SSE3052: Embedded Systems Practice

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Introduction

- Schedule
  - 18:00 ~ 21:45 (Tue.)
  - Recorded lecture+Online lecture
- Course homepage
  - all contents will be uploaded on i-Campus
  - lecture slides, announcements, exam scores, projects, etc.
- TAs
  - 안민우
    - minwoo.ahn@csi.skku.edu, #400509 in Semiconductor Bldg.
  - 김범석
    - bumsuk.kim@csi.skku.edu, #400509 in Semiconductor Bldg.

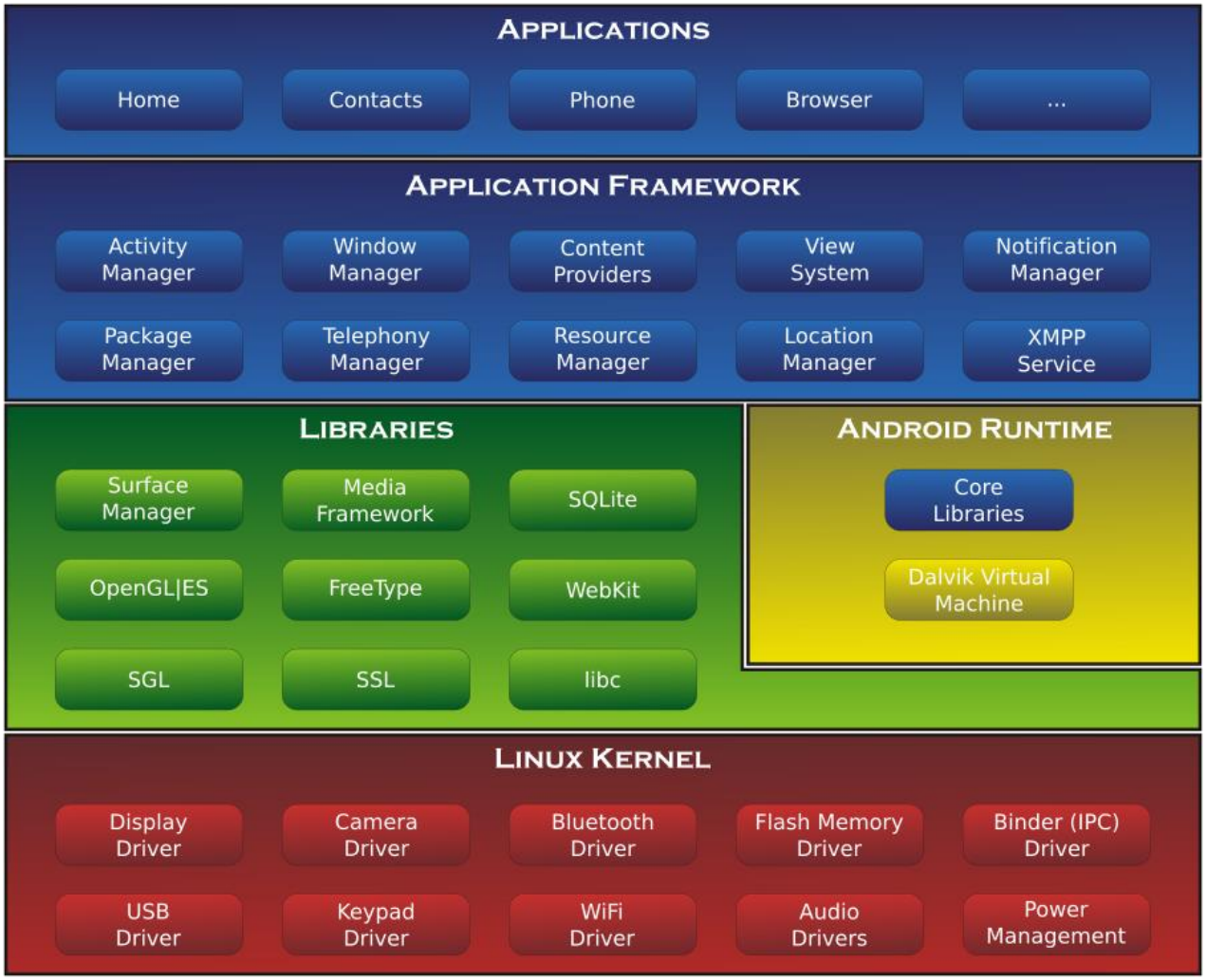
Mobile Smart Device

- General-purposed system
  - Plenty of apps in market
  - Foreground/background apps
- Networked system
  - Internet connectivity via wireless network
  - Fetch data from the Internet
  - Sync user data with cloud
- Battery-backed system
  - Limited operating time
  - Energy efficiency
- Resource-constrained system
  - Limited resources (e.g., memory, CPU, storage)
  - Efficient use of them is important

