



JavaOne™

java.sun.com/javaone

A JavaFX™ Script Programming Language Tutorial

Jim Weaver, JavaFX™ Script Author, Developer, Teacher
<http://JavaFXpert.com>

TS-4794





Learn how to develop Rich Internet Applications in compiled JavaFX Script programming (by looking at lots of code)

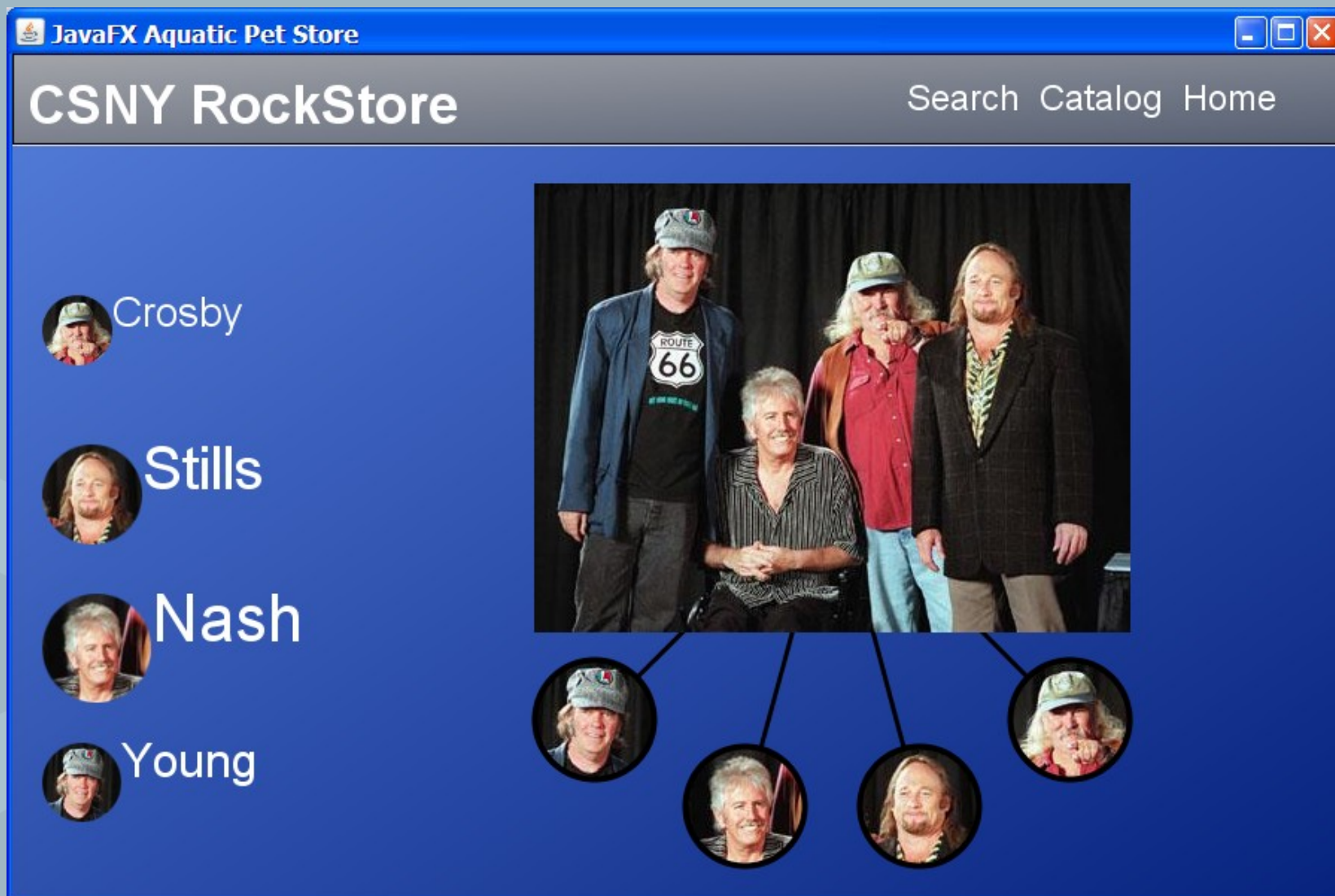
GOAL

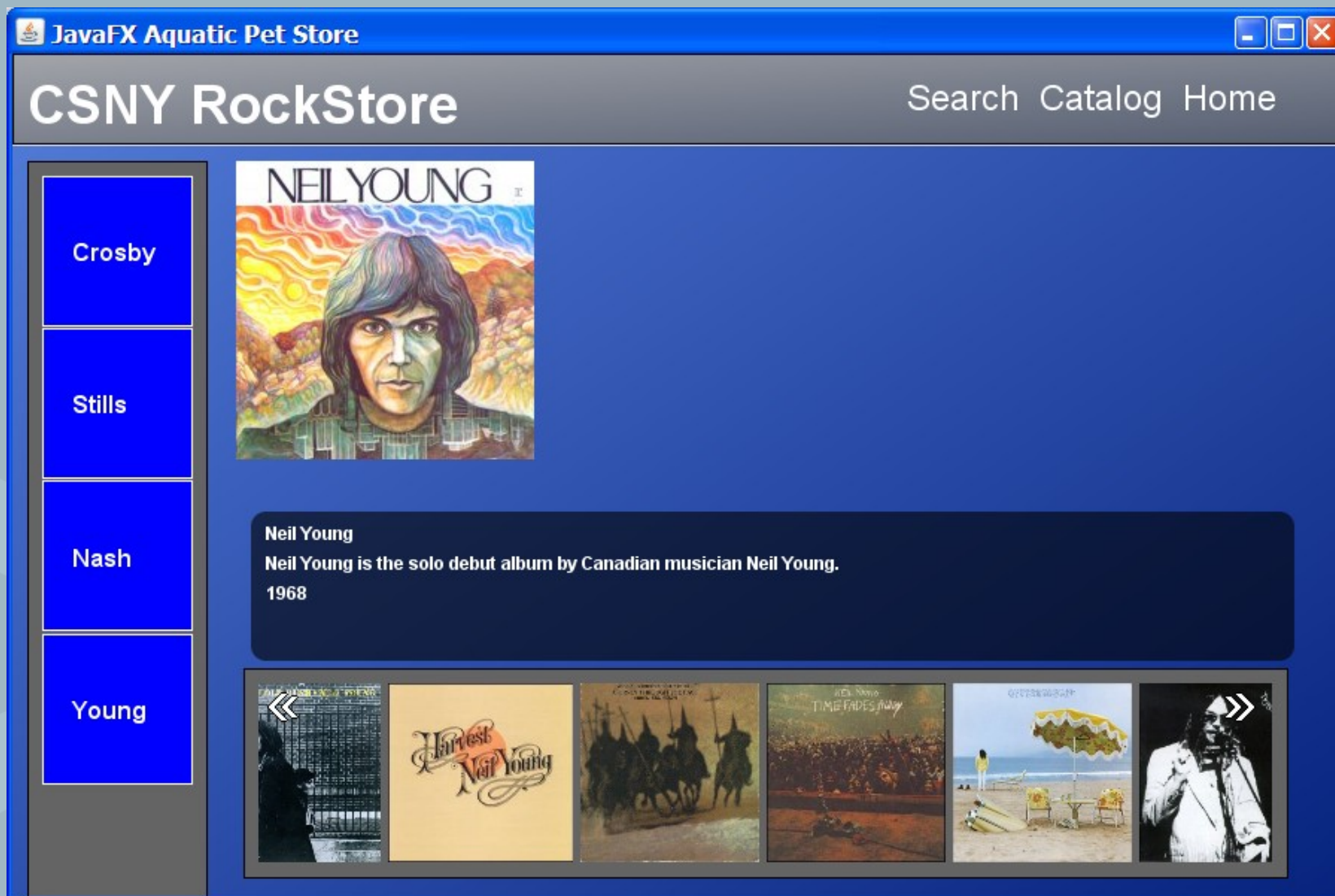


- Do a quick demo of a JavaFX Script technology
- Show some instructive code from the demo (in most cases)
- Repeat first two steps until we're almost out of time
- Q & A

