Mobile Application Development

MTAT.03.262

Satish Srirama
satish.srirama@ut.ee
Course Purpose

• Introduce mobile application development
• Introduce multiple mobile platforms
  – Android OS
• Introduction to location based services
• Working with sensors
• Research in mobile cloud domain

Questions

• Have you ever programmed for mobile devices?

• How comfortable are you with programming?
  – Java?
    • External APIs?
  – Web programming?

• Have you heard of cloud computing?
Related Courses

• **MTAT.03.266** Mobile Application Development Project (3 ECTS)
  – Tue. 10.15 - 12.00, Ülikooli 17 - 219

• **MTAT.03.280** Mobile and Cloud Computing Seminar (3 ECTS)
  – Thu. 14.15 - 16.00, Ülikooli 17 - 220

• **MTAT.08.027** Basics of Cloud Computing (3 ECTS)
  – Spring 2017
Outline

• Mobile application development with Android
• Location Based services
• Sensor development with Arduino
• Mobile Cloud research
• Apple iOS
Grading

• No written exam
• Active participation in the lectures (Max 5%)
  – 80% attendance is compulsory
  – Submission of exercises performed in class (80% is compulsory) -- Let us call them course exercises
• Homework – 20%
  – 4 Home works
• Home Assignments – 75%
  – 3 Home Assignments
• You should score 50% in each subsection
Grading policy

• Up to 1 week delay
  – Your submission will be graded for 80%

• After 1 week delay until end of course
  – Your submission will be graded for 50%
Grading - continued

• Incentive for taking projects
  – “Mobile application development project” - MTAT.03.266
    • 3 more ECTS
    • 1 Man Month task / Person
    • 3-4 persons per group
    • To be delivered by middle of December 2016
Course schedule

• **Lectures:** Friday 14.15 - 16.00, J. Liivi 2-122
• **Practice sessions:** Friday 16.15 - 18.00, J. Liivi 2-122

• **Schedule of the lectures**
  
  [https://courses.cs.ut.ee/2016/MAD/fall/Main/Lectures](https://courses.cs.ut.ee/2016/MAD/fall/Main/Lectures)
Lecture 1

MOBILE APPLICATION DEVELOPMENT
The Seven Mass Media

First Mass Media Channel - Print from the 1500s
Second Mass Media Channel - Recordings from 1900
Third Mass Media Channel - Cinema from 1910s
Fourth Mass Media Channel - Radio from 1920s
Fifth Mass Media Channel - TV from 1950s
Sixth Mass Media Channel - Internet from 1990s
Seventh Mass Media Channel - Mobile from 2000s

[Tomi T Ahonen]

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country or region</th>
<th>Number of mobile phones</th>
<th>Population</th>
<th>Phones per 100 citizens</th>
<th>Data evaluation date</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>World</td>
<td>6,800,000,000+</td>
<td>7,012,000,000</td>
<td>67</td>
<td>2013[7][9]</td>
</tr>
<tr>
<td>01</td>
<td>China</td>
<td>1,206,553,000+</td>
<td>1,349,565,838</td>
<td>69.2</td>
<td>September 2013[4]</td>
</tr>
<tr>
<td>02</td>
<td>India</td>
<td>667,600,000</td>
<td>1,220,800,359</td>
<td>70.72</td>
<td>30 April 2013[7]</td>
</tr>
<tr>
<td>03</td>
<td>United States</td>
<td>327,577,529</td>
<td>310,868,000</td>
<td>103.9</td>
<td>June 2013[8]</td>
</tr>
<tr>
<td>05</td>
<td>Russia</td>
<td>256,116,000</td>
<td>142,905,290</td>
<td>155.5</td>
<td>July 2013[12]</td>
</tr>
<tr>
<td>06</td>
<td>Indonesia</td>
<td>236,800,000</td>
<td>237,566,363</td>
<td>99.99</td>
<td>September 2013[10]</td>
</tr>
<tr>
<td>07</td>
<td>Pakistan</td>
<td>129,583,076</td>
<td>178,854,781</td>
<td>72.45</td>
<td>September 2013[14]</td>
</tr>
<tr>
<td>08</td>
<td>Japan</td>
<td>121,246,700</td>
<td>127,628,095</td>
<td>55.1</td>
<td>June 2013[15]</td>
</tr>
<tr>
<td>09</td>
<td>Nigeria</td>
<td>11,400,000</td>
<td>165,200,000</td>
<td>69</td>
<td>May 2013[16]</td>
</tr>
<tr>
<td>10</td>
<td>Bangladesh</td>
<td>11,057,500</td>
<td>165,039,000</td>
<td>73.8</td>
<td>September 2013[17]</td>
</tr>
</tbody>
</table>

