UNIT II
ADVANCED DYNAMIC WEB CLIENT SIDE PROGRAMMING
Google Web Toolkit (GWT)

Introduction

- Desktop client-server applications and their drawbacks.

- Static-only Web pages
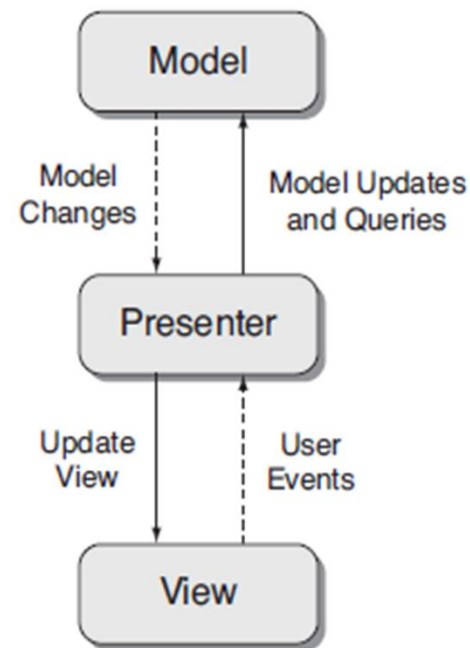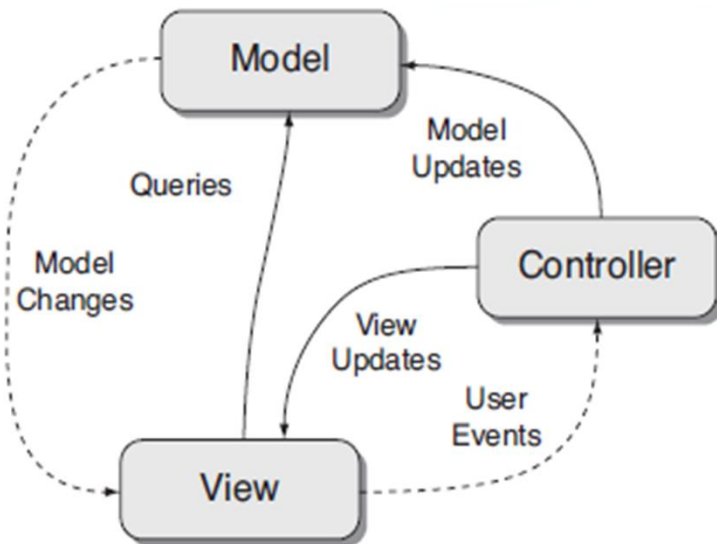
- Introduction of Web applications

What is GWT?

- Powerful web application development toolkit

  – Write -> Debug/Test -> Optimize -> Run

- Primarily Java -> JavaScript, HTML, AJAX

- Cross-Browser support.

The 'Right' Design Pattern

- What's the right design pattern for a GWT app?

Client/Server Communication

- Remote Procedure Calls (RPC)

    – Asynchronous

- Different mindset

- 3 Components needed in GWT for RPC

    – Interface for the service (header)

    – Implementation of interface

    – Asynchronous interface for Client

Serialization

- Needed for RPC

- Serialization is the process of packaging the contents of an object so that it can (be) moved from one application to another application or stored for later used.

Serialization

- Must satisfy at least one of the following requirements.

  – It is a primitive type (int, char, boolean, etc.)

  – It is an array of serializable types

  – A class is serializable if it meets these three requirements:

    - It implements either Java Serializable or GWT's 'IsSerializable' interface, either directly, or because it derives from a superclass that does.

    - Its non-final, non-transient instance fields are themselves serializable, and

    - It has a default constructor

The 'Back' Button Problem

- GWT vs. the 'Back' button.

  - URL doesn't change

- Handling the problem

  - The History Class

  - Tokens

Compilation

- One of the most advanced features

- Optimizations

- Three output styles

    – Obfuscated

    – Pretty

    – Detailed

Optimizations

- Major selling point of GWT

  – Dead Code Elimination

  – Constant Folding

    - Window.alert("Hello " + "World") -> $wnd.alert("Hello World")

