Comp-304 : Adapter (cont.)
Lecture 24

Alexandre Denault
Original notes by Hans Vangheluwe
Computer Science
McGill University
Fall 2007

Assignment 4

Is due today, at 11:55.
However ...

Assignment 5

- Due date: March 19th
- Team size == 1
- In this assignment, you will implement the Command Pattern for the physical simulation system you worked on in assignment 1.
- This is probably one of the shortest assignment I've ever given, the solution being less than 150 lines of code.
- But beware assignment 6, it's going to be a long one.

jMonkey Engine

- jME (jMonkey Engine) is a high performance scene graph based graphics API.
  - The scenegraph allows for organization of the game data in a tree structure.
  - Typically, these nodes are organized spatially to allow the quick discarding of whole branches for processing.
- jME was built to fulfill the lack of full featured graphics engines written in Java.

Mouse Handling in jMonkey

- Mouse handling in jMonkey is slightly different.
- For keyboard input, it uses an action handler system similar to the Command Pattern.
  - The user can specify the behavior of his application by implementing an InputHandler.
  - He then gives behavior to the InputHandler by registering InputAction objects.
- For mouse input, we just need to register a different kind of listener.

MouseInputListener

```
private class MouseListener implements MouseInputListener{

   public void onButton(int button, boolean pressed,
       int x, int y) {

       if(pressed)
          dispplay.fireMousePressedEvent(x, y,
            getMouseButton(button), 1);
       else
          dispplay.fireMouseReleasedEvent(x, y,
            getMouseButton(button), 1);
   }

   public void onMove(int xDelta, ...
   public void onWheel(int wheelDelta, ...
}
```

Java RMI

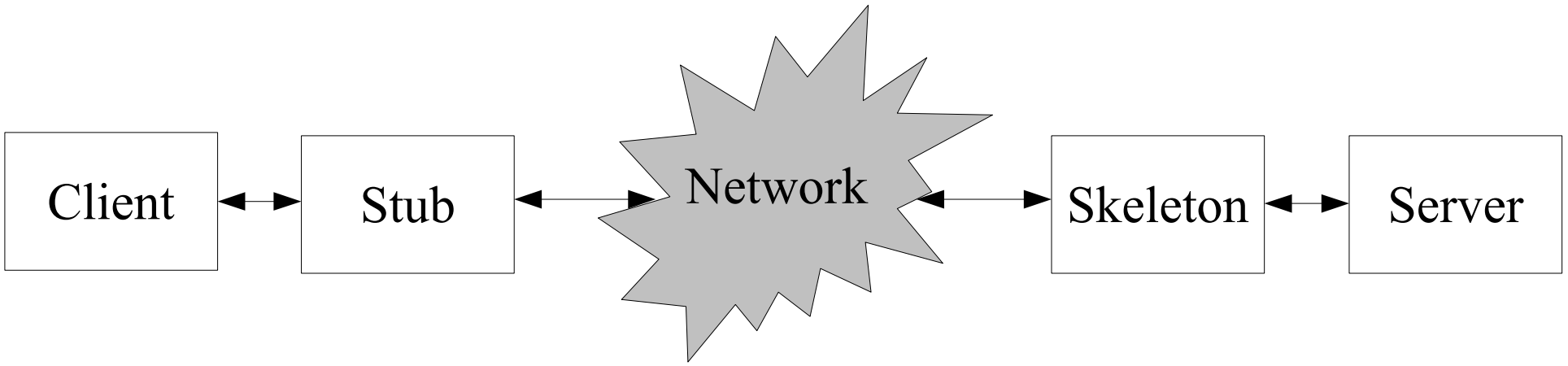
- Another example of the Adapter pattern is Java RMI.
- To better understand this example, we need to take a look at Java RMI.

