LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

LFE Medieninformatik - Gregor Broll, Alexander De Luca

Praktikum Entwicklung von Mediensystemen

Mobile Dienste für Studenten

Http and Record Stores – 10/30/2009

Outline

Outline:

- **Solution for exercise 1**
  - Camera MIDlet
  - Audio MIDlet
- **Mobile Http-connections and Record Stores**
- **Exercise 2**

Exercise 1 - Solutions

Camera MIDlet

1. Create player and control:

```
//initialize player with camera source
player = Manager.createPlayer("capture://video");

//realize player
player.realize();

// VideoControl object for controlling the display
videoControl = (VideoControl)player.getControl("VideoControl");
```

Exercise 1 - Solutions

Camera MIDlet

2. Show video source on screen (1/2):

- Attach to Form

```
if(videoControl!=null) {
    Item videoItem = (Item)(videoControl.initDisplayMode(
              VideoControl.USE_GUI_PRIMITIVE,null));
    videoItem.setLayout(Item.LAYOUT_CENTER |
                        Item.LAYOUT_NEWLINE_AFTER);
    form.append(videoItem);
 }
```

Camera MIDlet

2. Show video source on screen (2/2):

- Attach to Canvas

```
int width = getWidth();
int height = getHeight();

videoControl.initDisplayMode(
 videoControl.USE_DIRECT_VIDEO, this);
 try { // display video 2 pixels away from borders
     videoControl.setDisplayLocation(2, 2);
     videoControl.setDisplaySize(width - 4, height - 4);
 }...
 videoControl.setVisible(true);
```

Exercise 1 - Solutions

Camera MIDlet

3. Start Player:

```
// starts the player
 // prefetch() is called implicitly
 player.start();
```

Camera MIDlet

4. Make a snapshot (1/2):

- Only a snapshot of the current video stream.
- Java ME cannot use the full available camera resolution.

  => must be considered at design time
- e.g. Nokia 3650 supports 160 x 120 pixels only
- Use getSnapshot() method with a supported image type or null for standard encoding (mostly PNG)

Camera MIDlet

4. Make a snapshot (2/2):

```
new Thread() { // anonymous Thread definition
    public void run() {
        try {
            // synchronize this
            synchronized(CameraMidlet.this) {
                byte[] imageData;
                imageData = videoControl.getSnapshot(null);
            }
        } catch(MediaException e) {...}
    }
}.start();
```

Exercise 1 - Solutions

Camera MIDlet

5. Close Player

- Close the Player at the end
- e.g. when exiting the MIDlet

```
player.close();
```

Camera MIDlet

6. Show Picture:

```
// create image out of the byte array
Image photo = Image.createImage(imageData, 0,
            imageData.length);
// append the image directly to a form
form.append(photo);

or

// create an ImageItem and append this
ImageItem photoItem = new ImageItem(null,
          photo, ImageItem.LAYOUT_CENTER, null);
form.append(photoItem);
```

Audio MIDlet

1. Create player and control:

```
// create the player using standard encoding
 player = Manager.createPlayer("capture://audio");
 player.realize();
 rc = (RecordControl)player.getControl("RecordControl");

 // create an OutputStream for the RecordControl
 output = new ByteArrayOutputStream();
 rc.setRecordStream(output);
```

Audio MIDlet

2. Start Recording:

- Recording should run in an extra Thread
- Will run until stopped

```
// At first start the control
 rc.startRecord();

 // then start the player
 player.start();
```

Audio MIDlet

3. Stop Recording:

```
// commiting the control finishes recording
 rc.commit();

 // save the recordedData in a byte array
 byte[] soundData = output.toByteArray();

 // close the player
 player.close();
```

Exercise 1 - Solutions

Audio MIDlet

4. Play recorded data:

```
// create an input stream with the byte array
ByteArrayInputStream audioInputStream = new
          ByteArrayInputStream(soundData);
player = Manager.createPlayer(audioInputStream, "audio/x-wav");
player.prefetch();

// add PlayerListener for checking on player status
player.addPlayerListener(this);
player.start();
```

Common Hints and Tips

Hints and Tips:

- **Packages should be used but in a reasonable number (virtual machine might have problems with too many packages)**

- **On device debugging is terrible but some tools like MyRedirector (http://www.mobile-j.de/snipsnap/space/J2ME/System.out+redirect+on+S60+3rd+Edition) are helpful (pre-installed on many mobile phones in our labs)**

