CS340
Lecturer: Dr. Simina Fluture
Homework 1

✓PART A:
Two of the most popular operating systems are MS Windows and UNIX. *If you want in your outline you can choose the Mac OS instead of Unix.*
In about two pages, give an outline of each of them. Emphasize on the main characteristics and the features and advances of the most important versions.

✓PART B: (half to one page) What is an Android operating system? What are its characteristics and applications?

PART C:
   ✓ In about half page give characteristics **of real-time operating systems**. Give examples of real-time operating systems. NOTE: name them don't give application of them.
   ✓ In about half page describe what an **embedded system** is. Give examples of embedded systems.
   ✓ Are embedded systems the same as real-time systems? Discuss.
   ✓ What are TSR processes. Give examples of TSR processes of our days.

✓PART D:
Do an Internet search and give an overview for Interrupts and Interrupt Request.

   • Unix (linux)- computer:
· Use the man command to find out about the trap instruction.
Type: man trap
Give an **overview** of what you read (not cut and paste). If your attempt is unsuccessful do a search on the Internet.

Make sure you list the used sources.

✓PART E:
Carefully read the posted Grading Policy and the definitions for Plagiarism and Cheating posted on the course webpage under **Academic Integrity**

If you have any questions related to these topics please email me. Otherwise, please enter your name in the following paragraph. At the end of the paragraph sign your name by entering the initials.

I, ___YUQIAN ZHANG___ *have carefully read and understood the posted Grading Policy, and the definitions of Cheating and Plagiarism given in the Academic Integrity link. I am aware that any student caught cheating or plagiarizing will automatically receive an F for the course and that other forms of dishonesty will result in similar actions.*
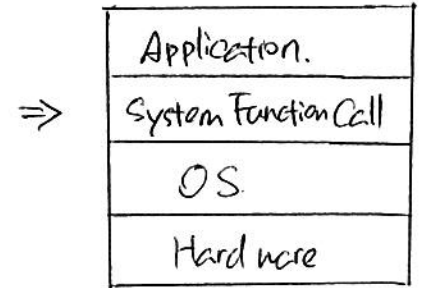
___YZ.___

Name Initials

Part A.

• Outline of MS Windows

Application.
System Function Call
OS.
Hardware
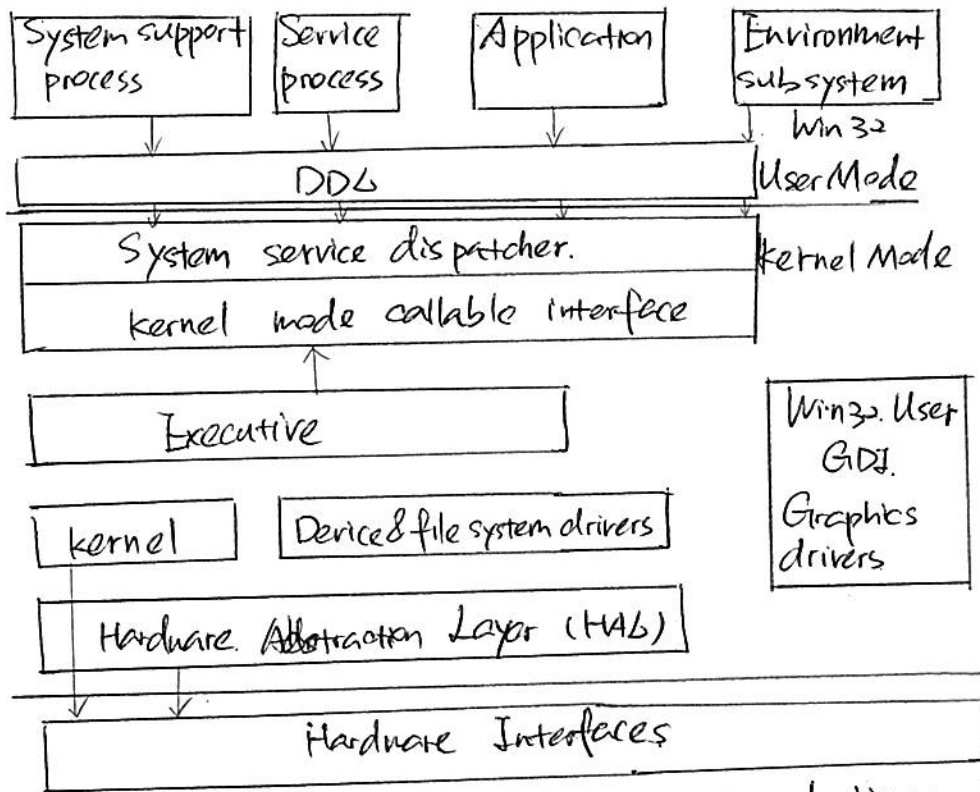
abstract.

