

2D User Interfaces - Exercises

Tutorial 2

Canvas, Layers and LayerManager

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Overview

1. **Canvas**
2. **LayerManager**
3. **Layers (Sprites, TiledLayer)**
4. **Assignment & Tips**

Canvas

“**public abstract class** Canvas **extends** Displayable”

Used for:

- Displaying graphics
- Handling events (key events, key mappings)
- Getting device capabilities

Canvas

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/Canvas.html>

```
public class ExampleCanvas extends Canvas {
    //Constructor
    public ExampleCanvas() { }

    //Draw a blue text to the Canvas
    protected void paint(Graphics g) {
        g.setColor(0x0000ff);
        g.drawString("Test", 0, 0, Graphics.TOP | Graphics.LEFT);
    }
}
```

Trick: Get used to always set the color

In the Midlet class:

```
ExampleCanvas myCanvas = new ExampleCanvas();
Display.getDisplay(this).setCurrent(myCanvas);
```

Canvas – key handling

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/Canvas.html>

```
public class ExampleCanvas extends Canvas {
    ...
    //Handle keystrokes
    public void keyPressed (int keyCode) {
        switch (getGameAction(keyCode)) {
            case LEFT: break;
            case RIGHT: break;
            case UP: break;
            case DOWN: break;
            case FIRE: break;
            ...
        }
        repaint();
    }
}
```

Other handlers:

`keyPressed(int keyCode)` | `keyReleased(int keyCode)` | `keyRepeated(int keyCode)`

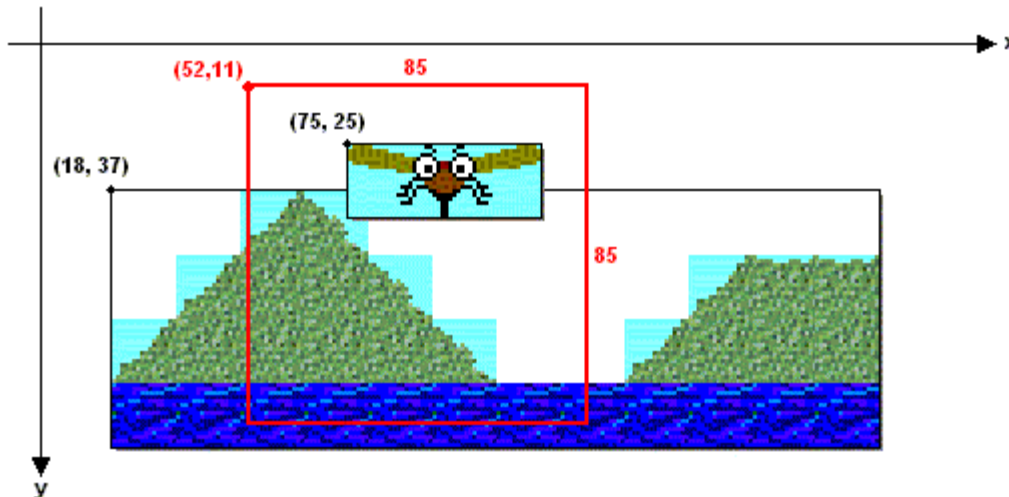
LayerManager

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/manager/layer/manager.html>

“`public class LayerManager extends Object`”

Used for:

- Management of a series of Layers
- Index of Layer is like z-order (0: closest to user)
- „view window“ as visible part (scrolling)
- Paint to the screen „`print(g, 17, 17)`“



LayerManager - Example

In the Canvas-Class:

...

```
//Create LayerManager
```

```
LayerManager manager = new LayerManager();
```

```
//Create a LayerObject (e.g. Sprite)
```

```
Sprite myLayer = new Sprite(Image.createImage(100,200));
```

```
//add the Layer to the manager
```

```
manager.append(myLayer);
```

...

```
protected void paint(Graphics g) {
```

```
    manager.paint(g, 0, 0);
```

```
}
```

Layer, Sprite, TiledLayer

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/dui/game/Layer.html>

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/dui/game/Sprite.html>

Layer is a abstract class which must be implemented

Implementations are **Sprite** and **TiledLayer**

```
public class MySpriteClass extends Sprite {  
    ...  
    //Constructor  
    public MySpriteClass(Image image, int initialX, int initialY) {  
        super(image);  
        //sets the image and the graphics-variables  
        myImage = image;  
        myGraphics = image.getGraphics();  
        myGraphics.drawRect(0,0,10,10);  
        //Set the initial position of the List relative to the Canvas  
        setPosition(initialX, initialY);  
    }  
}
```

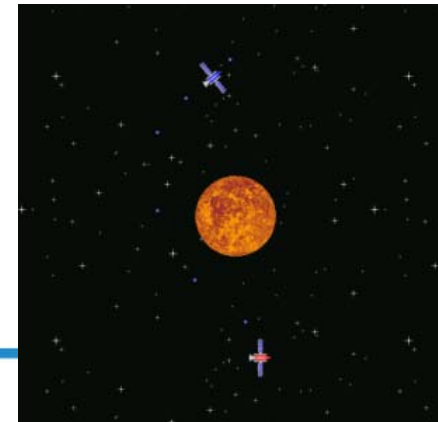
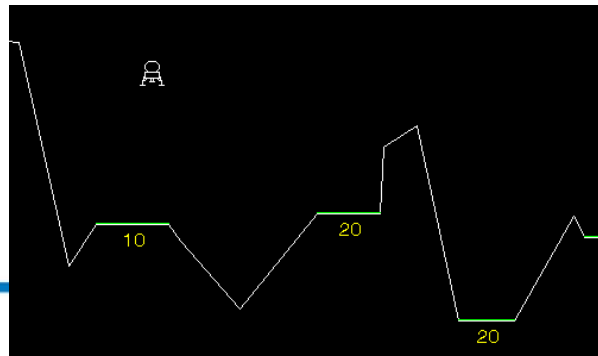
Exercise Assignment

Implement a SimpleList-Class which shows hierarchical Data and has at least the following functionality:

- Add/remove Groups to/from the List or an existing Group
- Add/and remove Items to/from the List or an existing Group
- Mark the selected Item or Group
- Navigate to that List

Extra Hattrick Exercise:

- Implement a 'game' where the main character always stays in the middle of the screen while the background moves behind, e.g.
 - Lunar Lander
 - Space Wars



Tips & Hints & Questions

Read the API documentation at:

<http://java.sun.com/javame/reference/apis/jsr118/>

Especially of the Canvas, LayerManager, Layer, Sprite and TiledLayer:

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/ui/Canvas.html>

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/ui/game/Layer.html>

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/ui/game/LayerManager.html>

<http://java.sun.com/javame/reference/apis/jsr118/javax/microedition/lcd/ui/game/Sprite.html>

Questions

- Is an empty element a group? Can it be opened?
- What is the main root node?

Exercise Presentation

- When you finished your work
 - Come by in our office (with appointment) and present your work before the next tutorial is held (for today's exercise before the tutorial session on 06.11.08 at 13.00h)
 - If you are fast, you can present your solution in the lab session
 - Room: 03.13.035
- Q/A: maierp@in.tum.de / toennis@in.tum.de
- 2dui@mailnavab.in.tum.de

- See you back here on 30.10.08 at 13.00h for the lab session