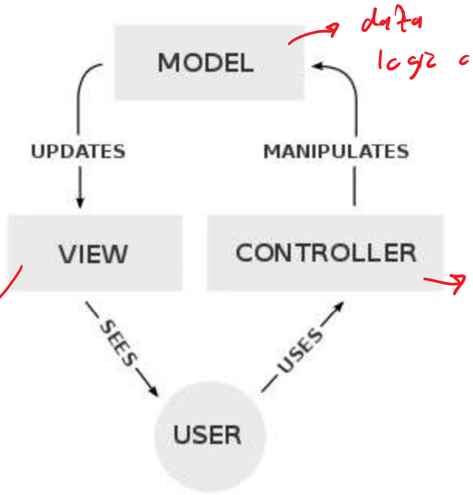
Lazy Initialization - Tactic of delaying the creation of an object, the calculation of a value, or some other expensive process until the first time it is needed.

Singleton - Ensure a class has only one instance, and provide a global point of access to it.

Observer or Publish/subscribe - Define a one-to-many dependency between objects where a state change in one object results in all its dependents being notified and updated automatically.



Model–view–controller - Commonly used for developing user interfaces that divide the related program logic into three interconnected elements (became popular for designing web applications)
https://en.wikipedia.org/wiki/Model%E2%80%93view%E2%80%93controller

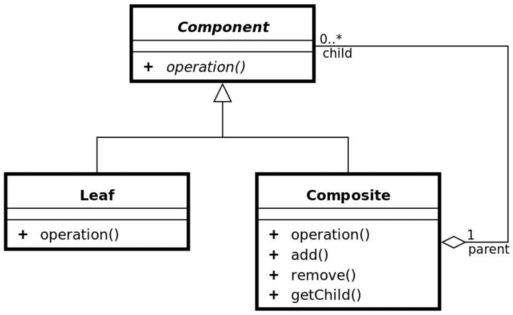


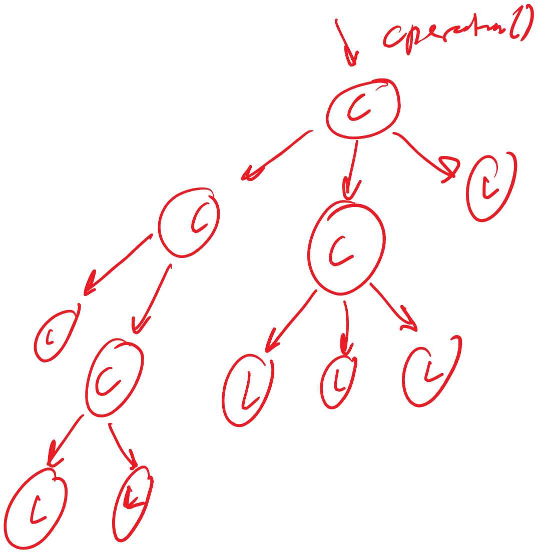
→ data
logic or business rules

GUI

→ input
↳ button click
↳ keyboard
↳ mouse movement
↳ touch

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





```
class Node<T> {
  T value;
  Node<T> next;
private  ~~public~~ Node(T value, Node<T> next) {
    this.value = value;
    this.next = next;
  }
private static ArrayList<Node<T>> pool = new ArrayList<>();
public static createNode(T value, Node<T> next) {
    if (pool.size() > 0) { ~~return pool.remove(0);~~ }
    return new Node(value, next);
}
                                        {
                                        Node<T> node = pool.remove(0);
                                        Node.value = value;
                                        Node.Next = Next;
                                        return node;
                                        }
public static removeNode(Node<T> nod) {
}   pool.add(node);
}
public class LList<E> implements List<E> {
  Node<E> front;
  int size;

                                     Node<E>?
  public LList() {
    this.front = ~~new Node<E>(null, null);~~ Node.createNode(null,null);
  }

  public void prepend(E s) {
    this.front.next = ~~new Node<E>(s, this.front.next);~~ Node.createNode(s, this.front.next);
    this.size += 1;
  }

  public void remove(int index) {
    Node<E> current = this.front;
    for(int i = 0; i < index; i += 1) {
      current = current.next;
    }
  ->  Node.removeNode(current.next);
    current.next = current.next.next;
    this.size -= 1;
  }

  public void add(E s) {
    Node<E> current = this.front;
    while(current.next != null) {
      current = current.next;
    }
    current.next = ~~new Node<E>(s, null);~~ Node.createNode(s, null);
    this.size += 1;
  }
}
```

```
class SingleObject {
 private static SingleObject singleton;

private
 ~~public~~ SingleObject() {
   //initialization
 }
 public static SingleObject get() {
    if ( singleton == null) {
       singleton = new SingleObject();
    }
}
    return singleton;
 }
```

```
SingleObject obj = SingleObject.get();
```

```
interface SomeEvent {
 public void fire();
}


class SomeEventHandler implements SomeEvent {
 public void fire() {
   System.out.println("SomeEventHandler does some stuff").
 }
}


class OtherEventHandler implements SomeEvent {
 public void fire() {
   System.out.println("OtherEventHandler does some stuff").
 }
}


class Worker {
 List<SomeEvent> handlers;

 void listen(SomeEvent handler) {
   handlers.add(handler);
 }
 //void unlisten(SomeEvent handler) {}

 void actionHappened() {
   for (SomeEvent handler: handlers) {
     handler.fire();
   }
 }
}
void run ( ) {
   if (      ) {
     actionHappened();
   }
}
```

```
SomeEvent evt1 = new SomeEventHandler();
SomeEvent evt2 = new OtherEventHandler();

Worker worker = new Worker();

~~worker.run();~~
worker.listen(evt1);
worker.listen(evt2);
worker.run();
```

2

3