



Mobile Information Device Programming (16)

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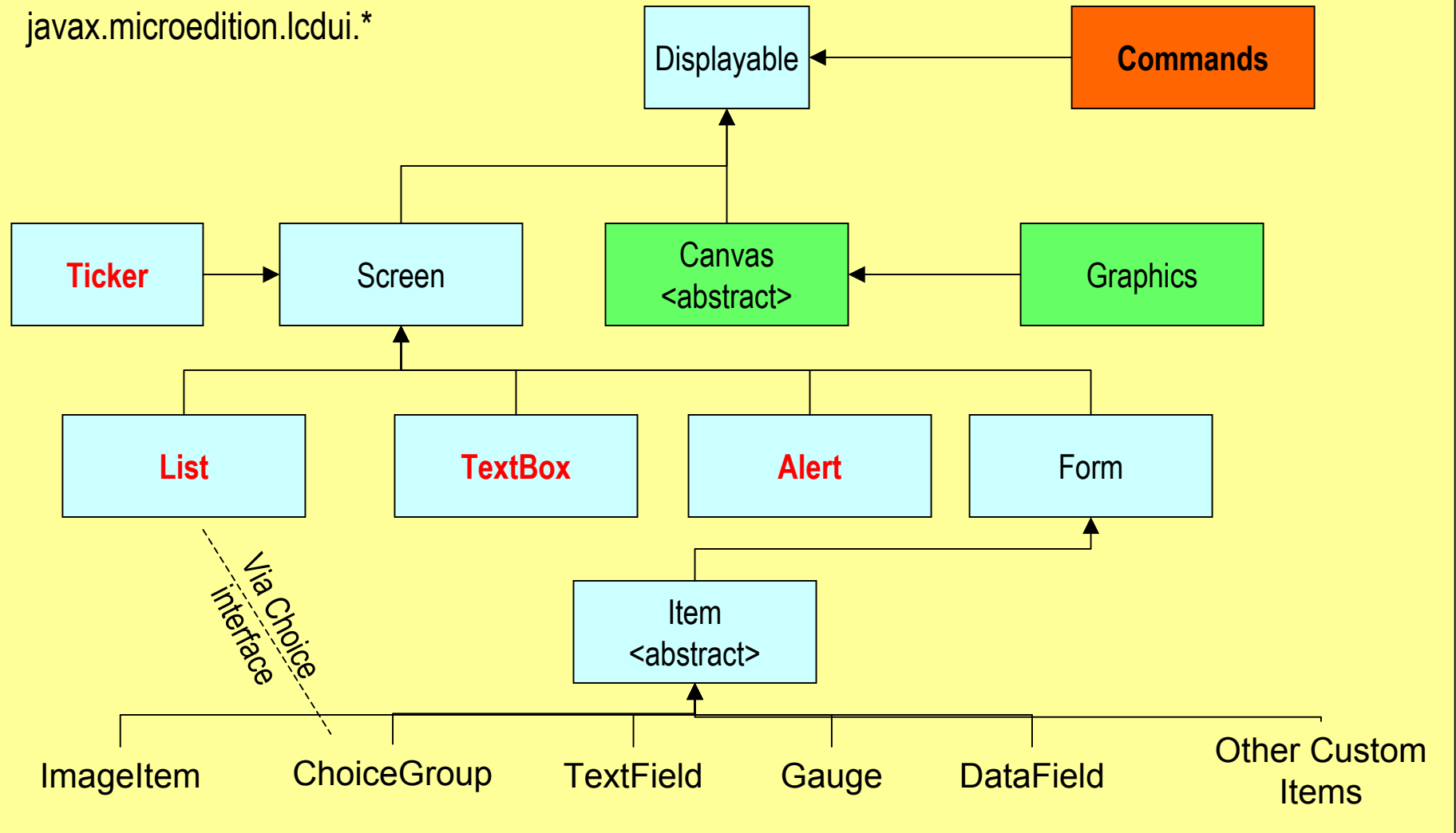
Animation

- MIDlets for **Animation** applications
- **Display Manager** API (Manage Displayable objects)
- **Animating** a series of Images
- Examples



Displayable Hierarchy

javax.microedition.lcdui.*





Facts

1. There is little to no complexity in moving from a **Form** to an **Alert** or **List**
2. There may be applications that you want to move between a number of *Displayables*
3. Going forward is normally straightforward but rewinding could be challenging – Hence
4. **DisplayManager** deals with MIDlets with a large number of *Displayables*



The Display Manager Class

- It leaves a **trail** as you move along the *Displayables* in your application.
- This **trail** makes moving back through *Displayables* much simpler.
- The *DisplayManager* class is not part of MIDP it is designed (by J. W. Muchow 2002)



Display Manager API

- The *DisplayManager* is implemented as a stack under `java.util.Stack`, The methods are:

<i>Method</i>	<i>Description</i>
<i>Constructor</i>	
<i>DisplayManager(Display display, Displayable mainDisplayable)</i>	Creates a new DisplayManager
<i>Methods</i>	
<i>void pushDisplayable(Displayable new Displayable)</i>	Push a Displayable object on to the stack
<i>void popDisplayable()</i>	Pop a Displayable object off the stack
<i>void home()</i>	Pop all Displayable objects and return to the "main" displayable object
REF: J. W. Muchow (2002), J2ME Technology & MIDP, The Sun Microsystems Press	

Example16-1: Coding an Animation Application



Note: this example is extracted from J.W. Muchow (2002) with minor modifications

- We need to create 5 MIDlets for this example:
 - A DisplayManager
 - A Main MIDlet called AnimTimer.java
 - A TimerCanvas to create the graphics and placing the images on display (we will use clipping techniques [why?])
 - OptionsList to choose the actions to be taken e.g. Start, Stop and Set Timer
 - SleepForm a form containing a gauge to control the speed of animation, and other commands to save the settings, going to the main menu and back to the previous display.
- Creating the images



Results





Ex 16-1: General

- Use a stack to push and pop Displayable objects
- The constructor needs to refer to a Displayable object e.g. Canvas, Form, ...
- Define an *Alert* component to pop up error messages if they occur
- Create a *Form* and define it as the main Displayable



Ex 16-1: General cont.

