JavaFX Animations

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Animation Basics

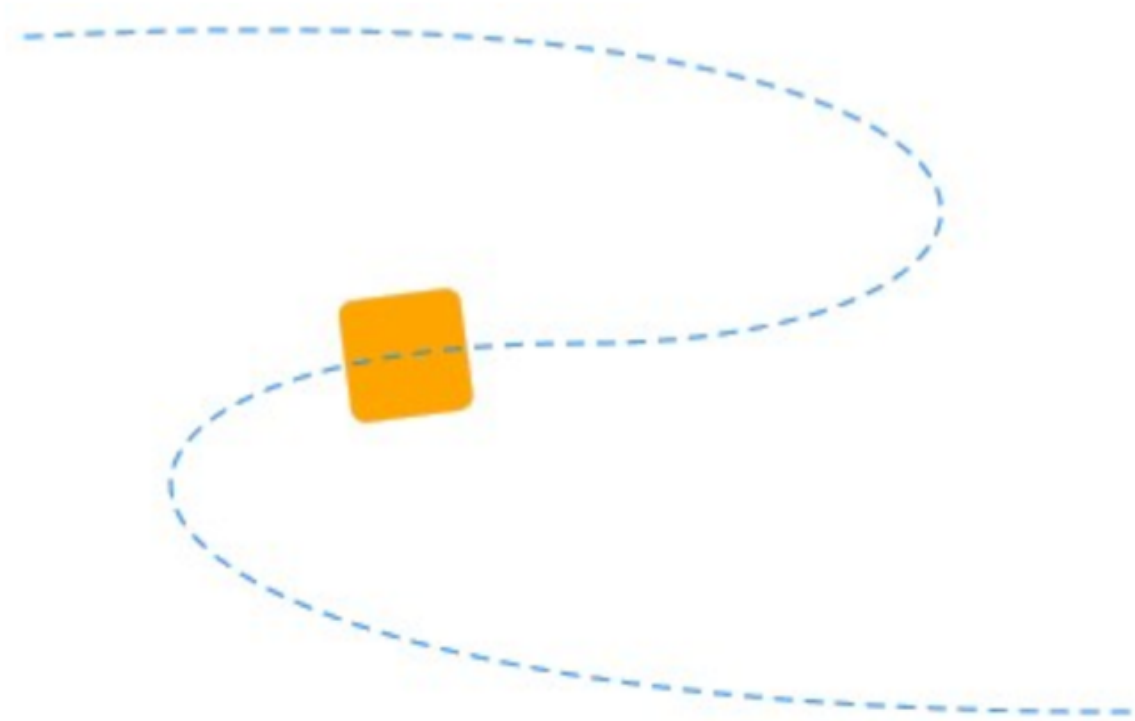
- Animation in JavaFX can be divided into timeline animation and transitions
- Timeline and Transition are subclasses of the javafx.animation.Animation class
- In general, animating an object implies creating illusion of its motion by rapid display
  - In JavaFX, a node can be animated by changing its property over time
- JavaFX provides a package named **javafx.animation**
  - This package contains classes that are used to animate the nodes
  - Animation is the base class of all these classes

Transitions

- Transitions in JavaFX provide the means to incorporate animations in an internal timeline
- Transitions can be composed to create multiple animations that are executed in parallel or sequentially
- **Fade Transition**
  - A fade transition changes the opacity of a node over a given time.
- **Path Transition**
  - A path transition moves a node along a path from one end to the other over a given time
- **Sequential Transition**
  - A sequential transition executes several transitions one after another