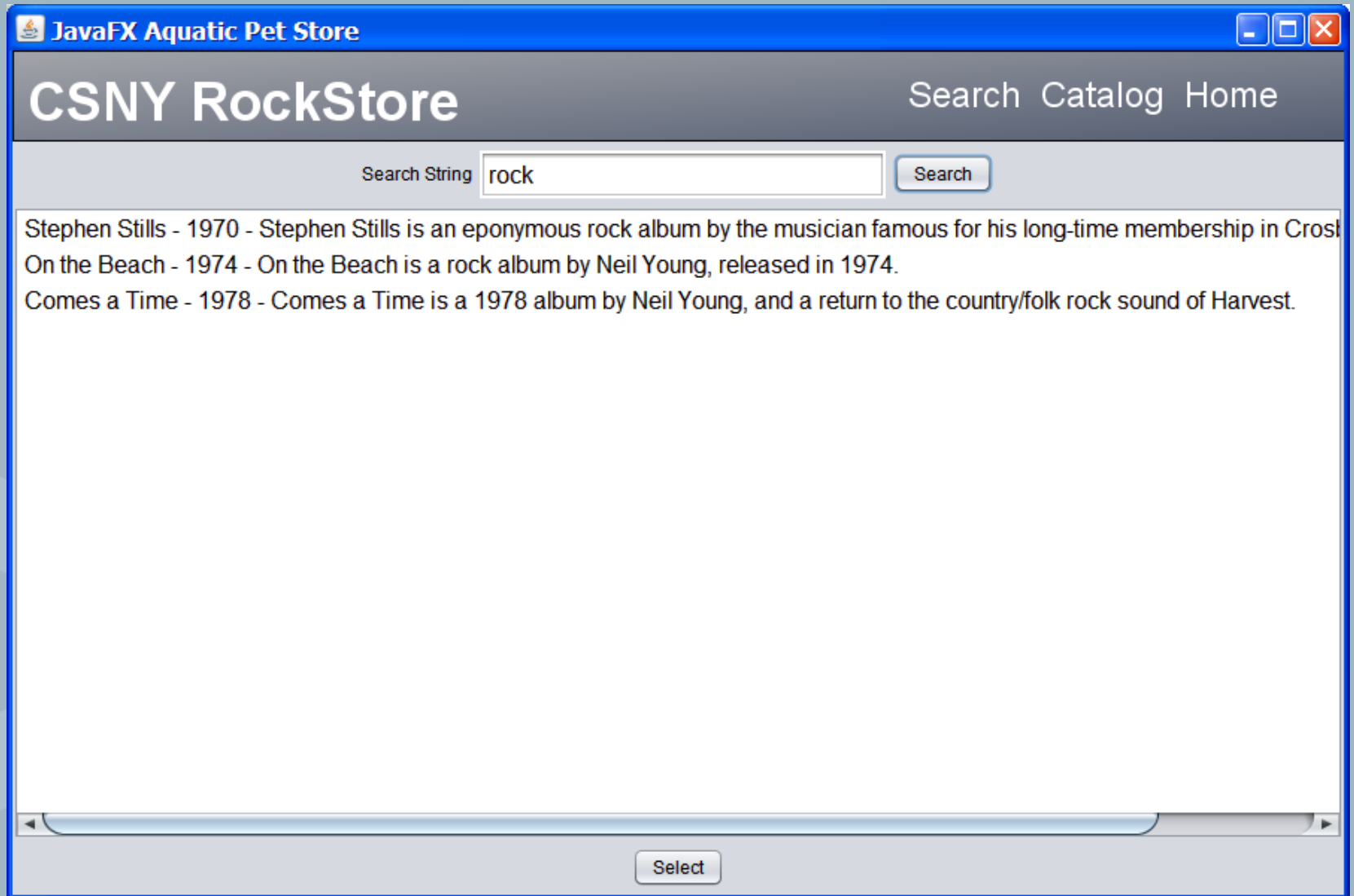


- Burn into your mind that JavaFX Script software is ***“Simple, Elegant, and Leverages the Power of Java”***
- Show you the coolness of ***Declaratively Scripting the UI*** (including ***Layouts***), ***Binding***, ***Triggers***, and ***Sequences***
- Convince you that ***JavaFX Script software is desperately needed*** in the software development industry, and that it is ***fun to develop!***
- Rant a little about how the dream of a ***ubiquitous Java Virtual Machine (JVM™) on the client*** didn't happen circa 1996, but ***is happening in 2008***, partly due to ***Java Platform, Standard Edition (Java SE platform) update 10***





<http://JavaFXpert.com/weblog/2007/11/spotting-javafx.html>



<http://JavaFXpert.com/weblog/2007/11/spotting-javafx.html>





```
/*
 * HelloGoodbye.fx -
 * A "Hello World" style program that demonstrates
 * declaratively expressing a user interface.
 */
package beatles;
import javafx.gui.*;

Frame {
    var phrase:String // The model
    title: "Hello, Goodbye"
    height: 300
    width: 400
    visible: true
    content:
        BorderPanel {
            center:
                Canvas {
                    content:
                        Text {
                            x: 50
                            y: 125
                        }
                }
        }
    }
```



```
Canvas {
  content:
    Text {
      x: 50
      y: 125
      content: bind phrase
      font:
        Font {
          size: 36
        }
    }
}
bottom:
  FlowPanel {
    content: [
      Button {
        text: "Hello"
        action:
          function():Void {
            // The button was clicked
            phrase = "You say hello...";
          }
      }
    ]
  }
}
```



```
Button {
    text: "Hello"
    action:
        function():Void {
            // The button was clicked
            phrase = "You say hello...";
        }
},
Button {
    text: "Goodbye"
    action:
        function():Void {
            phrase = "and I say goodbye";
        }
}
] // end of content sequence
}
}
```



- > `javafx -d . HelloGoodbye.fx`
- > `javafx beatles.HelloGoodbye`





```
public class HelloGoodbyeModel {  
    public attribute phrase:String;  
    public attribute color:Color;  
}
```

```
Frame {  
    var hgModel = HelloGoodbyeModel {  
        phrase: "Hello, Goodbye lyrics"  
        color: Color.GREEN  
    }  
    ...  
    content:  
        BorderPanel {  
            center:  
                Canvas {  
                    content:  
                        Text {  
                            x: 50  
                            y: 125  
                            content: bind hgModel.phrase  
                            fill: bind hgModel.color  
                        }  
                    }  
                }  
            }  
        }  
}
```



```
...
bottom:
    FlowPanel {
        content: [
            Button {
                text: "Hello"
                action:
                    function():Void {
                        hgModel.phrase = "You say hello...";
                        hgModel.color = Color.RED;
                    }
        },
        Button {
            text: "Goodbye"
            action:
                function():Void {
                    hgModel.phrase = "and I say goodbye";
                    hgModel.color = Color.BLUE;
                }
        }
    ] // end of content sequence
} ...
```