Java RMI explained

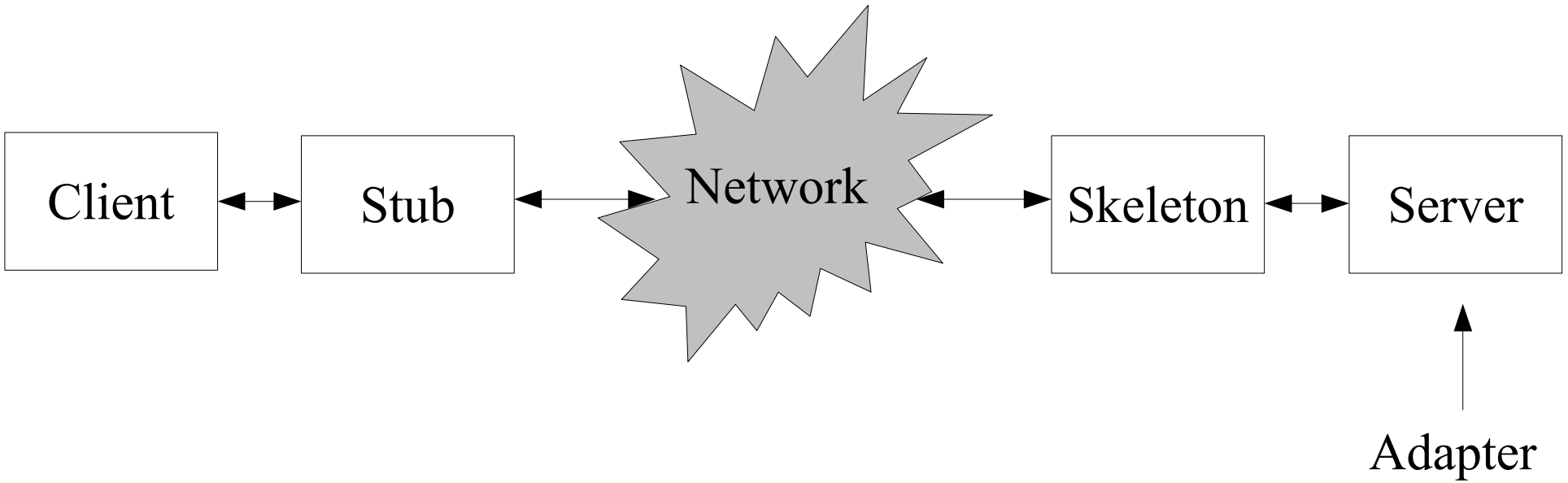
- RMI stands for Remote Method Invocation.
- In simple terms, RMI allows you to execute methods on objects found on a different machine.
- It is similar to other method invocation system, such as CORBA (Common Object Request Broker Architecture).
- RMI makes invoking methods transparent:

```
LinkList remoteList = RMI.getObject("nameoflist");
remoteList.add(new Integer(1));
```