Path Transition

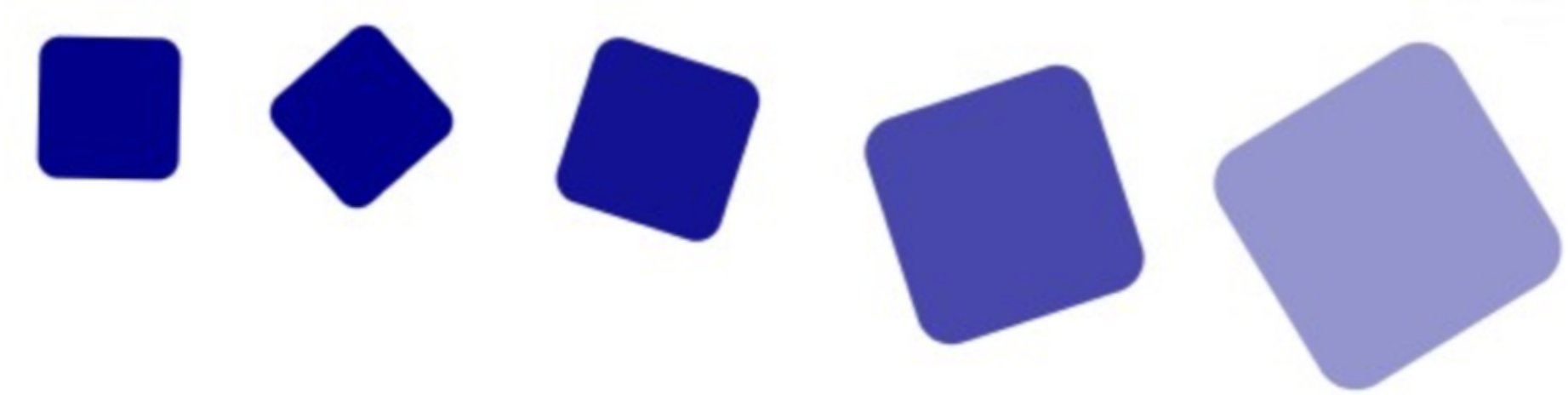
Figure 1-1 Path Transition



Parallel Transition

- A parallel transition executes several transitions simultaneously
- The following example shows a parallel transition that executes fade, translate, rotate, and scale transitions applied to a rectangle

Figure 1-2 Parallel Transition



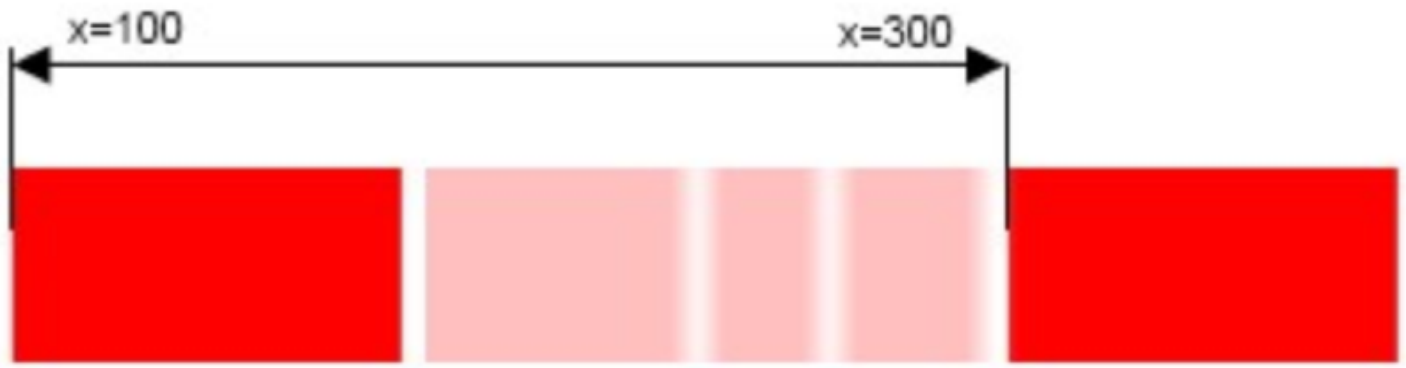
Timeline Animation

- An animation is driven by its associated properties, such as size, location, and color etc.
- Timeline provides the capability to update the property values along the progression of time
  - JavaFX supports key frame animation
- In key frame animation, the animated state transitions of the graphical scene are declared by start and end snapshots (key frames) of the state of the scene at certain times
  - The system can automatically perform the animation
  - It can stop, pause, resume, reverse, or repeat movement when requested

Basic Timeline Animation

- The example below animates a rectangle horizontally and moves it from its original position X=100 to X=300 in 500 ms
  - To animate an object horizontally, alter the x-coordinates and leave the y-coordinates unchanged

Figure 1-3 Horizontal Movement



Timeline Events

- JavaFX provides the means to incorporate events that can be triggered during the timeline play
- A Timeline processes individual KeyFrame sequentially in the order specified by KeyFrame.time
  - defined by one or more KeyFrames
  - A KeyFrame defines target values at a specified point in time that are interpolated along a Timeline
- The animated properties are interpolated to/from the targeted key values at the specified time of the KeyFrame to Timeline's initial position, depends on Timeline's direction
  - defined as key values in KeyFrame.values
- Timeline processes individual KeyFrame at or after specified time interval elapsed, it does not guarantee the timing when KeyFrame is processed'
- **Warning :** A running Timeline is being referenced from the FX runtime. Infinite Timeline might result in a memory leak if not stopped properly. All the objects with animated properties would not be garbage collected