  – Copy Propagation

  – String Interning

  – Code In-Lining
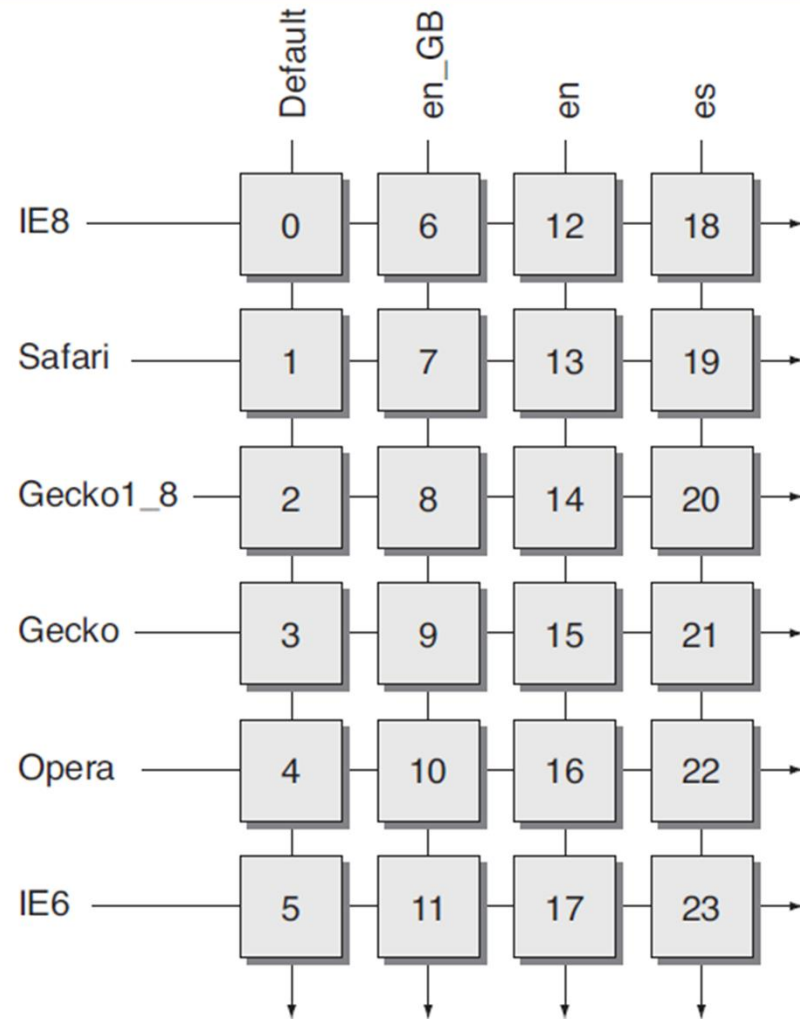
Optimizations

- ## Code splitting

```java
public class Hello implements EntryPoint {
  public void onModuleLoad() {
    Button b = new Button("Click me", new ClickHandler() {
      public void onClick(ClickEvent event) {
        Window.alert("Hello, AJAX");
      }
    });

    RootPanel.get().add(b);
  }
}
```

```java
public class Hello implements EntryPoint {
  public void onModuleLoad() {
    Button b = new Button("Click me", new ClickHandler()
      public void onClick(ClickEvent event) {
        GWT.runAsync(new RunAsyncCallback() {