Components of a RMI System



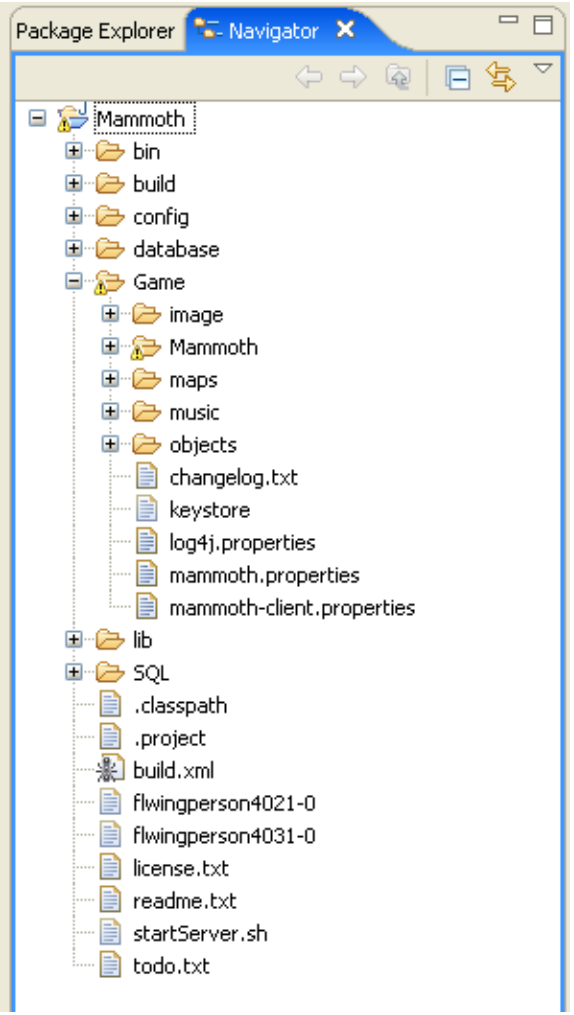
Components of a RMI System

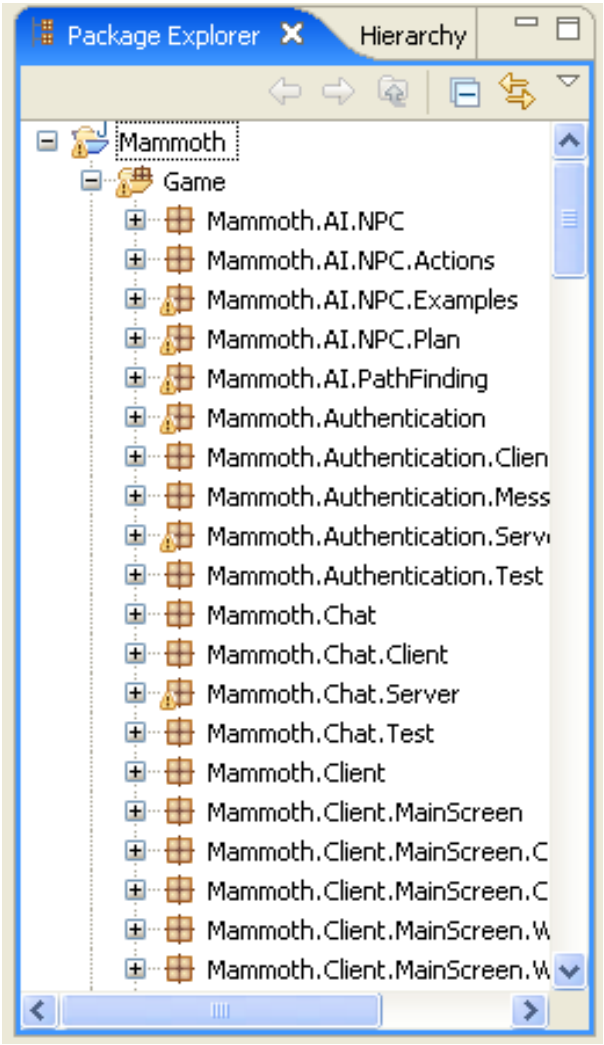


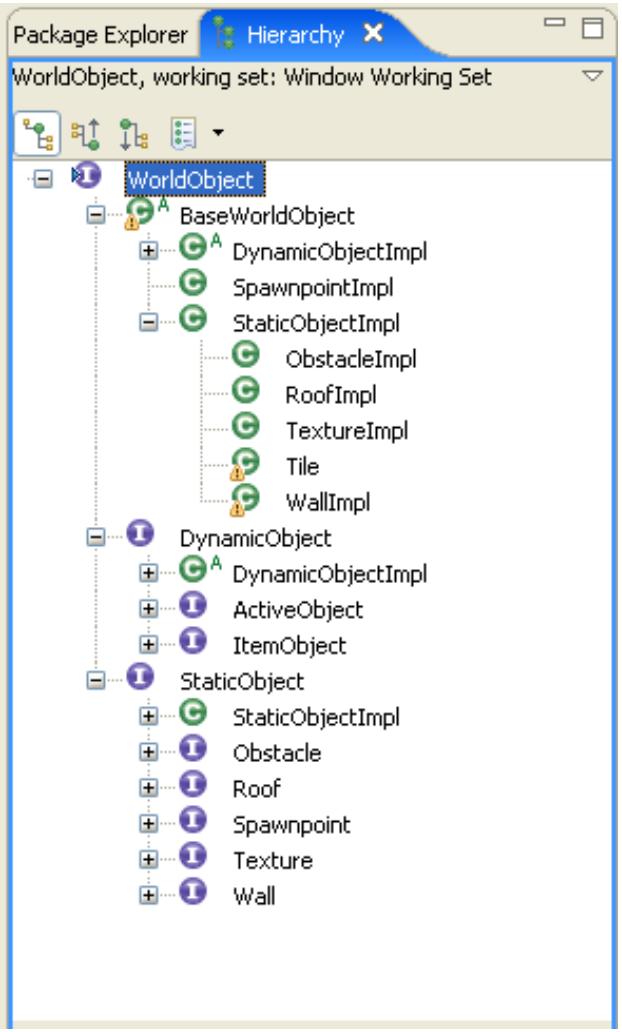
Remote Objects

- Objects hosted on the server must implement the java.rmi.Remote interface.
- However, you might not want to modify your existing object.
- Thus you need an adapter.

Tree Widgets







Pluggable Adapters

- A class is more reusable when you minimize the assumptions other classes must make to use it.
- By building interface adaption into a class, you eliminate the assumption that the other classes see the same interface.
- In other words, interface adaptation lets us incorporate our class into existing systems that might expect different interfaces to the class.

In our example

- Our example showed three example of tree widgets in Eclipse.
- Each of these widget showed a different tree structure:
  - Files
  - Packages
  - Type Hierarchy
- However, each of these tree will have their own data structure.
- So how do I build a tree widgets that works with any type of tree class.