⇒

- picture from Peiking University. Online course on coursera.

(Buses, I/O devices, interrupts, interval timers, DMA, memory cache control ...)

• For first OS for the PC – DOS

Features: — Single user system
Characters — Machine independence.
advances. — Program control.
- Peripheral management.
- Managing files
- processing commands
- Managing Input and output.
- Managing Memory
- Operating with Assembler.

• Win95

Features: — 32 bit self contained operating system
C ——— —built in enhanced version of DOS
A ———
- Intro 'Start' taskbar.
- formed by a large number of Virtual device drivers
- Plug & play capabilities
- Memory limitation expanded.
- shipped with The Microsoft Network

* __Win 98.__ Cont'd.
  - Graphical user Interface.
  - Icons. (Apps. Doc. Prg).
  - Start Button.
  - Taskbar.
  - Windows Explorer.
  - Right/Mouse Button.
  - Long File Names
  ✳ Multitasking
  - Shortcuts
  - Easy Internet Access
  - Help.

- __Win Me.__
  - Graphical OS.
  - last OS in Win 9x
  - Include IE s> Media Player.
  - Fast boot times
  - ↑ power management and suspend resume operations
  - Include USB devices & printers
  - ↓ buggy & unstable.

- __Win XP.__
  - symbolize the innovation
  - experience for personal PC

- __Win. Vista.__
  - Processor: 1 GHz Intel-compatible
  - Memory: 1GB RAM.
  - Drives: 40 GB disk space.
  - DVD drive.
    Standard Sound Card
    Direct compatible video card
    Video RAM.

- __Win 7.__ - More combinated Personal & Business
- __Win 8.__ - Personal computer OS.
  - Change OS platform
  - competing with Mobile OS.

- from. LinkedIn Lectures

- __Outline of Unix.__

  The Unix OS has following features:

  - Multitasking and multi user.

  - Programming Interface

  - Use of files as abstractions of devices and other objects

  - Built-in. networking (TCP/IP is standard)

  - Persistent system service process called "daemons" and managed by init

- from. wikipedia.

● Outline of Unix   Cont'd.

UNIX commands Libraries

System call interface.   (User)

Kernel   (Shell)

Hardware

User programmes

Libraries.

User Level

Kerne level

System call interface

File Subsystem.

Buffer Cache.

process Control subsystem

Interprocess Communication

Scheduler

Memory Management.

Character. | Block
Device Drivers

Hardware Control.

Hardware level.