Report: Mobile cloud to grow beyond $11 billion in 2018

Written by CooperEgg // July 12, 2012 // No Comment // Cloud Performance

The proliferation of smartphones, tablets and other mobile devices is contributing to change in the private sector, as businesses continue to leverage these gadgets in an attempt to enhance efficiency and potentially gain a competitive advantage. According to a new report by Global Industry Analysts, the evolution of mobility is also changing the cloud computing landscape, pushing the mobile cloud market to generate more than $11 billion in revenue by 2018.

Verizon's Stratton: The Future Of IT Is Mobile And Cloud

[Comment Now] [Follow Comments]
Popular consumer mobile applications

• Location-based services (LBSs)
  – Deliver services to users based on his location

• Mobile social networking
  – Most popular social networking platforms have apps for mobiles

• Mobile commerce
  – An extension of e-commerce

• Mobile payment
  – Near field communication (NFC) payment
Popular consumer mobile applications - continued

• Context-aware services
  – Context means person's interests, history, environment, connections, preferences etc.
  – Proactively serve up the most appropriate content, product or service

• Mobile instant messaging (MIM)
  – Skype for mobiles

• Mobile e-mail

• Mobile video
Variety of languages and platforms to choose from

<table>
<thead>
<tr>
<th>Programming language</th>
<th>Debuggers available</th>
<th>Emulator available</th>
<th>Integrated development environment available</th>
<th>Cross-platform deployment</th>
<th>Installer packaging options</th>
<th>Development tool cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe AIR</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, Flash Builder, Flash Professional</td>
<td>iOS (iPhone, iPad, iPod touch), Android, BlackBerry</td>
<td>The native distribution format of each platform</td>
<td>Flash Builder, Flash Professional - Commercial licenses available Adobe AIR SDK (command line tool) - Free</td>
</tr>
<tr>
<td>Airplay SDK (Now Marmalade)</td>
<td>C, C++</td>
<td>Yes</td>
<td>Visual Studio, XCode</td>
<td>All native: Android, BlackBerry, BREW, iOS (iPhone), Maemo, Palm/WEBOS, Samsung bada, Symbian, Windows Mobile 6.x and desktop, OSX</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>alcheMo</td>
<td>Java</td>
<td>Yes</td>
<td>Debugger integrated in Visual Studio, Eclipse or XCode</td>
<td>Android, BREW, iOS (iPhone), Windows Mobile</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>Android</td>
<td>Java but portions of code can be in C, C++</td>
<td>Yes in Eclipse, standalone debugging monitor available</td>
<td>Yes, in Eclipse, Project Kneural Android plugin for NetBeans</td>
<td>Android only, because of Dalvik VM, March 2009</td>
<td>.apk</td>
<td>Free</td>
</tr>
<tr>
<td>Appcelerator</td>
<td>JavaScript</td>
<td>Yes</td>
<td>Satoshi Srinivasa, internal SDK</td>
<td>Android, BlackBerry, Blackberry dropped</td>
<td>The native distribution format of each platform</td>
<td>Apache 2.0 license, commercial licenses</td>
</tr>
</tbody>
</table>

http://en.wikipedia.org/wiki/Mobile_application_development
http://en.wikipedia.org/wiki/Mobile_operating_system
Popular platforms – Market share

http://en.wikipedia.org/wiki/Mobile_operating_system
The devices we use
MOBILE APPLICATION DEVELOPMENT WITH ANDROID
Key Mobile Challenges

- Low processing power
- Limited RAM
- Intermittent, low bandwidth, high latency data connections
- Impact on battery life