Data Type	Literal Syntax	Default Value
String	"I'm a String" or 'I am a String'	Empty (zero length) String
Boolean	true / false	false
Integer	42	0
Number	3.14159	0.0



- There are two general categories of data types in JavaFX:
 - **Primitive** (also known as basic) data types
 - **Object** types
- Another data type is **sequence** (also known as an array).
- Any type may be assigned to a **variable** (`attribute` or `var`)



Freebase Browser JFX

View Help

Freebase Object ID: /topic/en/james_gosling Go

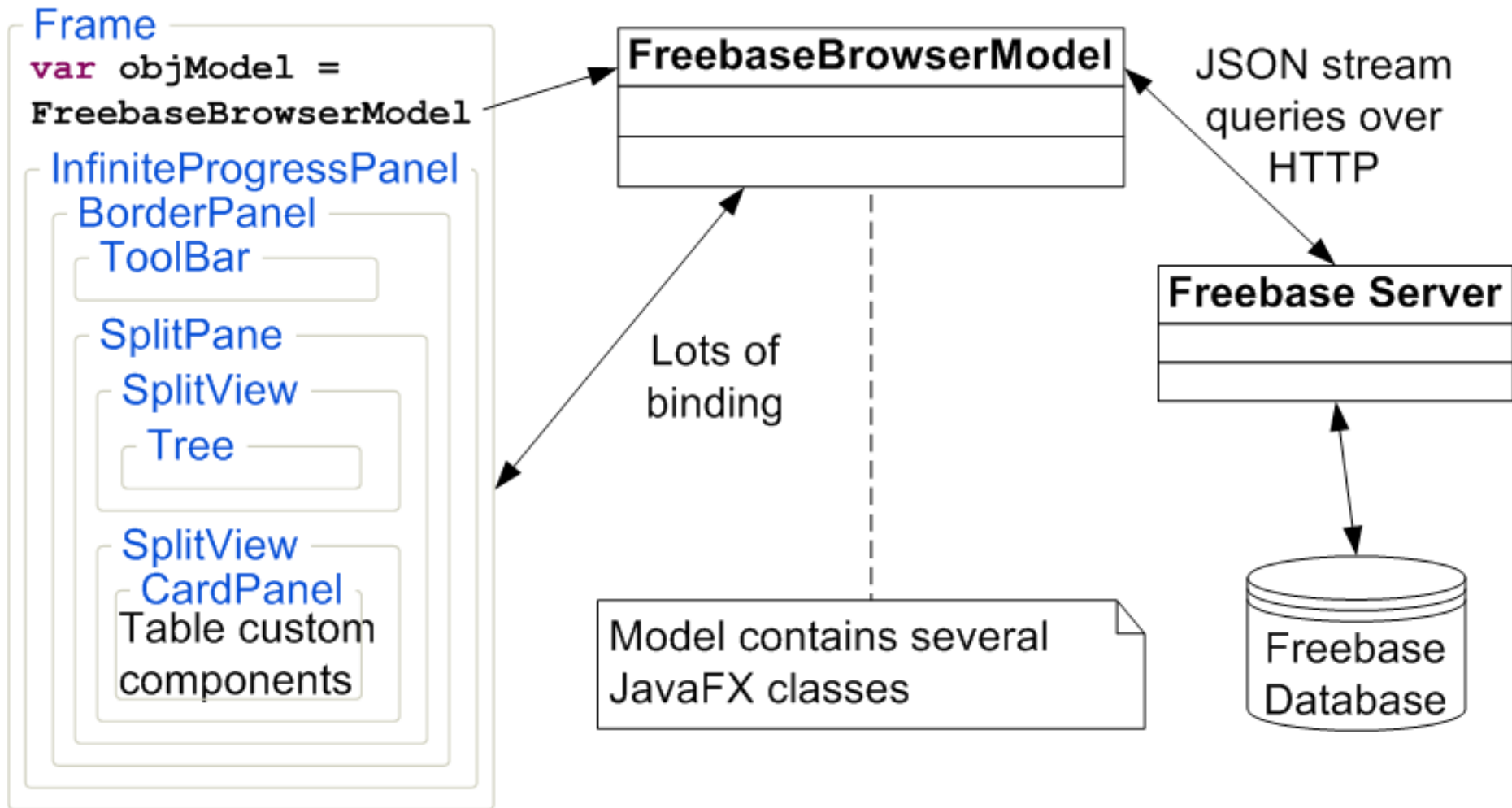
James Gosling

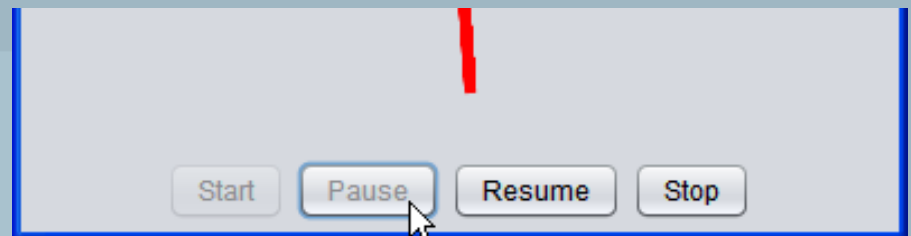
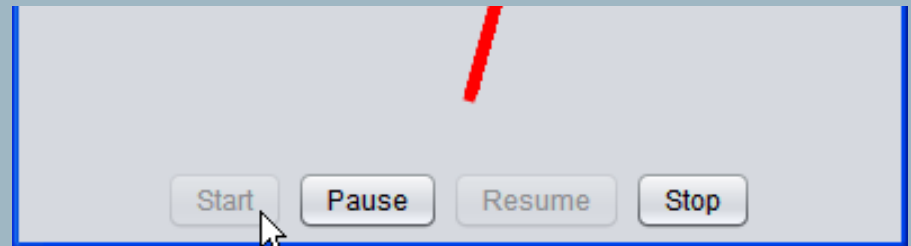
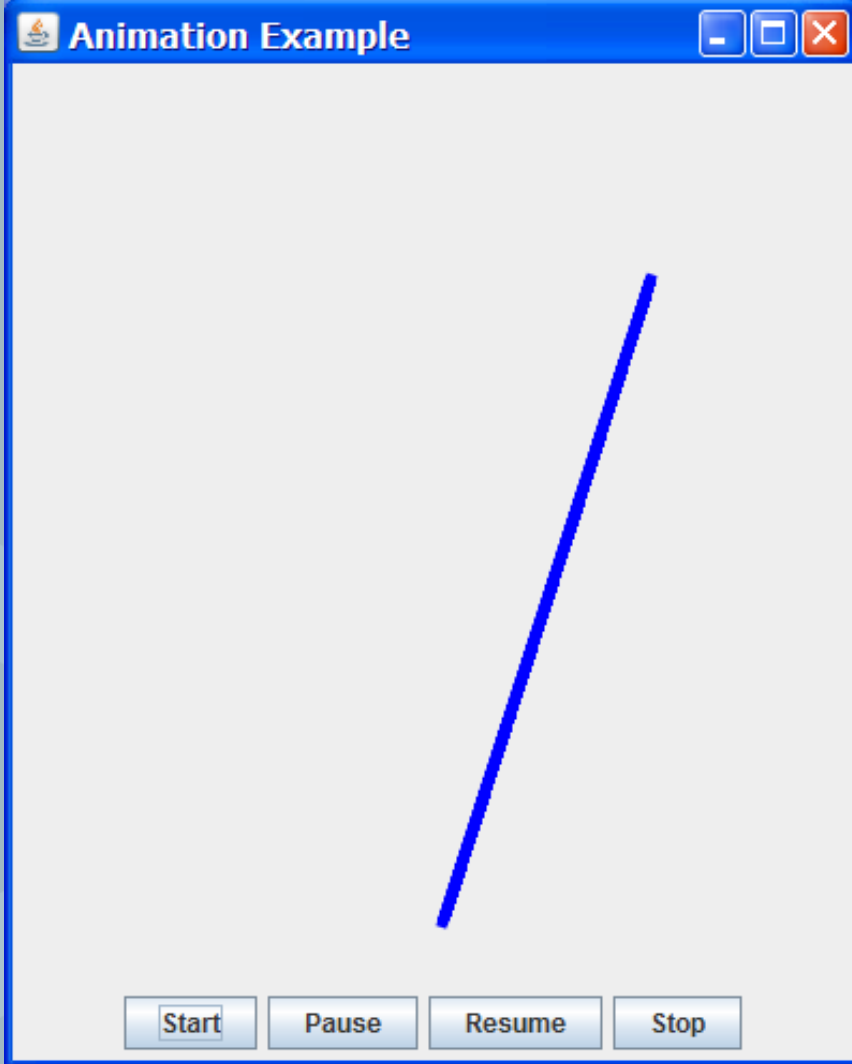
- permission
- type
 - Topic
 - Person
 - Programming Language
 - Software Developer
- article
- image
- Profession
- Gender
- Country Of Nationality
- Web Link(s)
- Languages Designed
 - Java