Hardware
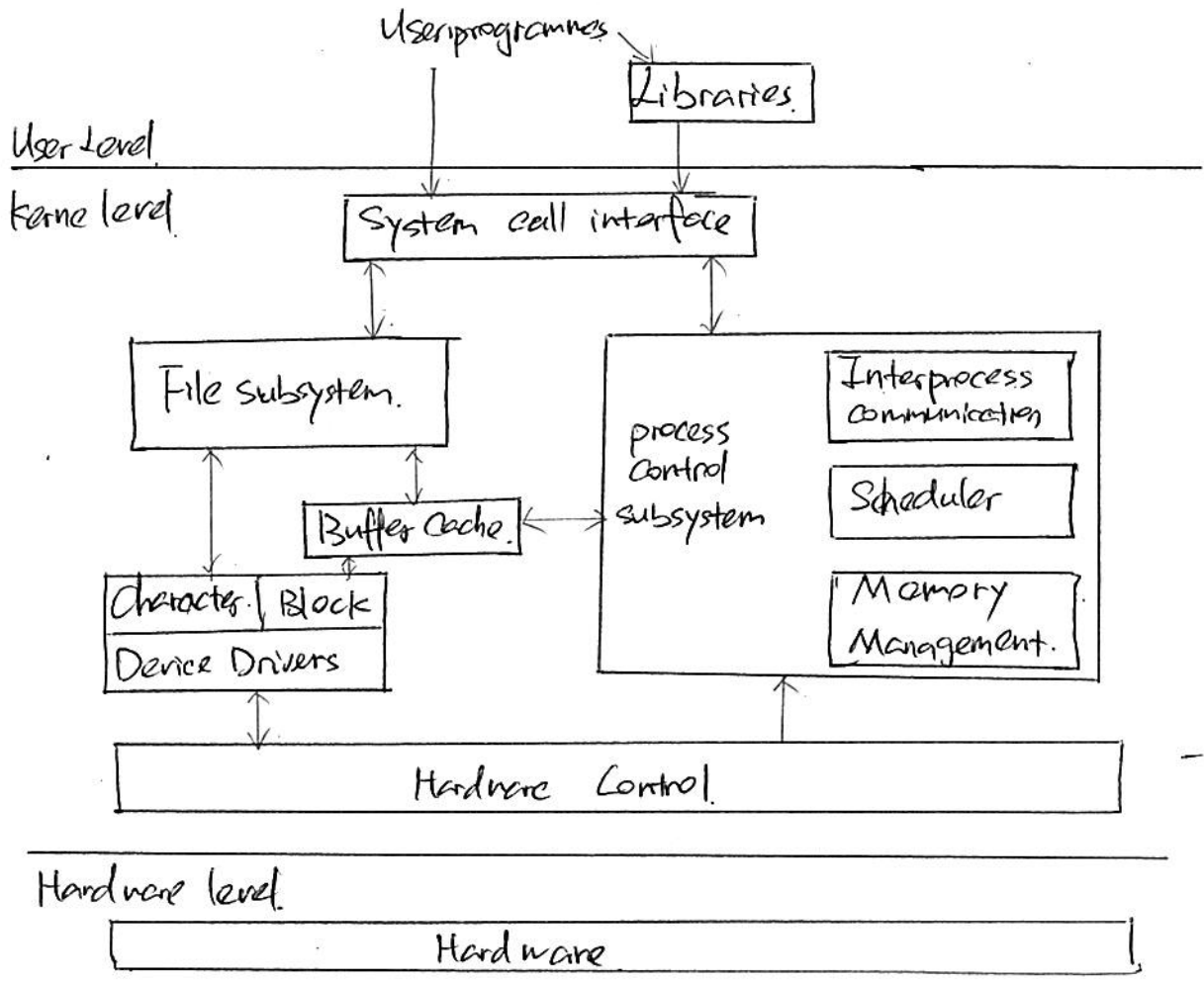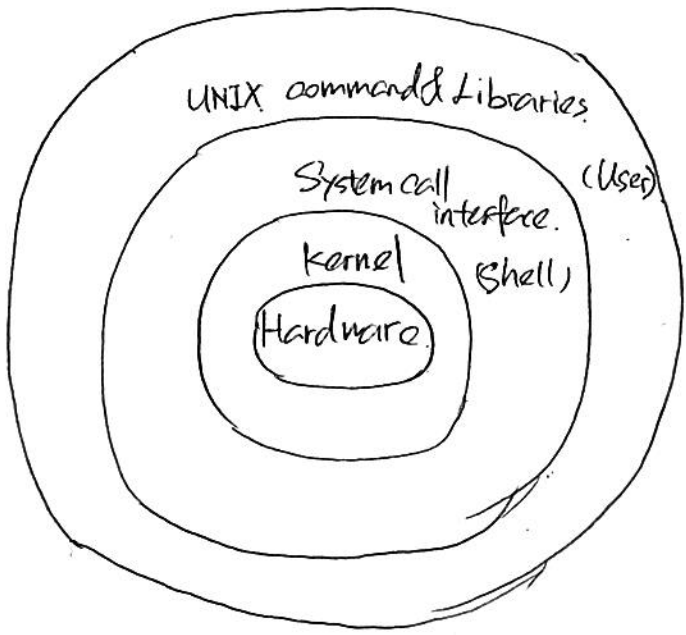
— picture from Peking University Online course on Coursera