- Create the main MIDlet
- Show a Canvas with animated time
- Include start and stop configurations for the timer
- Adjust the sleep interval of the thread (setting the time the animation thread sleeps between repainting the display)



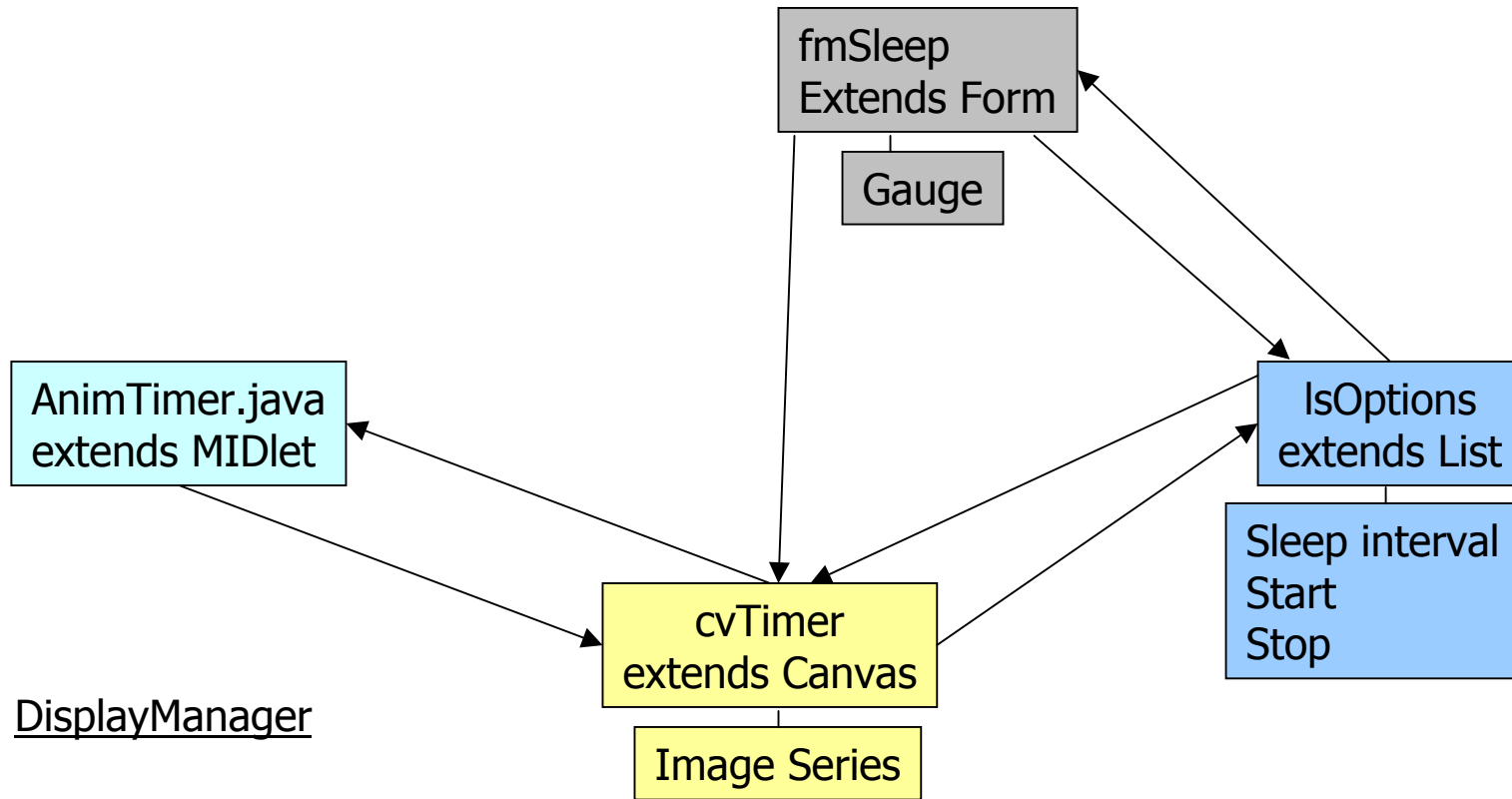
Ex 16-1: General cont.

- On the Sleep Form you will have 3 options:
 1. Back: returns to the Gauge
 2. Save: saves the current speed setting
(the higher the gauge the slower the animation)
 3. Home: to return to the animation.





Animation MIDlet Design



DisplayManager

pushDisplayable()
popDisplayable()
home()



Application Design

AnimTimer class

- *AnimTimer* is the main MIDlet class, its task is to initialise other components and manage the interface with application manager.



Application Design

cvTimer Class

cvTimer corresponds to the first instance of running *the application*.

- You can either Exit the application or choose from a list of options
- Here is the first encounter with *pushDisplayable()*
Calling the *DisplayManager* for the first time
- This call is to push a reference to the current *Displayable(cvTimer)* onto a stack





Application Design

IsOptions & fmForm Class

- From *IsOptions* you can return to *cvTimer* or Display Form (fmSleep)
- Note that when we move to fmSleep we push The current *Displayable* onto a stack
- From fmSleep you can either return to *IsOptions* (*popDisplayable()* from the stack) or *cvTimer* using *home()* method