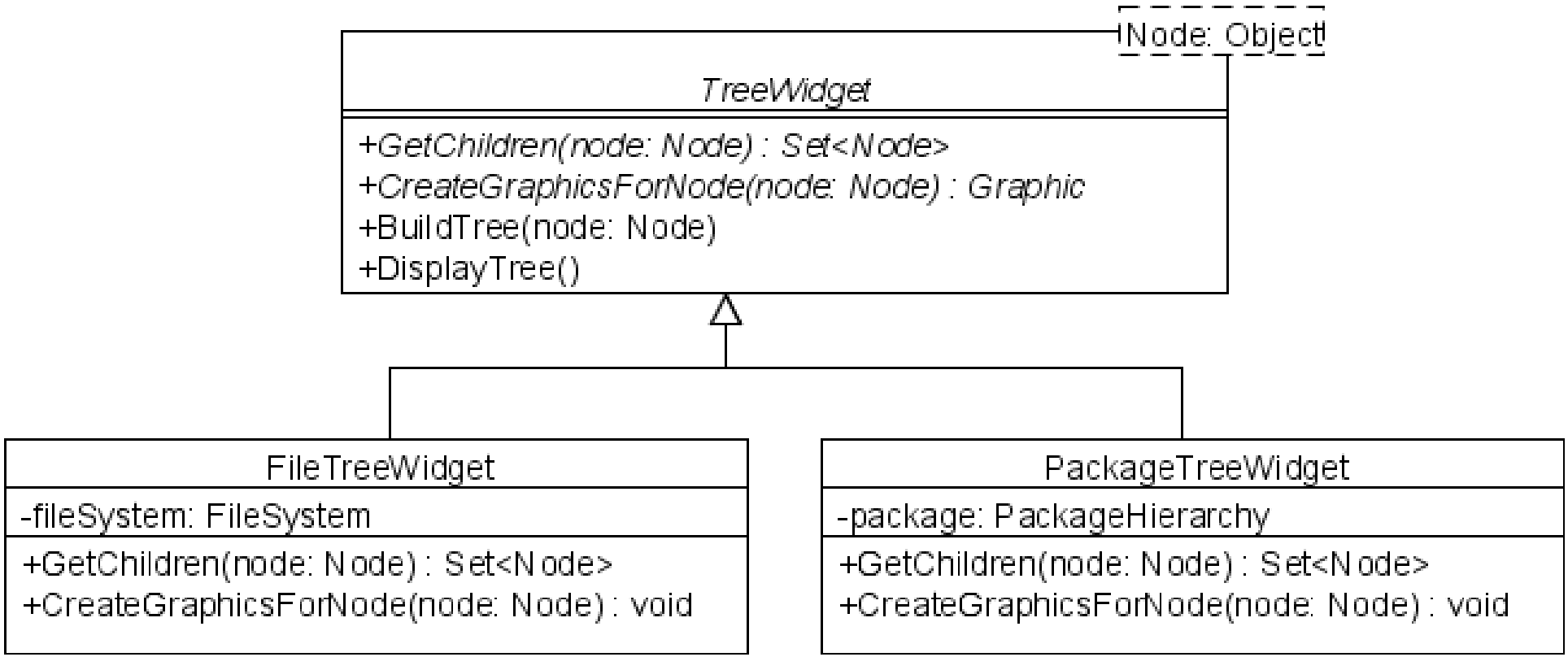
First Step

- First, you must find a “narrow” interface for the Adaptee.
  - The smallest subset of operations that let us do the adaptation.
- The “narrower” the interface, the easier the adaptation.
- But what do I need to know about a tree to display it?

To draw a tree

- I need two functions:
  - GetChildren(node: Node) : Set<Node>
  - CreateGraphicsForNode(node: Node) : void