          public void onFailure(Throwable caught) {
            Window.alert("Code download failed");
          }

          public void onSuccess() {
            Window.alert("Hello, AJAX");
          }
        });
      }
    });

    RootPanel.get().add(b);
  }
}
```
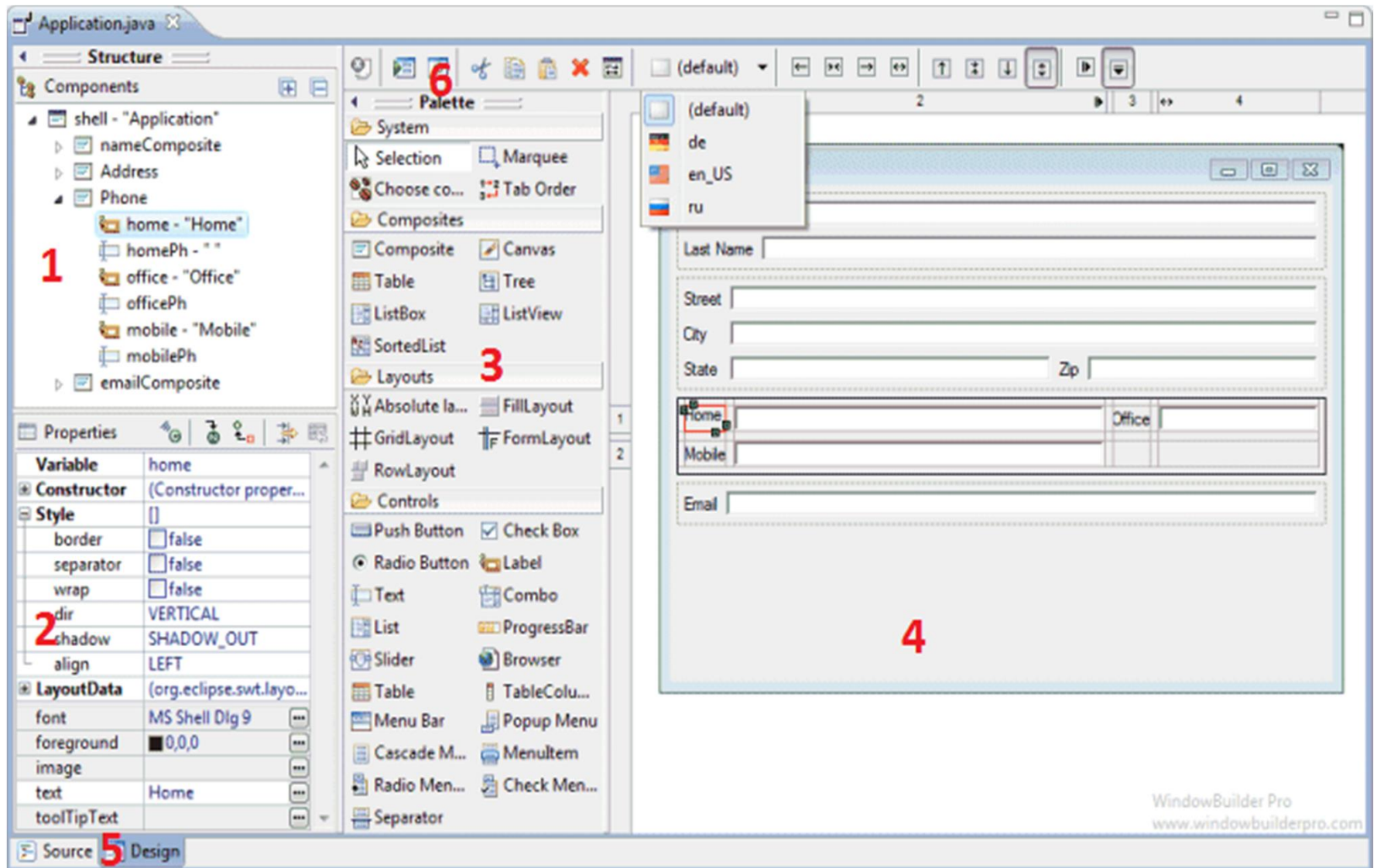
Permutations

24 Total Permutations

6 Browser types and 4 locales

GWT Designer

- Easily build the GUI

- Very little CSS experience needed

- Drag and Drop

- Design Preview

- Many included Widgets and Panels

GWT Designer

Panels

- Panels contain widgets and other panels.

- Define layout

- >15 Panels available each with own pros and cons.