Part B

- Android is a mobile OS based on the Linux kernel that is currently developed by Google. It is a powerful OS supporting a large number of applications in Smart Phones.

- Main characteristics:
  - Application framework
  - Dalvik virtual machine
  - Integrated Browser
  - Optimized graphics
  - SQLite
  - Media Support
  - GSM Technology
  - Bluetooth, EDGE, 3G Wifi
  - Camera, GPS, Compass, etc

- Applications
  - Composed of one or ↑ application components (activity, services, content providers, broadcast receivers)
  - Each component performs a different role in the overall application behavior. Activated individually
  - The manifest file must declare all components in the application, and should also declare all application requirements
  - Non-code application resources should alternatives for different device configurations

Part C

- Characteristics of real-time OS:
  - Reliability
  - Consistency (Rigid time requirements)
  - Scalability
  - Predictability
  - Performance

Applications
  - Military Radar System
  - Government Network switching control system
  - Commercial Satellite monitoring system
  - medical - maneuvering mechanisms
  - educational Global positioning system
  - cultural infrastructures

- Embedded OS is a computer that is a component in some more complex system. It is dedicated to the support of its host system.

- Example of Embedded OS:
  - -. Computers that control the floodgates of dam.
  - -. Computers that control a point-of-sale terminal
  - -. _____ that regulate a residential sprinkler system
  - -. _____ control Media Play on a Car.
  - - A clock computer in the Television / Radio / Watch.

- No. They arenot same

  Embedded OSystems often with real-time computing constraints. But not all
  Not all real-time OSystems are embedded in. other some. more complex systems
  So. they are likely common. but not the same.

- TSR. (Terminate Terminate and stay resident. Program):
  is a computer program that uses a system call in. DOS OS to return control
  of. the Computer to the OS, as though the program has 'quit, but stays
  resident. in computer memory. So. It can be reactived by a hardware or
  software. interrupt.