- But how do I implement this?

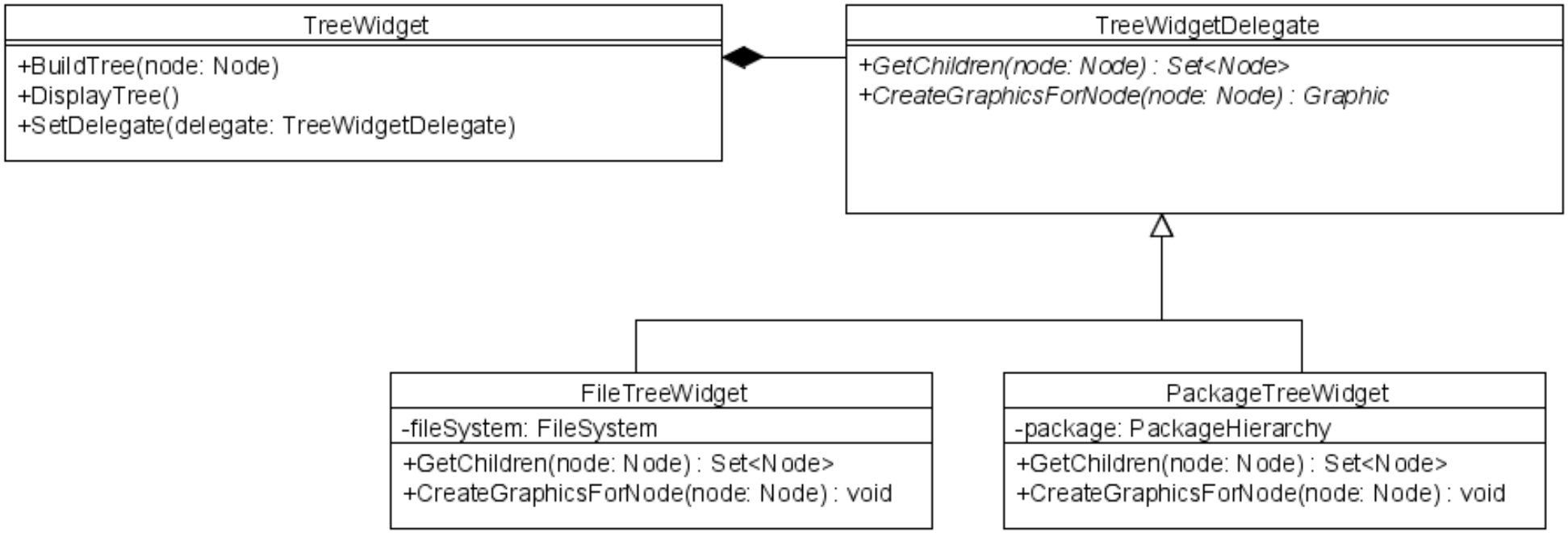
Using Abstract Operations



BuildTree(node: Node)

```
children = GetChildren(N)
for each child in children
    graphic.add(CreateGraphicsForNode(child))
    BuildTree(child)
```

Using Delegate Objects



BuildTree(node: Node)

```
children = delegate.GetChildren(N)
for each child in children
   graphic.add(delegate.CreateGraphicsForNode(child))
   BuildTree(child)
```