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ITSE 2122:- Mobile Programming

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Introduction to Programming Languages

Introduction to Programming Languages

- What is a Programming Languages ?
  - A programming language is a set of rules that provides a way of telling a computer what operations to perform,
  - A programming language is a set of rules for communicating an algorithm,
  - It provides a linguistic framework for describing computations,

A programming language is a notational system for describing computation in a machine-readable and human-readable form.

A programming language is a tool for developing executable models for a class of problem domains.

Introduction to Programming Languages ……

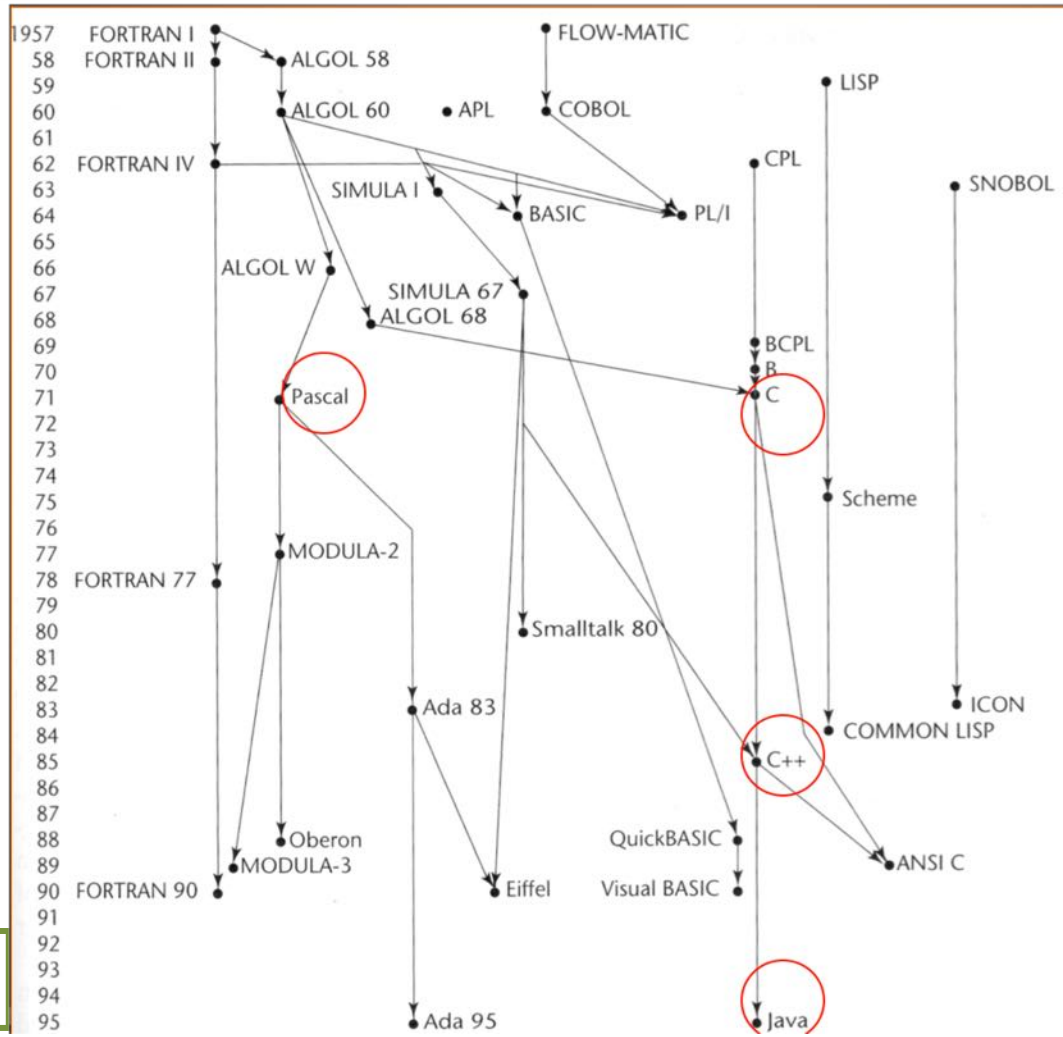
- Levels of Programming Languages
  - Levels are assigned to each programming language, based on the degree of correlation to a natural language,
  - The more similar to a natural language, the higher is the level