Basic Panels
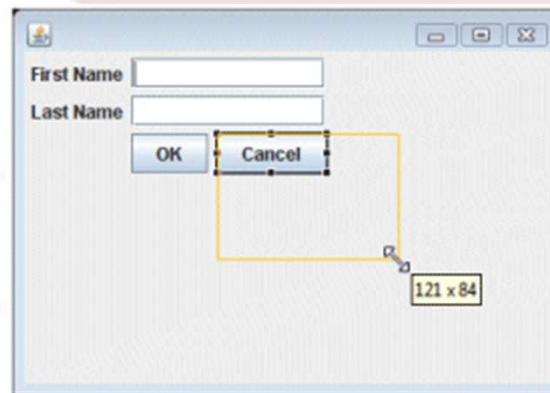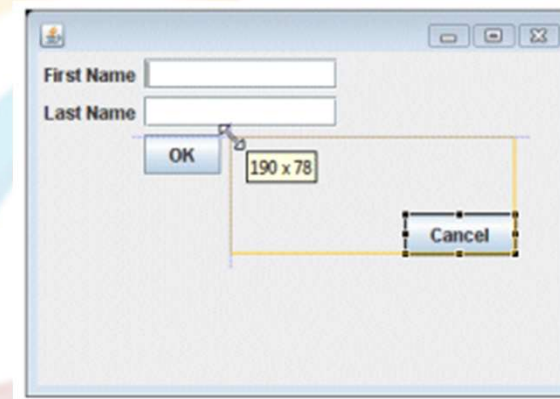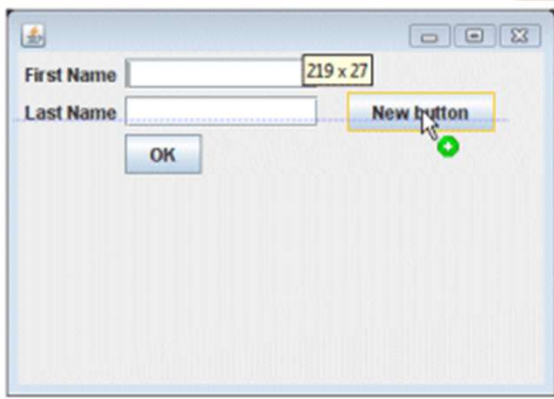
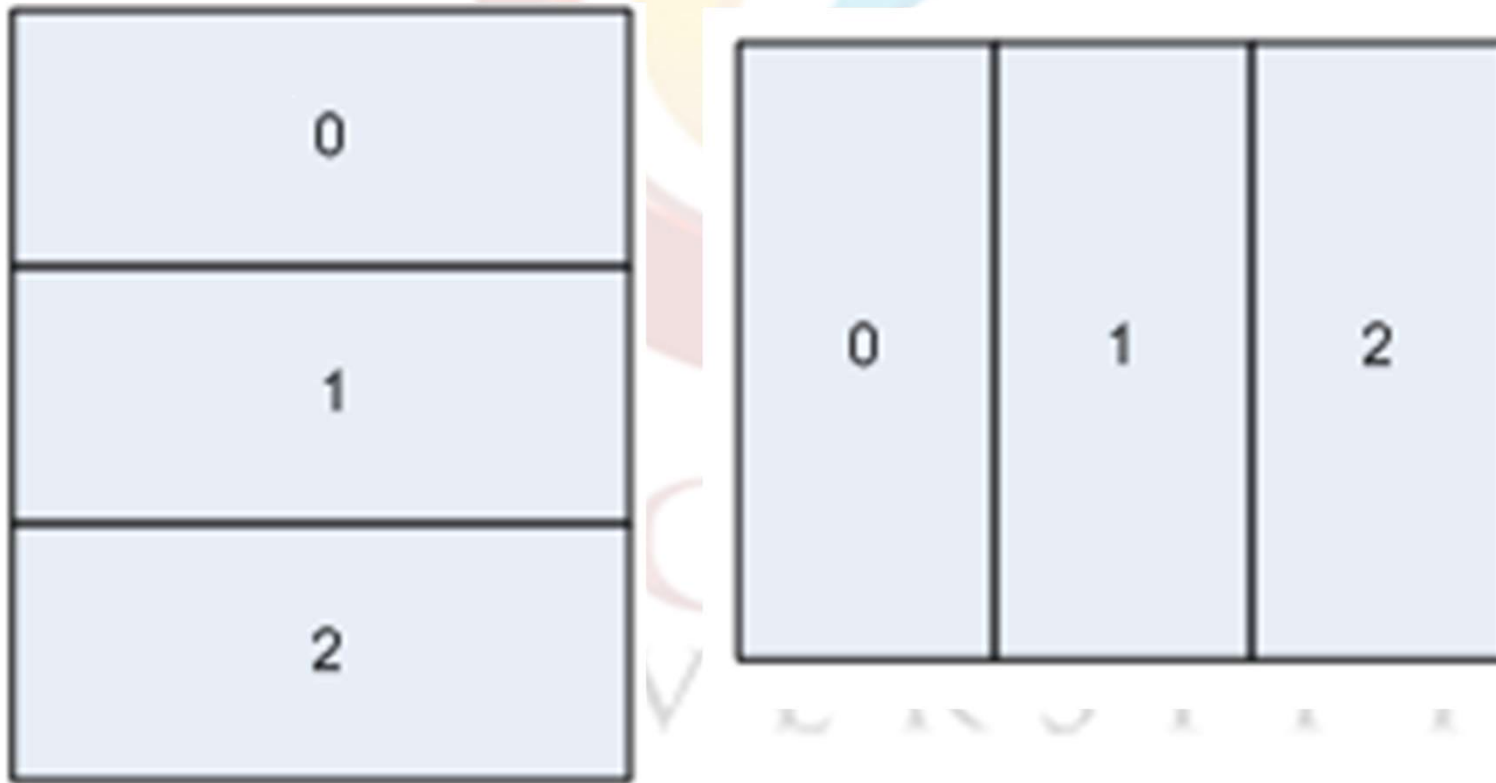- Root Panel