Java ME Network Programming

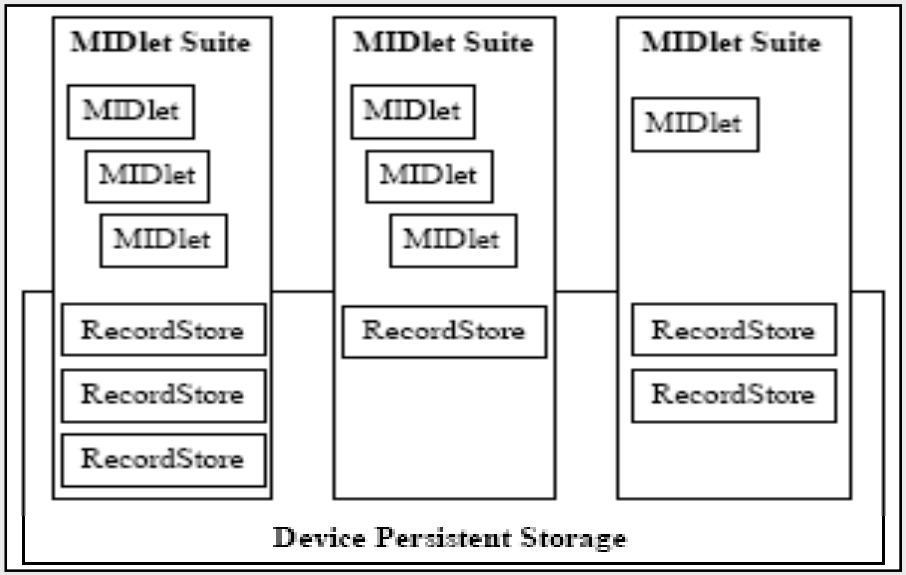
- Generic Connection Framework (GCF) – part of CLDC – is the basis for network programming in Java ME
- Collection of interfaces in CLDC - implemented by MIDP
- No constructors for various connection objects – constructed by calling static method *open(url)* of factory-class *Connector*
- Returns an object that implements one of the generic connection interfaces which is specified by a protocol-identifier
- CLDC defines interfaces for HTTP, socket, datagram and serial port
- MIDP additionally supports HTTPS, server-socket and SSL

```
HttpConnection hc =
    (HttpConnection)Connector.open(“http://www.someurl.de”);

Connector.open(„socket://127.0.0.1:32780“);
Connector.open(„comm:IR0;baudrate=19200“);
Connector.open("file:/myFile.txt");
```

Persistent Storage: Record Stores

- **Record store**
  - contains records (pieces of data)
  - instance of javax.microedition.rms.RecordStore
- **Every MIDlet in a MIDlet Suite can access every Record Store**
- **Since MIDP 2.0:**
  - Access across Suite boarders possible !!!



Java ME Record Management System (RMS) II

- Java ME provides only limited features to read and write data on mobile devices and store them permanently
- Package javax.microedition.rms; main class RecordStore => named „database“; collection of uniquely identified Records (byte arrays)
- RecordStores are identified by their name, Records by their ID (primary key)
- RMS allows manipulation and sharing of records within RecordStores
- Accessing records by their ID is often tedious, use Enumeration instead

```
RecordStore db = RecordStore.openRecordStore("myDBfile", true);

byte[] b = baos.toByteArray();
myDBfile.addRecord(b, 0, b.length);
```

Exercise 2 - Overview

Goal:

- Introduction to Java ME network programming and Record Management System (RMS)
- Part of CLDC and MIDP => should run on all mobile phones

Task:

- Create a MIDlet that sends an arbitrary string to a server and displays the answer
- Implement a history-feature that stores the last 5 answers from the server permanently – even after the MIDlet is shut down

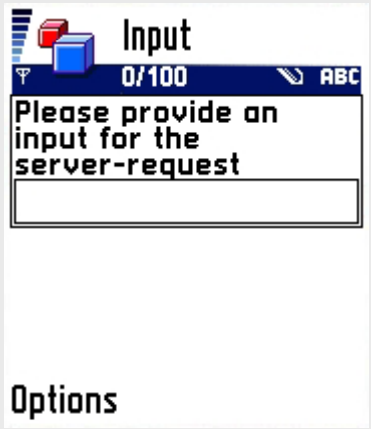
Server URL:

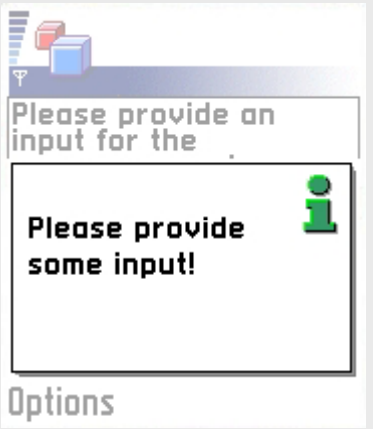
- http://murx.medien.ifi.lmu.de/~gregor/echo.php?input=tralala

Exercise 2 - Details

Different Tasks/Interfaces:

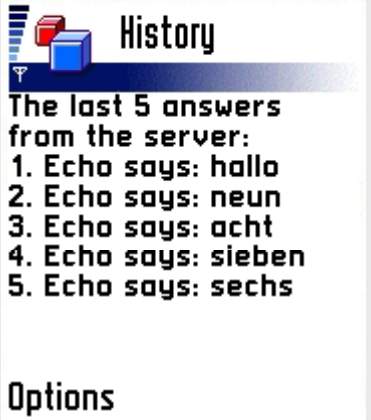
- Inserting an arbitrary string
- Checking the validity of the input (no input – no connection)
- Sending the input to the server (e.g. display a waiting screen)
- Displaying the answer from the server
- Displaying a history of the last 5 answers (which are stored permanently)





Connection Setup/Threading:

- Use either HTTP POST- or GET-request
- Run Http-connection in extra thread
- Simple threading enough



Exercise 2 - Submission

Solution:

- Must work on a mobile phone (test on emulator first)
- Mobile phones and SIM cards can be lent from the university (Alexander De Luca, 5th floor)

Deadline and Submission:

- Each student must submit his/her own solution via email to gregor.broll(at)ifi.lmu.de and alexander.de.luca(at)ifi.lmu.de by Thursday, November 5rd, 12 p.m.
- Create a zip-file named after you and insert a folder called excercise2 containing your solution.

Questions?

Have fun!