High Level Programming	Low Level Programming	Machine Readable Code

For i=0 to 10 do
{
Statement 1;
Statement 2;
}
	LOAD r1,b
	LOAD r2,h
	MUL r1,r2
	DIV r1,#2
	RET
		0001001001000 10
		1000100100100 01
		0100100100111 01
		1001100010010 10
		1001...

Introduction to Programming Languages ……

- Programming Languages (high level):
  - Uses words, symbols and grammatical rules (like natural language)
  - Grammatical rules are often referred to us called syntax,
  - Each programming language has a different set of syntax rules.



There are so many Programming Languages

Like any other human languages ….

Introduction to Programming Languages ……

- Two broad groups of Programming Languages:
  - Sequential/Traditional Programming Languages
    - Sequences of instructions
    - First, second and some third generation languages
    - FORTRAN, COBOL, BASIC, C,
  - Object-oriented Programming Languages
    - Objects are created rather than sequences of instructions
    - Some third generation, and fourth and fifth generation languages Programming Languages
    - C++, JAVA,

Introduction to Programming Languages ……

- Other special programming languages

Script Languages

- JavaScript, VBScript, Php, ASP, Perl and Python

Text Processing Languages

- LaTex, PostScript

Markup Languages

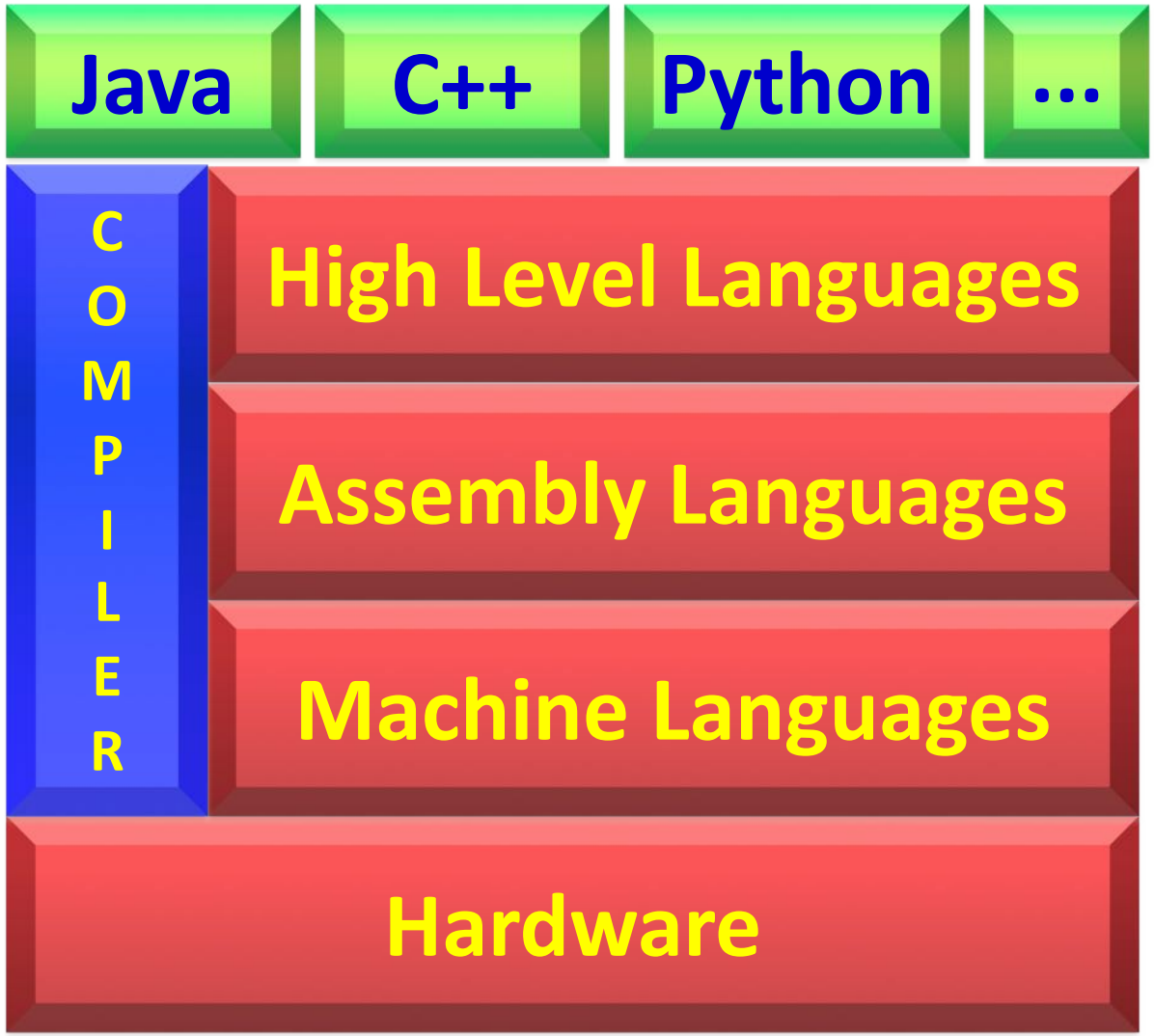
- HTML, XML,

Command Languages

- sh, csh, bash, (Unix Shell)

Introduction to Programming Languages ……

- Programming Language Architecture (high level)
  - Regardless of what language is used, we need to convert our program into machine language so that the computer can understand it (Compiler or Interpreter)



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Software Engineering Fundamentals

- Software

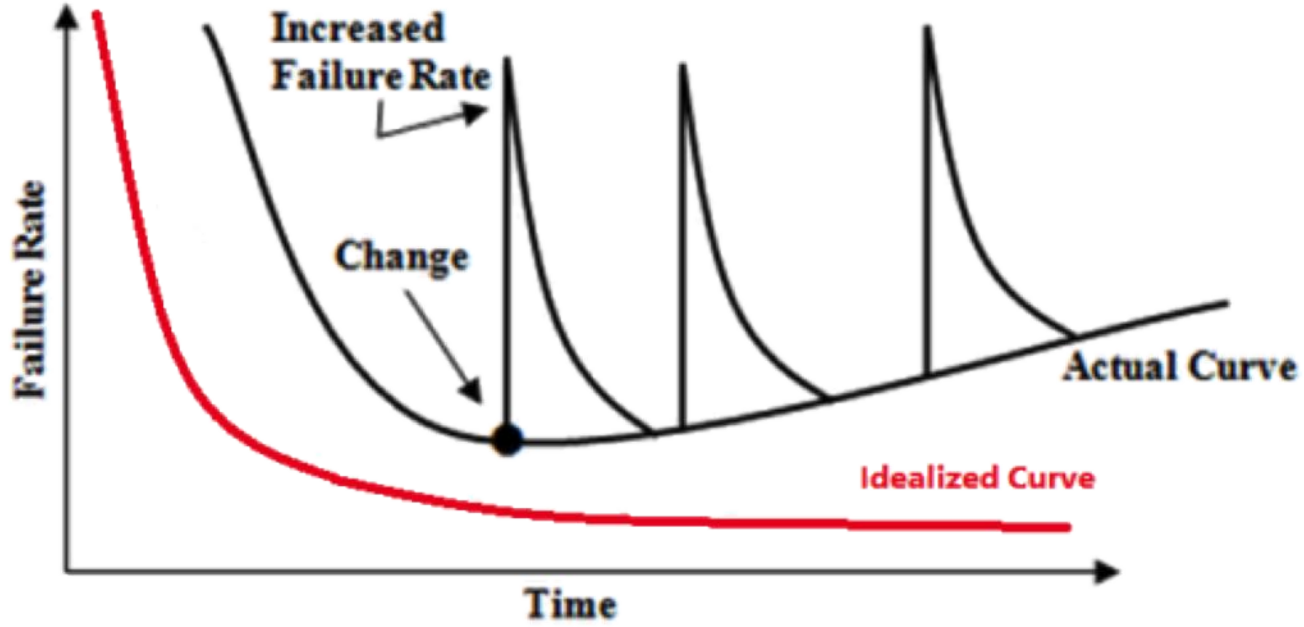
Software is a set of **programs**, **routines** and **symbolic languages** that **control** the function of the **hardware** and direct its operation. A language that enables computer to work.

