GUI

JavaFX
Overview

• similarly as in Swing
  – single-threaded UI

• UI thread
  – all UI changes from this thread
    
    Platform.runLater(Runnable runnable)
    
  – long-running operations -> own thread

• javafx.concurrent
  – Worker interface
    • similar to the SwingWorker class
  – Task, Service, ScheduledService
    • implementations of the Worker interface
    • Service executes Tasks
JavaFX Task\(<V>\>

- implements
  java.util.concurrent.FutureTask\(<T>\>

- executing
  Thread th = new Thread(task);
  th.setDaemon(true);
  th.start();

  - or
    ExecutorService.submit(task);

- one-time action
  - cannot be reused
JavaFX Task<V>

- property
  - ReadOnlyObjectProperty<Throwable> exception
  - ReadOnlyStringProperty message
  - ObjectProperty<EventHandler<WorkerStateEvent>> onCancelled
  - ObjectProperty<EventHandler<WorkerStateEvent>> onFailed
  - ObjectProperty<EventHandler<WorkerStateEvent>> onRunning
  - ObjectProperty<EventHandler<WorkerStateEvent>> onScheduled
  - ObjectProperty<EventHandler<WorkerStateEvent>> onSucceeded
  - ReadOnlyDoubleProperty progress
  - ReadOnlyBooleanProperty running
  - ReadOnlyObjectProperty<Worker.State> state
  - ReadOnlyStringProperty title
  - ReadOnlyDoubleProperty totalWork
  - ReadOnlyObjectProperty<V> value
  - ReadOnlyDoubleProperty workDone
**JavaFX Service\(<V>\)**

- non-visual component
- executes tasks
  - uses Executor (by default ThreadPoolExecutor)

```java
class MyService extends Service<String> {
    protected Task createTask() {
        return new Task<String>() {
            ... 
        };
    }
}
new MyService().start();
```
JavaFX Service<V>

- vlastnosti
  - ReadOnlyObjectProperty<Throwable> exception
  - ObjectProperty<Executor> executor
  - ReadOnlyStringProperty message
  - ObjectProperty<EventHandler<WorkerStateEvent>> onCancelled
  - ObjectProperty<EventHandler<WorkerStateEvent>>onFailed
  - ObjectProperty<EventHandler<WorkerStateEvent>>onReady
  - ObjectProperty<EventHandler<WorkerStateEvent>>onRunning
  - ObjectProperty<EventHandler<WorkerStateEvent>>onScheduled
  - ObjectProperty<EventHandler<WorkerStateEvent>>onSucceeded
  - ReadOnlyDoubleProperty progress
  - ReadOnlyBooleanProperty running
  - ReadOnlyObjectProperty<Worker.State> state
  - ReadOnlyStringProperty title
  - ReadOnlyDoubleProperty totalWork
  - ReadOnlyObjectProperty<V> value
  - ReadOnlyDoubleProperty workDone
ScheduledService\(<V>\)

- automatically restarts itself after an execution
Application

- Nodes
  - Button
  - Label
  - ...
  - Line
  - Circle
  - Rectangle
  - ...

Stage

Scene

Scene graph

Node

Node

Node
Canvas

- an image that can be drawn on using a set of graphics commands

```java
Canvas canvas = new Canvas(250,250);
GraphicsContext gc = canvas.getGraphicsContext2D();

gc.setFill(Color.BLUE);
gc.fillRect(75,75,100,100);
```
Games

- Canvas + AnimationTimer
SceneBuilder

- a visual tool for UI creation
  - Starting with Oracle Java SE 8u40, Oracle does not provide a separate set of accompanying JavaFX Scene Builder binaries...

- download