image



Profession Computer Scientist Programmer





<http://JavaFXpert.com/weblog/2008/03/really-this-tim.html>



```
package metronome_model;
import javafx.animation.*;

public class MetronomeModel {
    public attribute x2Val:Number;
    public attribute anim =
        Timeline {
            autoReverse: true
            keyFrames: [
                KeyFrame {
                    time: 0s
                    values: x2Val => 100
                },
                KeyFrame {
                    time: 1s
                    values: x2Val => 300 tween Interpolator.LINEAR
                }
            ]
            repeatCount: Timeline.INDEFINITE
        };
}
```



```
package metronome_ui;
import javafx.gui.*;
import metronome_model.*;

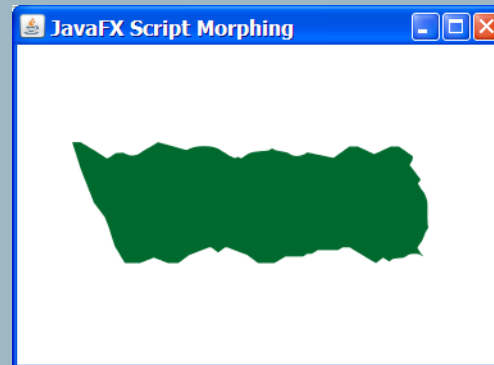
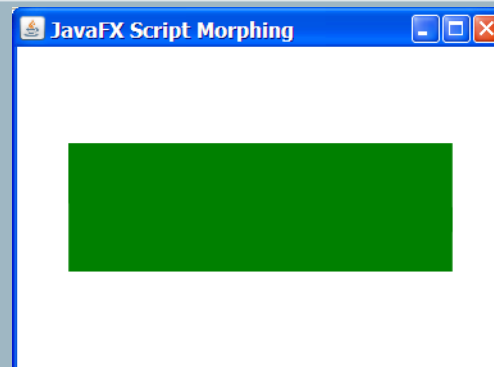
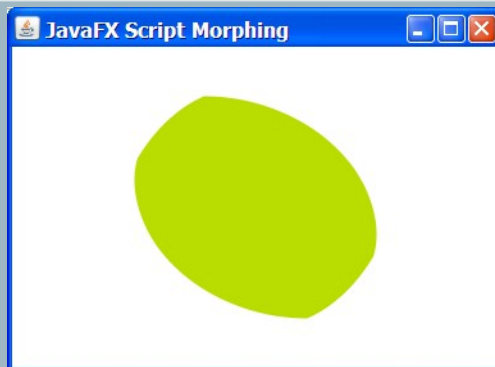
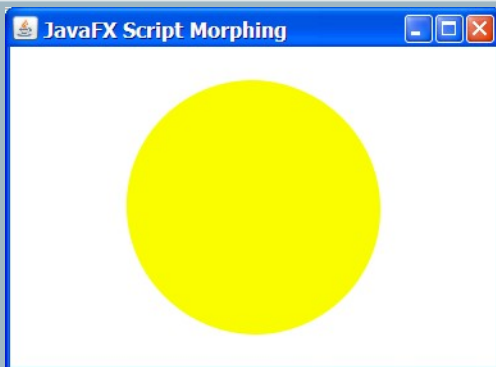
Frame {
    var metroModel = MetronomeModel {}
    ...
    content:
        BorderPanel {
            center:
                Canvas {
                    content:
                        Line {
                            x1: 200
                            y1: 400
                            x2: bind metroModel.x2Val
                            y2: 100
                            strokeWidth: 5
                            stroke: Color.RED
                        }
                }
        }
    }
```



```
bottom:
    FlowPanel {
        content: [
            Button {
                text: "Start"
                enabled: bind not metroModel.anim.running
                action:
                    function():Void {
                        metroModel.anim.start();
                    }
            },
            Button {
                text: "Pause"
                enabled: bind not metroModel.anim.paused and
                           metroModel.anim.running
                action:
                    function():Void {
                        metroModel.anim.pause();
                    }
            },
        ],
    }
```



```
Button {
    text: "Resume"
    enabled: bind metroModel.anim.paused
    action:
        function():Void {
            metroModel.anim.resume();
        }
},
Button {
    text: "Stop"
    enabled: bind metroModel.anim.running
    action:
        function():Void {
            metroModel.anim.stop();
        }
}
]
}
}
```



<http://JavaFXpert.com/weblog/2008/03/really-this-tim.html>



```
import javafx.animation.*;
import javafx.gui.*;
import java.lang.System;

var shape1 = Circle {
    centerX: 190
    centerY: 125
    radius: 100
};
var shape2 = Rectangle {
    x: 40
    y: 75
    width: 300
    height: 100
};
```



```
var shape3 = Text {
    font:
        Font {
            size: 96
            style: FontStyle.BOLD
        }
    x: 25
    y: 150
    content: "JavaFX"
};

var shape4 = Text {
    font:
        Font {
            size: 96
            style: FontStyle.BOLD
        }
    x: 25
    y: 150
    content: "Rocks!"
};

;
```



```
var color = Color.RED;
var geom:Shape = shape1;

var t = Timeline {
    repeatCount: Timeline.INDEFINITE
    autoReverse: true
    keyFrames: [
        KeyFrame {
            time: 0s
            values: [
                geom => shape1 tween Interpolator.EASEBOTH,
                color => Color.YELLOW tween Interpolator.EASEBOTH,
            ]
        },
        KeyFrame {
            time: 3s
            values: [
                geom => shape2 tween Interpolator.EASEBOTH,
                color => Color.GREEN tween Interpolator.EASEBOTH,
            ]
        },
    ],
}
```



```
KeyFrame {
    time: 6s
    values: [
        geom => shape3 tween Interpolator.EASEBOTH,
        color => Color.BLUE tween Interpolator.EASEBOTH,
    ]
},
KeyFrame {
    time: 9s
    values: [
        geom => shape4 tween Interpolator.EASEBOTH,
        color => Color.RED tween Interpolator.EASEBOTH,
    ]
}
];
```



```
Frame {
  closeAction:
    function() {
      System.exit(0);
    }
  title: "JavaFX Script Morphing";
  visible: true
  content:
    Canvas {
      preferredSize: [380, 250]
      background: Color.WHITE
      content:
        DelegateShape {
          shape: bind geom
          fill: bind color
        }
    }
}

t.start();
```