  Examples: — Disk Operating Systems
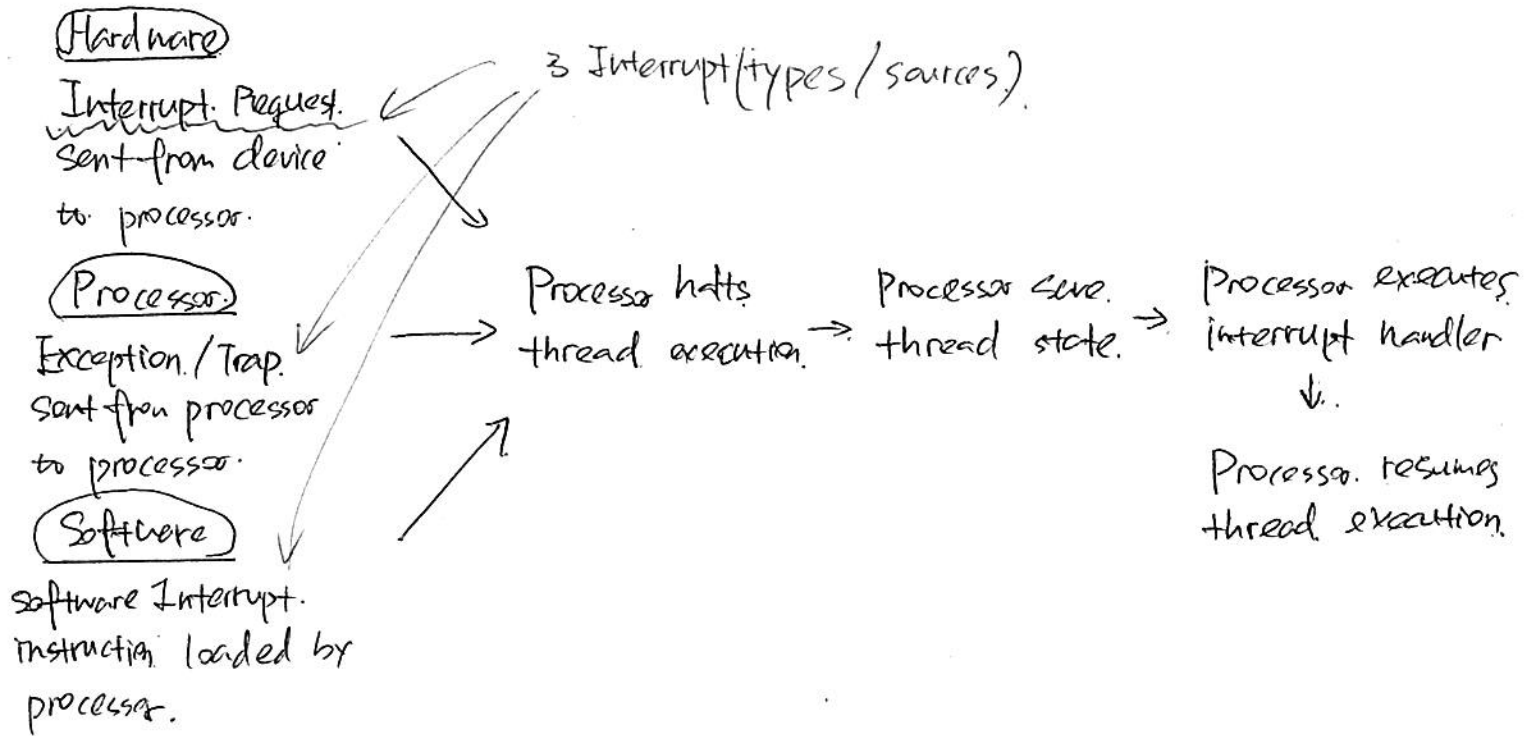
  — No. -task. Operating System
  Calculators, clocks, notepads.
  (When. running another. program in DOS you can press the preset
  keyboard key or. combination of keys TSR program will 'pop up' into
  view.

Part D

- Interrupts is a signal to the processor emitted by hardware or software.
  indicating an event that needs immediate attention

- Interrupt Request is a hardware signal sent to the processor that
  temporarily stops a running program and allows a special program,
  an interrupt handler, to run instead.

- Concluding Together.

(Hardware)

Interrupt. Request.
Sent from device
to processor.

(Processor)

Exception / Trap.
Sent from processor
to processor.

(Software)

Software Interrupt.
Instruction loaded by
processor.

3 Interrupt (types / sources)

Processor halts → Processor save → Processor executes
thread execution. → thread state. → interrupt handler
                                        ↓
                                     Processor resumes
                                     thread execution.

- Type man trap

  ◦ trap. synopsis.   trap [action condition]

  ◦ The meaning of action '-', null (""), "#?", EXIT, 0

  • Each time trap is invoked : eval action

  •. If without argument   "trap-- %s %s ... \n", <action>, <condition>...

  × Neumeric signal numbers corresponding Table.

  ◦ Exit Status rules.