  – Top-Most Panel

  – Automatically created

  – HTML <body> element

Basic Panels

- ## Absolute Panel

Basic Panels
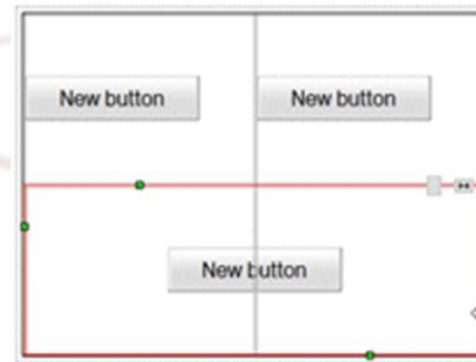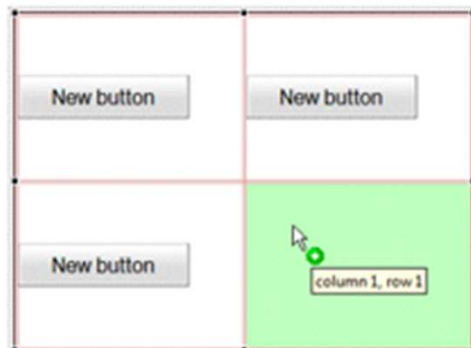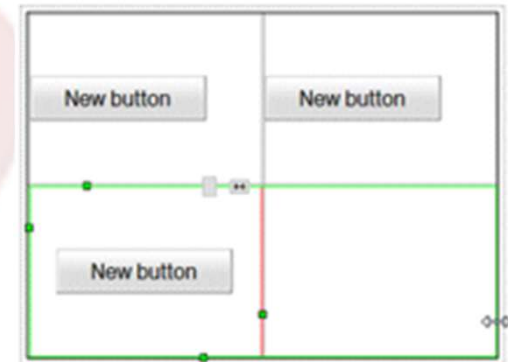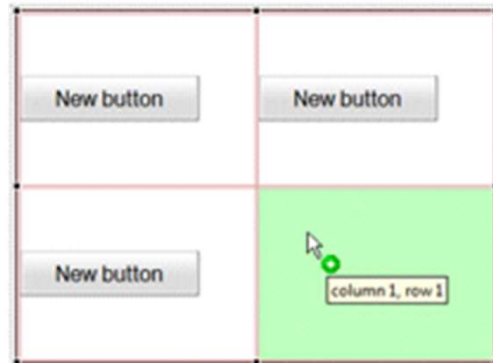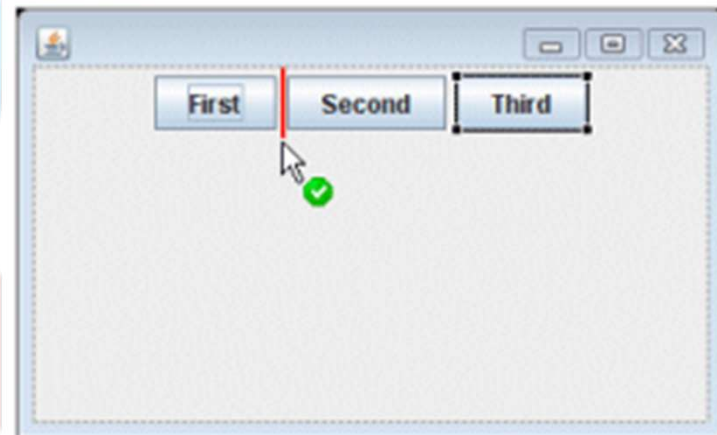
- Vertical/Horizontal Panel – Uses HTML table
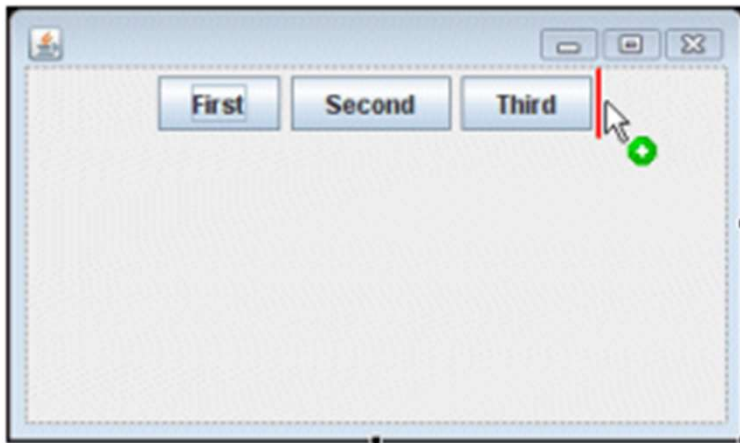
Basic Panels