➤ Enhanced Java technology deployment

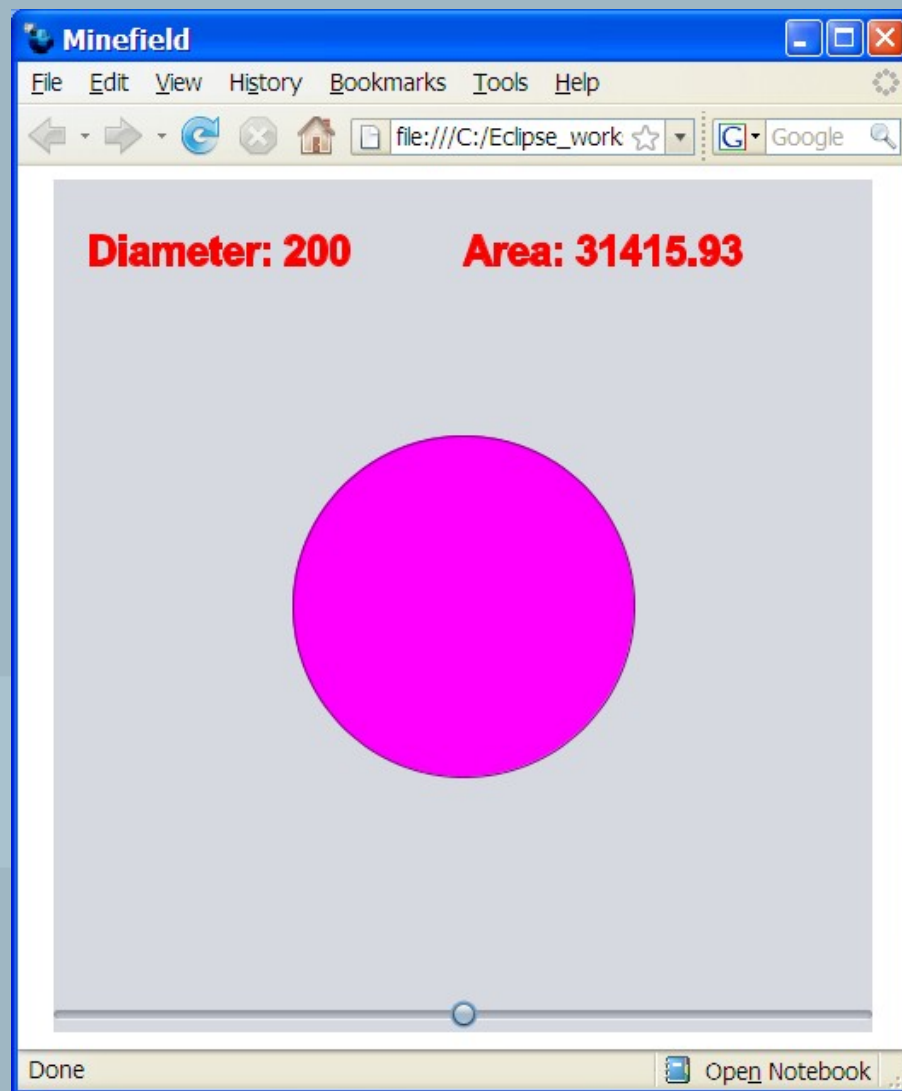
- Easy JRE™ version detection via a simple JavaScript interface
- Incremental Java Kernel online installer (for first-time Java platform users)
- Java platform auto-updater

➤ Improved performance and look & feel

- JavaSM Quick Starter service feature – warm start of JRE software by prefetching
- Hardware acceleration support
- Nimbus Look & Feel

➤ Next-Generation Java Plug-In Tool

- Improved reliability – can kill the plug-in without affecting browser
- Ability to specify large heap sizes
- Built-in Java Network Launching Protocol (JNLP) support
- Ability to specify per-applet command-line arguments
- Improved Java platform/JavaScript platform communications



<http://JavaFXpert.com/weblog/2008/03/creating-comp-1.html>



```
class CircleModel {  
    attribute diameter:Integer;  
    bound function getArea():Number {  
        Math.PI * Math.pow(diameter / 2, 2);  
    }  
}
```

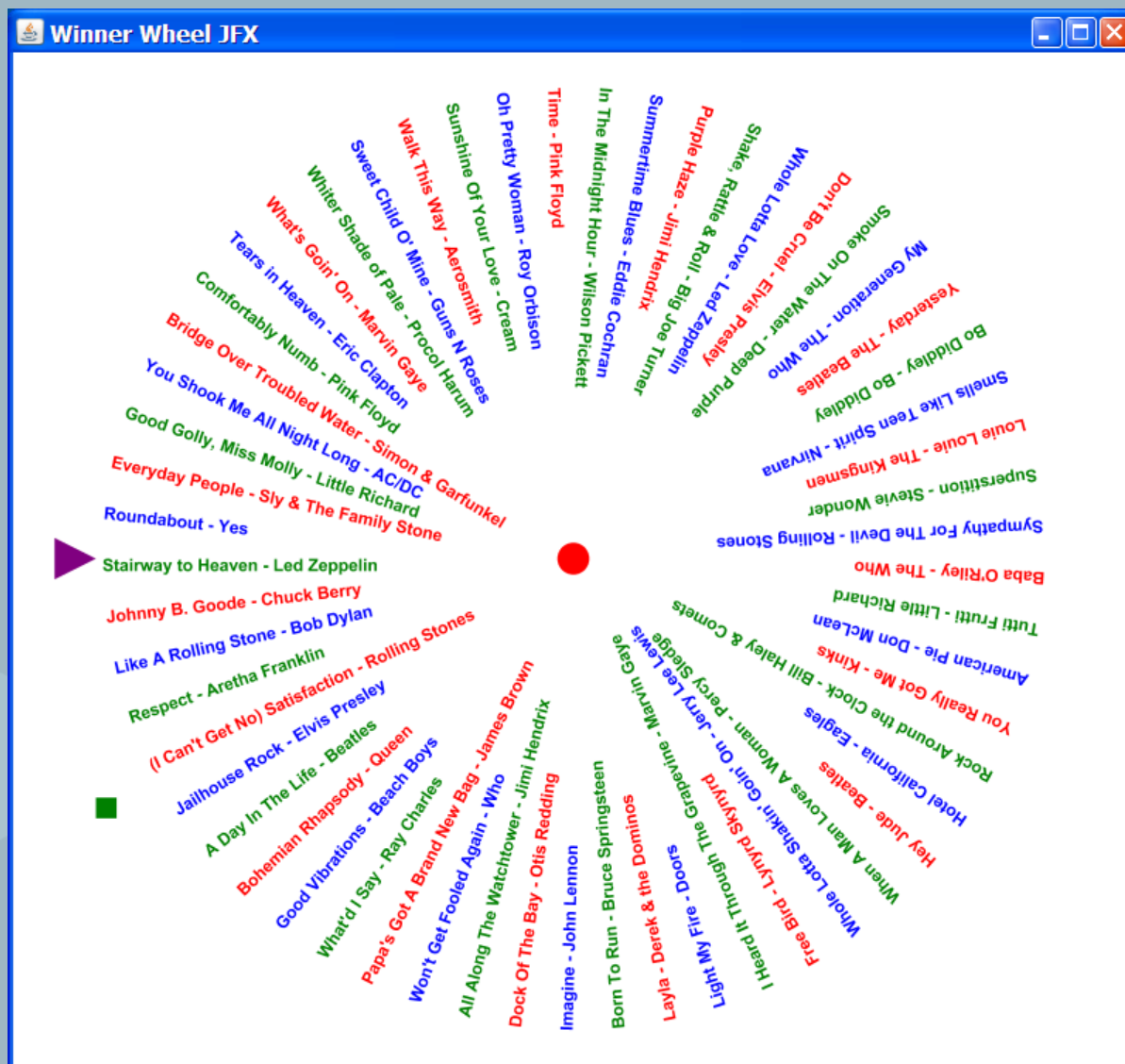
```
Application {  
    var cModel = CircleModel {}  
    content:  
        BorderPanel {  
            center:  
                Canvas {  
                    content: [  
                        Circle {  
                            centerX: 240  
                            centerY: 250  
                            radius: bind cModel.diameter / 2  
                            stroke: Color.PURPLE  
                            strokeWidth: 1  
                            fill: Color.MAGENTA  
                        },  
                    ]  
                }  
            }  
        }  
}
```



