


Chapter 7

Tcl/Tk - 3, Java

Bindings

Bind a Tcl/Tk script to an X event

Example 4

```
canvas .c -bd 3 -relief raised; pack .c
button .b -text BUTTON1; pack .b
bind .b <Enter> {.c config -cursor {clock}}
```


File I/O

```
open /etc/passwd r
set f file4
while {[gets $f line] >=0} {
   puts $line
}
close $f
```

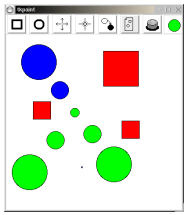
File I/O

- ✔ flush fileId
- ✔ seek fileID offset [start/current/end]
- ✔ tell fileID
- ✔ read fileID numbytes

File I/O

- ✔ file dirname name
- ✔ file tail name

Demo tkpaint



Mainline

CODE LISTING **tkpaint1.tcl**

```
#! /usr/local/bin/wish -f

set thistool rectangle
    set thisop grow
    set thiscolour black
    button.exitbtn - bitmap @ exit.xbm - command exit
    button.squarebtn - bitmap @ square.xbm - command setsquaretool
    button.circlebtn - bitmap @ circle.xbm - command setcircletool
    button.shrnkbtn - bitmap @ shrink.xbm - command "set thisop shrnk"
    button.growbtn - bitmap @ grow.xbm - command "set thisop grow"
    button.printbtn - bitmap @ print.xbm - command printit
    button.colorbtn - bitmap @ newcolour.xbm - command setanewcolour
    canvas.net - width 400 - height 400 - background white - relief sunken
    canvas.status - width 40 - height 40 - background white - relief sunken
    pack.net - side bottom
    pack.status - side right
    pack.squarebtn.circlebtn - side left - ipadx 1 m - ipady 1 m - expand 1
    pack.exitbtn.printbtn - side right - ipadx 1 m - ipady 1 m - expand 1
    pack.colorbtn.shrnkbtn.growbtn - side right - ipadx 1 m - ipady 1 m -
    expand 1 bind.net < ButtonPress - 1 >
{
makenode % x % y}
. status create rectangle 10 10 37 37 - tag statusthingy - fill $thiscolour
    set nodes 0;
set oldx 0;
set oldy 0;
```

Routines

CODE LISTING **tkpaint4.tcl**

```
proc beginmove {x y} {
    global oldx oldy
    set oldx $x; set oldy $y
}

proc domove {item x y} {
    global oldx oldy
    .net move $item [expr "$x - $oldx"] [expr "$y - $oldy"]
    set oldx $x; set oldy $y
}

proc altersize {item x y z} {
    .net scale $item $x $y $z $z
}

proc printit {} {
    .net postscript -file "pic.ps"
}
```


Routines

CODE LISTING **tkpaint2.tcl**

```
proc makenode {x y} {
   global nodes oldx oldy thistool thiscolor
   set nodes [expr "$nodes+1"]

   set x1 [expr "$x-20"]; set y1 [expr "$y-20"]
   set x2 [expr "$x+20"]; set y2 [expr "$y+20"]
   if {[string compare $thistool "oval"] == 0} {
       .net create oval $x1 $y1 $x2 $y2 -tag node$nodes -fill $thiscolor
   }
   if {[string compare $thistool "rectangle"] == 0} {
       .net create rectangle $x1 $y1 $x2 $y2 -tag node$nodes -fill $thiscolor
   }
   .net bind node$nodes <Enter> ".net itemconfigure node$nodes -width 5"
   .net bind node$nodes <Leave> ".net itemconfigure node$nodes -width 1"
   .net bind node$nodes <ButtonPress-3> "beginmove %x %y"
   .net bind node$nodes <B3-Motion> "domove node$nodes %x %y"
   .net bind node$nodes <ButtonPress-2> "dothisop node$nodes %x %y"
}

proc dothisop {item x y} {
   global thisop
   if {[string compare $thisop "shrink"] == 0} {
       altersize $item $x $y 0.5
   }
   if {[string compare $thisop "grow"] == 0} {
       altersize $item $x $y 2.0
   }
}
```