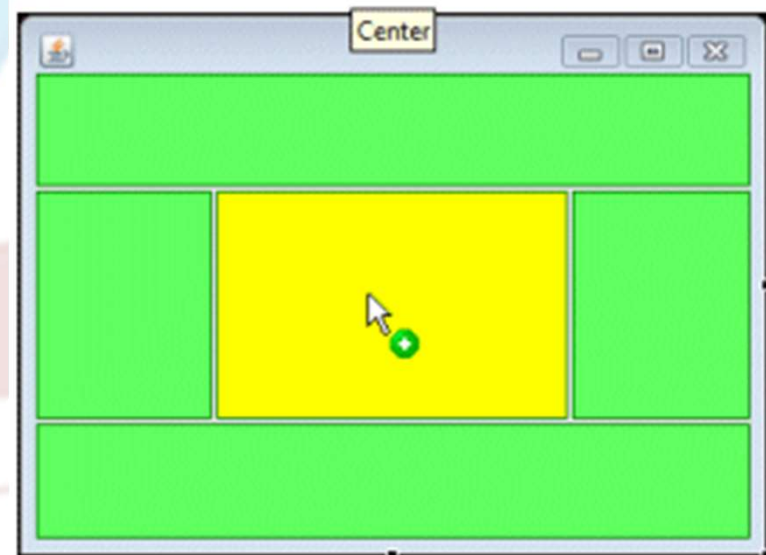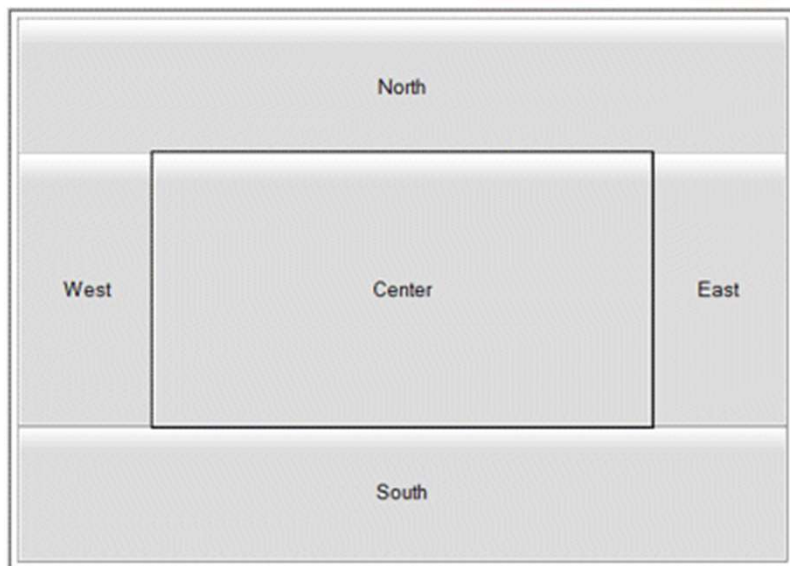**Grid**   **Flex Table**

Basic Panels

- Flow Panel - Div

Basic Panels

- Dock (Layout) Panel – North/South/East/West/Center

Widgets

- Many useful widgets

- Button, textbox, ListBox, …

- Easily create events

Composite Class

- Wrap a widget(s) in order to hide their methods

- Custom Widgets

  – Create your own methods

  – Make existing methods visible

- Can't modify composite outside of itself

- Can be reused

References

- http://web.appstorm.net/general/opinion/what-is-a-web-app-heres-our-definition/
- http://code.google.com/webtoolkit/
- Kereki, K. F. (2011). *Essential gwt building for the web with google web toolkit 2*. Boston, MA: Pearson Education, Inc.
- Gupta, I. (2009). *Accelerated gwt, building enterprise google web toolkit applications*. Berkeley, CA: Apress.
- Chaganti, R. (2007). *Google web toolkit: Gwt java ajax programming*. Birmingham, UK: Packt Pub Ltd.
- http://code.google.com/webtoolkit/examples/

Thank You