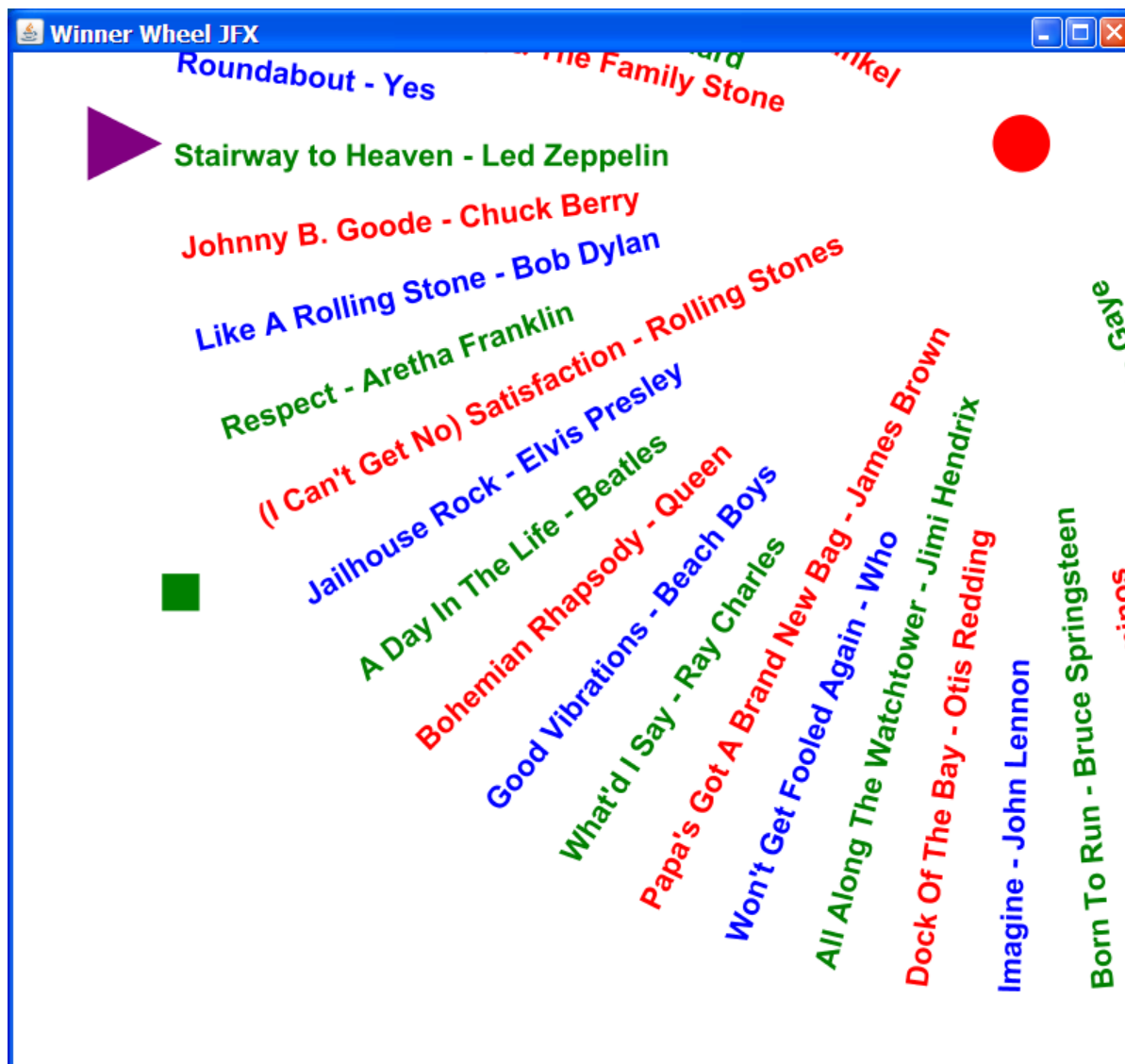
```
Text {
    font: font24Bold
    x: 20
    y: 50
    fill: Color.RED
    content: bind "Diameter: {cModel.diameter}"
},
Text {
    font: font24Bold
    x: 240
    y: 50
    fill: Color.RED
    content: bind "Area: {%3.2f cModel.getArea()}"
}
]
}
bottom:
Slider {
    minimum: 0
    maximum: 400
    value: bind cModel.diameter with inverse
}...
```



```
<html>
  <body>
    <center>
      <applet width=480 height=500>
        <param name="jnlp_href"
          value="BindToFunctionApplet.jnlp">
        <param name="ApplicationClass"
          value="BindToFunctionApplet">
      </applet>
    </center>
  </body>
</html>
```