Routines

CODE LISTING **tkpaint3.tcl**

```
proc setcircletool {} {
    global thistool thiscolor
    set thistool oval
    .status delete statusthingy
    .status create oval 10 10 37 37 -tag statusthingy -fill $thiscolor
}

proc setsquaretool {} {
    global thistool thiscolor
    set thistool rectangle
    .status delete statusthingy
    .status create rectangle 10 10 37 37 -tag statusthingy -fill $thiscolor
}

proc setanewcolor {} {
    global thiscolor

    if {[string compare $thiscolor "black"] == 0} {
        set thiscolor green
    } { if {[string compare $thiscolor "green"] == 0} {
            set thiscolor blue
        } { if {[string compare $thiscolor "blue"] == 0} {
                set thiscolor red
            } { if {[string compare $thiscolor "red"] == 0} {
                    set thiscolor orange
                } { set thiscolor black }
                }
        }
    }
    .status itemconfigure statusthingy -fill $thiscolor
}
```


End of Tk intro

Next assignment will be a Tk programming one...

and now...

Java and JFC

- ✔ Java - applications across a network
- ✔ Native-code interpreter for Java code.
- ✔ Core functions called JFC (Java Foundation Classes).
- ✔ JFC for GUIs, accessability, 2D drawing...

AWT

- ✔ AWT - the Abstract Windowing Toolkit.
- ✔ AWT provides buttons, frames, dialogs...
- ✔ Implemented in native code in the Java interpreter.

Swing

- ✔ Not implemented in native code
- ✔ Implemented in AWT.
- ✔ Swing and AWT coexist

Swing advantages

1. Consistent look-and-feel
2. Pluggable look-and-feel
3. High-level widgets

How not to...

✘ Watch interpreter overhead

✘ Internal thread scheduling

Getting started

http://java.sun.com/j2se/1.4.2/download.html

- **j2sdk1.4.2**
  - http://www.comp.nus.edu.sg/~cs3283/ftp/Java/
- **Netbeans+j2sdk**
  - http://www.comp.nus.edu.sg/~cs3283/ftp/Java/

Documentation

Sun's Java web site, and http://www.netbeans.org.

- http://www.comp.nus.edu.sg/~cs3283/ftp/Java/jfcapi/
- http://www.comp.nus.edu.sg/~cs3283/ftp/Java/OpenAPIs/
- http://www.comp.nus.edu.sg/~cs3283/ftp/Java/JavaTutorial/
- http://www.comp.nus.edu.sg/~cs3283/ftp/Java/swingConnect/

Demo

Find the file called SwingSet2.jar. Then try:

java -jar SwingSet2.jar

Swing programming

✔ Use same strategy as used in Tcl/Tk.

✔ A good book that covers this material in detail is

The JFC Swing Tutorial

by Kathy Walrath and Mary Campione.

Toplevel components

The toplevel components provided by Swing are:

1. **JApplet** - for applets within web pages
2. **JDialog** - for dialog boxes
3. **JFrame** - for building applications

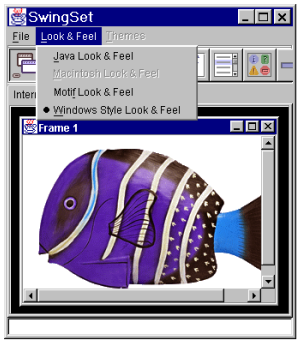
All other Swing components derive from the **JComponent** class.

JComponent

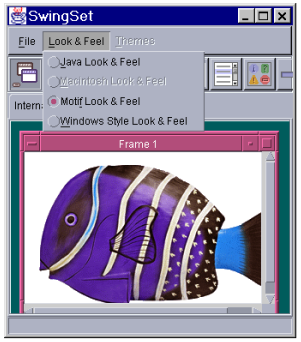
- **Tool tips** - little windows with explanations
- **Pluggable look and feel** - as described
- **Layour management** - items within the component
- **Keyboard action management** - Hot keys and so on.
- And other facilities

Swing implements an MVC architecture.