Software is a general term for the various kinds of **programs** used to **operate computers** and related devices..

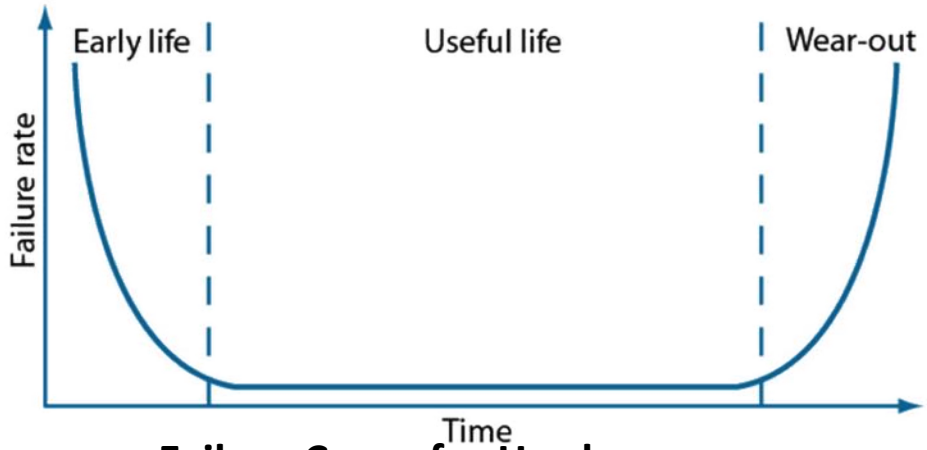
Software Engineering Fundamentals ……

- SW Characteristics (external):-
  - Logical rather than physical
  - Doesn't wear-out
  - SW deteriorate (capacity will not satisfy the growing demand users requirement)
  - Requires Maintenance (often more than once, in life time)
- SW Characteristics (Internal):-
  - Reliability- ability of the software to provide desired functionality
  - Usability - extent to which the software can be used with ease
  - Efficiency - use system resources in effective and efficient manner
  - Maintainability – ease to extend functionality, improve performance, or correct errors
  - Portability – ease to transfer software from one platform to another

Software Engineering Fundamentals ……



Failure Curve for Software



Failure Curve for Hardware

- Software can be considered as a **Product** and **Tool**
  - Product:- be **produced to use it**, as a calculator, as a display, to send, etc.
  - Tool:- used **to produce another SW** (vehicle to derive products), languages, OS, tools
- Applications
  - Applicable in all fields, area
  - Application Categories (Classification):-
    - System Software, Real-time Software (responds to external environment), Embedded Software, Business Software , Engineering and Scientific Software , Web-based Software, Artificial Intelligence Software, etc.