Android

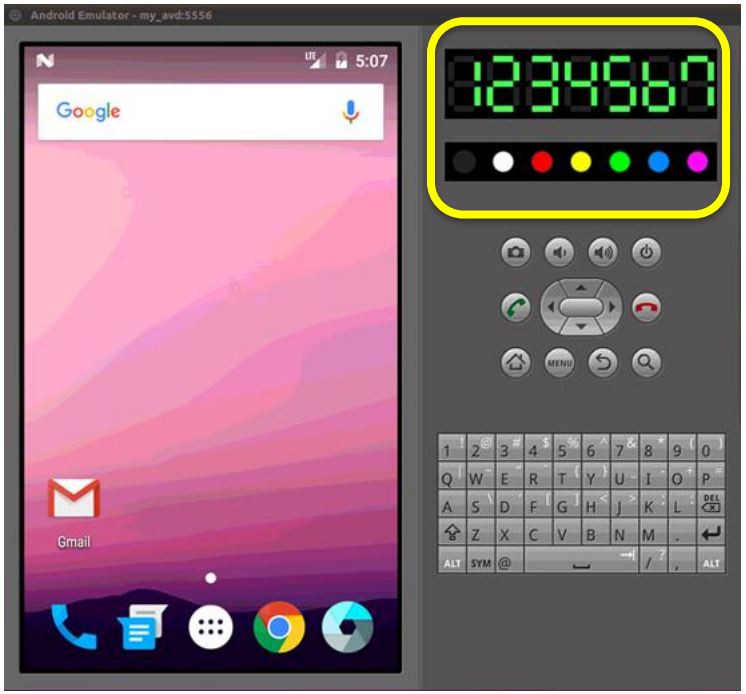
- The most popular mobile operating system

Android Software Stack



Course Plan

- Experiment
  - Linux kernel programming
    - Device driver programming
  - Android programming
    - Android app programming
- Programming assignment
  - Building a soft device
- Term project
  - Developing an Android app



Course Schedule

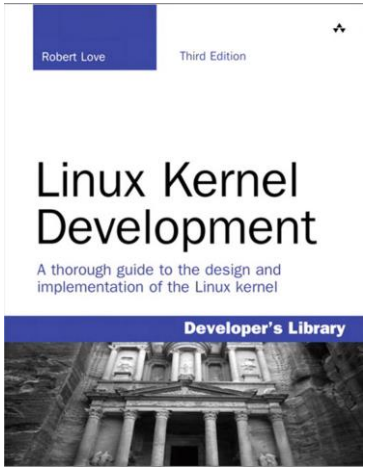
Week	Topic
Week 1	Course overview + Environment setup
Week 2	System call
Week 3	Virtual device
Week 4	Memory mapped I/O
Week 5	Soft device+Programming assignment
Week 6	Java introduction
Week 7	Java introduction (cont'd) + Term project proposal
Week 8	Hello Android
Week 9	Layout
Week 10	Activity, Intent, and Android services
Week 11	Java Native Interface
Week 12	Notification
Week 13	Introduction to Kotlin
Week 14	Content provider+Project presentation
Week 15	Final exam

Prerequisites

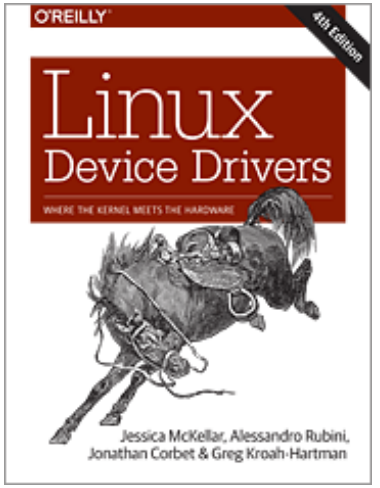
- Courses
  - Operating Systems: SSE3044
  - Embedded System Design: ICE3028
  - System Software Experiment 2: SSE2033
- Required skills
  - Fluent C programming skills
  - Object-oriented programming skills
    - C++ mandatory, Java optional
  - Basic knowledge of Unix/Linux systems
  - Computer architecture
    - x86 mandatory, ARM optional

References

- Linux Kernel Development
  - 3rd edition
  - Rovert Love
  - Pearson Education, Inc.



- Linux Device Drivers
  - 3rd edition
  - J. Corbet, A. Rubini, and G. Hartman
  - O'Reilly
  - 2005



References

- 인사이드 안드로이드
  - 송형주, 김태연, 박지훈, 이백, 임기영
  - 위키북스
  - 2010

- 안드로이드의 모든것 분석과 포팅
  - 고현철, 유형목
  - 한빛미디어
  - 2011

References

- Linux
  - Linux Cross Reference: http://lxr.free-electrons.com
- Android
  - Development: https://developer.android.com/guide/index.html
  - Android open-source project: https://source.android.com
  - Android Studio: https://developer.android.com/studio/index.html
- Java
  - Java API: https://docs.oracle.com/javase/7/docs/api/

Class Policies

- Grading policy (subject to change)
  - Lab + Report: 10%
  - Programming assignments: 20%
  - Term project: 30%
  - Final exam: 40%
- Lab attendance policy
  - You have to complete your lab assignment in each day
  - Up to four absences will be tolerated
    - You still need to complete your lab on time
    - 10% delay penalty per day

Questions?