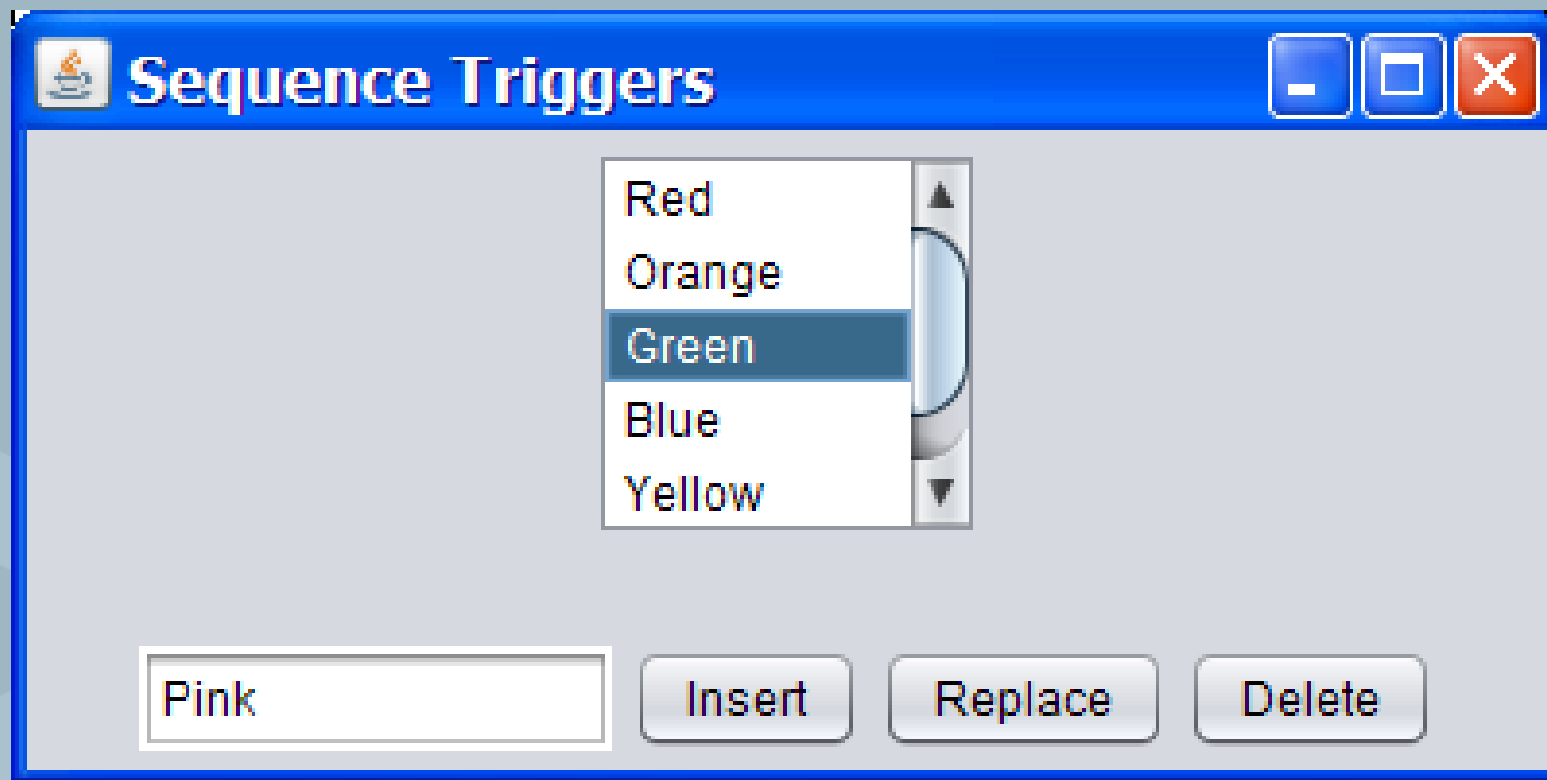
<http://JavaFXpert.com/weblog/2008/03/creating-comp-1.html>



<http://JavaFXpert.com/weblog/2008/02/whos-zoomin-who.html>



```
public class WinnerWheelJFX extends CustomNode {
    public function create():Node {
        ...
        return
            Group {
                transform: bind [
                    Scale.scale(if (zoomed) 3 else 1,
                                if (zoomed) 3 else 1),
                    Translate.translate(0, if (zoomed) -0.9 * cY else 0)
                ]
                content: [
                    Rectangle {
                        ...
                    },
                    ...
                    Group {
                        transform: bind [
                            Rotate.rotate(if (running) (a * rand) % 360
                                           else chosenIdx.doubleValue() /
                                           sizeof names * 360.0, cX, cY)
                        ]
                    }
                ]...
            }
    }
}
```



<http://JavaFXpert.com/weblog/2008/02/trigger-happy-.html>



```
class Model {  
    attribute entries:String[] = ["Red", "Green", "Blue",  
                                  "Yellow", "Purple"]  
    on replace oldValue[idxA..idxB] = newElement {  
        System.out.println("replaced {oldValue} at {idxA}  
                             with {entries[idxA]}");  
    };  
  
    attribute selectedIndex:Integer = 0 on replace {  
        System.out.println("selectedIndex={selectedIndex}");  
    };  
  
    attribute enteredText:String;  
}
```



```
Frame {  
  var mdl = Model {}  
  ...  
  ListBox {  
    cells: bind for (entry in mdl.entries)  
      ListCell {  
        text: entry  
      }  
    selection: bind mdl.selectedIndex with inverse  
    fixedCellWidth: 100  
    visibleRowCount: 4  
  }  
  ...  
}
```



```
import java.lang.System
```

```
class CompiledSequenceExample {  
    attribute ordinals:String[] =  
        ["zero", "one", "two", "three", "four", "five", "six"];  
  
    function printSomeOrdinals():Void {  
        for (lmnt in ordinals where lmnt.length() > 3) {  
            System.out.println("lmnt {}");  
        }  
    }  
  
    function getSomeOrdinals():String[] {  
        var elements =  
            for (lmnt in ordinals where lmnt.length() > 3) lmnt;  
        return elements;  
    }  
}
```



➤ JavaFX Script is an **expression language**, with block expressions:

- A block expression consists of expressions surrounded by curly braces and separated by semicolons
- The value of a block is its last expression

➤ `getSomeOrdinals()` can be simplified by removing the `var` assignment and `return` statement:

```
function getSomeOrdinals():String[] {  
    for (lmnt in ordinals where lmnt.length() > 3)  
        lmnt.length;  
}
```



```
import java.lang.System
```

```
class CompiledCompiledIfElseExample {  
    function getAlias(name:String):String {  
        var aka:String;  
        if (name == "Bruce Springsteen") {  
            aka = "The Boss";  
        }  
        else {  
            aka =  
                if (name == "Gordon Sumner") "String"  
                else "The Edge"  
        }  
        //return aka; // Note: return statement not required  
    }  
}
```



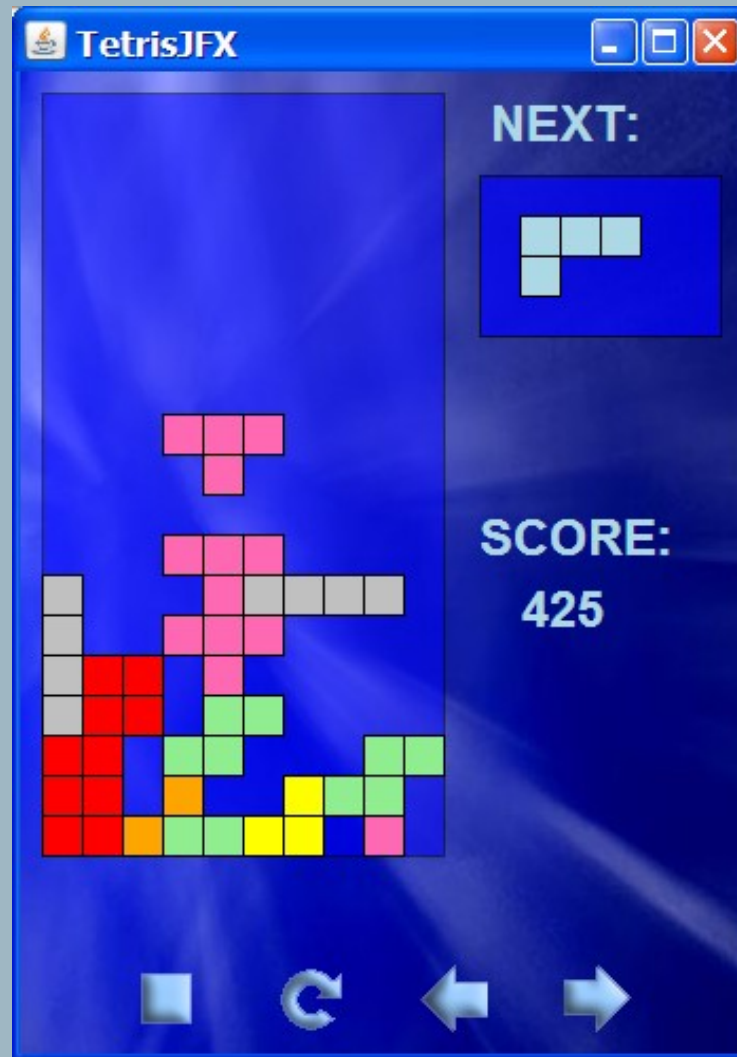
```
...
TextField {
    value: text mdl.enteredText with inverse
    columns: 10
},
Button {
    text: "Insert"
    defaultButton: true
    enabled: bind mdl.enteredText.trim() <> ""
    action:
        function():Void {
            insert mdl.enteredText before
                mdl.entries[mdl.selectedIndex.intValue()];
            mdl.enteredText = "";
        }
},
...
```



...

```
Button {
    text: "Replace"
    enabled: bind mdl.enteredText.trim() <> ""
    action:
        function():Void {
            mdl.entries[mdl.selectedIndex] = mdl.enteredText = "";
        }
},
Button {
    text: "Delete"
    enabled: bind mdl.selectedIndex >= 0
    action:
        function():Void {
            delete mdl.entries[mdl.selectedIndex];
        }
}
```

...