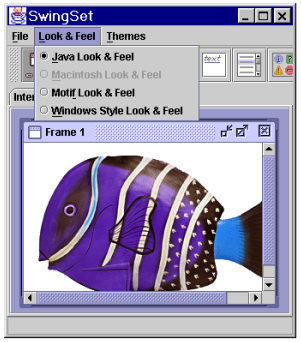
Pluggable look and feel



Pluggable look and feel



Pluggable look and feel



Pluggable look and feel

If you wished to use the WinXX look-and-feel, in the main of your application, you can make the following call:

```
UIManager.setLookAndFeel( "com.sun.java.swing.plaf.windows.WindowsLookAndFeel");
```


Example application

CODE LISTING **t2.java**

```
public class t2 extends javax.swing.JFrame {
    public t2() {
        initComponents();
    }
    private void initComponents() {
        jLabel2 = new javax.swing.JLabel();
        addWindowListener(new java.awt.event.WindowAdapter() {
            public void windowClosing(java.awt.event.WindowEvent evt) {
                exitForm(evt);
            }
        });
        jLabel2.setText("Hello Singapore!");
        jLabel2.setHorizontalAlignment(javax.swing.SwingConstants.CENTER);
        getContentPane().add(jLabel2, java.awt.BorderLayout.CENTER);
        pack();
    }
    private void exitForm(java.awt.event.WindowEvent evt) {
        System.exit(0);
    }
    public static void main(String args[]) {
        new t2().show();
    }
    private javax.swing.JLabel jLabel2;
}
```

Example application

- ✔ Instantiates a **JLabel**, and sets the text field.
- ✔ Call to **getContentPane** returns the **contentPane** object for the frame - this is a generic AWT container for components associated with each **JFrame**.
- ✔ The **addWindowListener** call is from **java.awt.Window.**

Example application

Example applet

CODE LISTING **HelloWorldApp.java**

```
public class HelloWorldApp extends javax.swing.JApplet {
    public HelloWorldApp() {
        initComponents();
    }
    private void initComponents() {
        jLabel1 = new javax.swing.JLabel();
        jLabel1.setText("Hello Singapore!");
        jLabel1.setHorizontalAlignment(javax.swing.SwingConstants.CENTER);
        getContentPane().add(jLabel1, java.awt.BorderLayout.CENTER);
    }
    private javax.swing.JLabel jLabel1;
}
```


Example applet

- ✔ This code follows the same structure,
- ✔ Class extends a **JApplet** instead of a **JFrame**.
- ✔ Compile to get a **HelloWorldApp.class** file,
- ✔ Has to be referenced in a web page

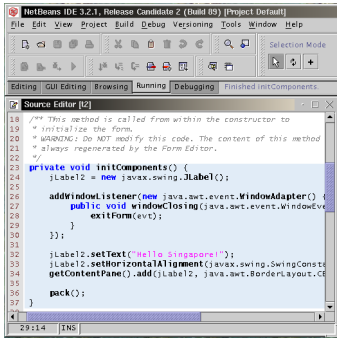
Example applet

CODE LISTING **HelloWorldApp.txt**

```
<BASE HREF="http://www.comp.nus.edu.sg/~hugh/swing/">
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2//EN">
<html>
The HelloWorld Applet <p>
<EMBED type         = "application/x-java-applet;version=1.1.2"
       java_CODE    = "HelloWorldApp.class"
       java_ARCHIVE = "applets.jar"
       WIDTH        = 400
       HEIGHT       = 50   ></EMBED>
</HTML>
```


Example applet

Netbeans IDE



Summary of topics

In this module, we introduced the following topics:

- Tool sets for Java/Swing
- The relationship between JFC, Java and Swing.
- Simple first programs