<http://JavaFXpert.com/weblog/2008/03/really-this-tim.html>



Word Search Puzzle Builder in JavaFX Script

Grid WordList Help

Icons: Grid, WordList, Help, Add

My Word Search Puzzle

	0	1	2	3	4	5	6	7	8
0				U	R	A	N	U	S
1		V	M						N
2			E						N
3			R						E
4			C	E	U	T			P
5			U		A	S			T
6	M	A	R	S		R			U
7			Y				T		N
8	J	U	P	I	T	E	R	H	E

Unplaced Words:

Placed Words:

- MERCURY
- VENUS
- MARS**
- EARTH
- JUPITER
- SATURN
- URANUS

<http://JavaFXpert.com/weblog/2007/11/spotting-javafx.html>



```
public class ThumbnailFilmStrip extends CustomNode {
    ...
    Group {
        content: [
            ImageView {
                translateX: 5
                translateY: 5
                image:
                    Image {
                        url: "{__DIR__}images/navigation/left.gif"
                    }
                onMouseEntered:
                    function(me:MouseEvent):Void {
                        apsModel.thumbnailFilmStripLastOffset =
                            apsModel.thumbnailFilmStripOffset;
                        apsModel.thumbnailFilmStripTargetOffset = 0;
                        apsModel.anim.start();
                    }
                onMouseExited:
                    function(me:MouseEvent):Void {
                        apsModel.anim.stop();
                    } ...
            }
        ]
    }
}
```



YahtzeeDice - NetBeans IDE Dev 200803250006

File Edit View Navigate Source Refactor Build Run Profile Versioning Tools Window Help

67.0/129.7MB

Projects **Files** **Services** **Profiler** ...fx YahtzeeMain.fx x Dice.fx x YahtzeeModel.fx x PipPlacement.fx x Dice...

Creating RIAs Article 1
YahtzeeDice
build
dist
nbproject
src
Dice.fx
DiceDistribution.fx
PipPlacement.fx
YahtzeeMain.fx

YahtzeeMain.fx - Navigator
Trees

```
import javafx.ui.*;  
import javafx.ui.canvas.*;  
import java.lang.System;  
  
Frame {  
    var model = YahtzeeModel {}  
    width: 510  
    height: 400  
    title: "Rolls Dice and Evaluate Yahtzee Combinations"  
    background: Color.WHITE  
    content:  
        BorderPanel {  
            center:  
                Box {  
                    var evalFont =  
                        Font {  
                            size: 20
```

16:1 INS

Output
YahtzeeDice (debug) x Debugger Console x
Listening on 4342
User program running
MethodBreakpoint [YahtzeeModel]. successfully submitted.
Method breakpoint hit in YahtzeeModel.<clinit> at line ? by thread
Thread AWT-EventQueue-0 stopped at YahtzeeModel.fx.<clinit>.

Watches **Local Variables** **Call Stack**

Name	Type	Value
------	------	-------

Breakpoints

YahtzeeDice (debug) running...



JavaFX SDK: How to receive the SDK ?

- The JavaFX SDK Preview release will be available in June 2008.
- Please visit <http://www.javaafx.com> to pre-register for the SDK Preview release.

- JavaFX Script software is:
S_____, E_____, and L_____ the P_____ of J_____
- Declaratively scripting the UI is straightforward, and layout components are placed in the UI containment hierarchy.
- Binding and triggers help enable declarative scripting.
- JavaFX Script software (and Java SE platform update 10) will bring back rich-client Java application environment



> Related URLs:

- JavaFX Software Community Site: <https://openjfx.dev.java.net>
- Sun's JavaFX Software Site: <http://java.sun.com/javafx>
- PlanetJFX: <http://jfx.wikia.com>
- Chris Oliver's Weblog: <http://blogs.sun.com/chrisoliver>
- “Helping you Become a JavaFXpert” Weblog: <http://JavaFXpert.com>

> Related Books:

- はじめてのJavaFX—最新スクリプト言語の基礎を徹底解説! (in Japanese), by 清水美樹, published by 工学社
- [JavaFX Script: Dynamic Java Scripting for Rich Internet/Client-side Applications](#), by James L. Weaver, published by Apress, October 2007
- [Dynamische und interaktive Java-Applikationen mit JavaFX](#) (in German), by Ralph Steyer, published by Addison-Wesley

> Related Training:

- JavaFXpert BootCamp: <http://BootCamp.JavaFXpert.com>



> Related JavaOneSM Conference Technical Sessions:

- TS-5152 Overview of the JavaFX™ Script Programming Language
- TS-5138 The JavaFX™ Platform: Sexy Interfaces For Mere Mortals
- TS-6290
Applets Reloaded: Introducing the Next-Generation Java™ Plug-in Technology
- TS-6610
Inside The JavaFX™ Script Technology-Based Runtime APIs: Scene Graph & WebKit
- TS-5449 Java™ Technology for Blu-ray and TV: Authoring for Performance Diversity
- TS-6019
A Look into Development for the JavaFX™ Mobile/TV Platform with the NetBeans™ IDE
- TS-6609 Using JavaFX™ Script To Build Swing Applications
- TS-6509
Incorporating Media into JavaFX™ and Java™ Technology-Based Applications
- TS-6127 Build Your Own Multitouch Interface with Java™ and JavaFX™ Technology
- TS-6656 Extreme GUI Makeover: Swing Meets FX



TS-5657

JavaFX™ Technology: Bring the Web with You: Multiple Interfaces to Games



➤ Related JavaOne Conference Labs, BOFs and Panels:

- LAB-7350
JavaFX™ Technology-Based Applications: Rich Client Applications with Cool E
- PAN-7372 Case Studies from the JavaFX™ Technology World
- BOF-5804 Meet with the JavaFX™ Tools Team
- BOF-6511 The Java™ Media Components API BOF
- BOF-5936 Meet the Java 2D™ API Graphics and Java Advanced Imaging Team
- BOF-5965 3-D Graphics APIs for the Java™ and JavaFX™ Platforms
- BOF-5501
Java™ Champions BOF: The Latest Buzz, Highlights, and Panel Discussion
- BOF-5992 How to Build RESTful
Clients with the JavaScript™, Ruby, and JavaFX™ Programming Languages
- BOF-4798 Parleys.com: An Adobe Flex/AIR and JavaFX™ Case Study
- BOF-5506 JavaFX™ TV Platform Overview

THANK YOU



Jim Weaver, JavaFX™ Script Author, Developer, Teacher
<http://JavaFXpert.com>

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