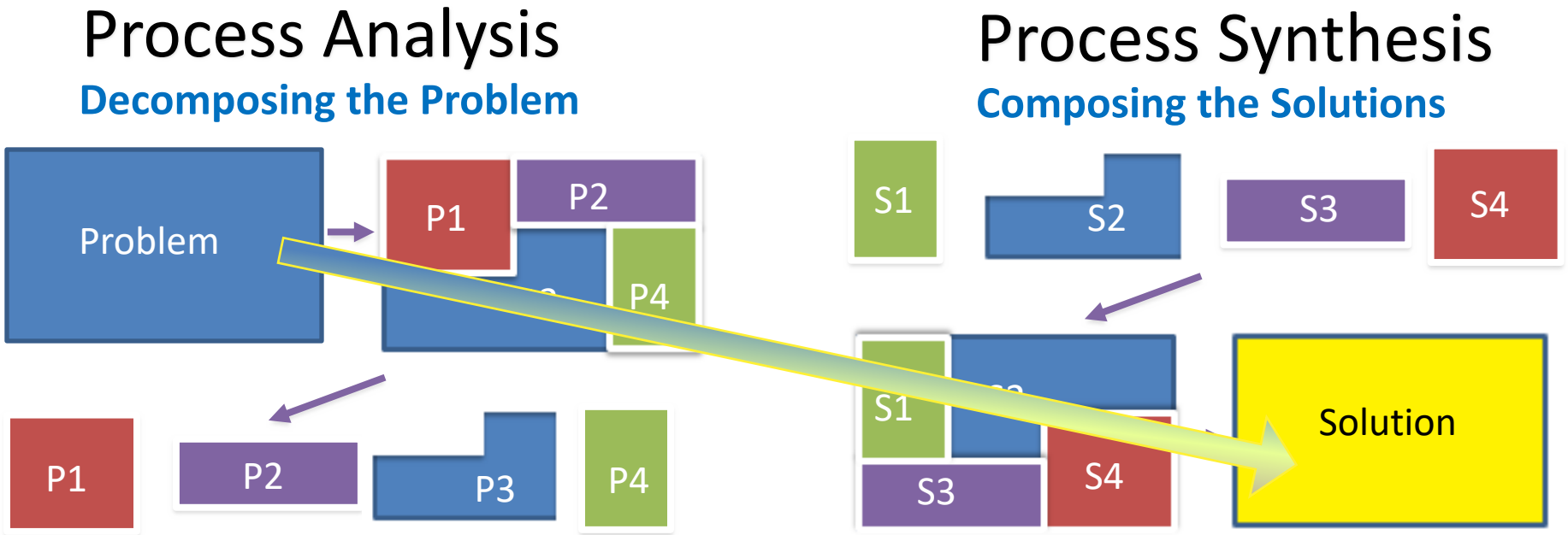
- Software Engineering

Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software

Definition by IEEE

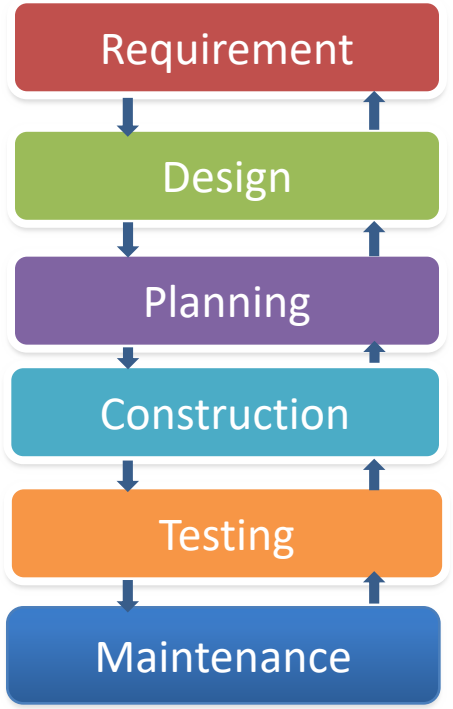
Software engineering is a principle which use a sound engineering principles in order to obtain economical and efficiently working SW to solve the real world problems

Software engineering is a discipline which uses the Process Analysis and Process Synthesis in solving the problems



Software Engineering Fundamentals ……

- The following Q's must be asked & answered in SE:-
  - What is the problem to be solved?
  - What are the characteristics of the entity that used to solve the problem?
  - How will the entity (solution) be realized?
  - How will the entity be constructed?
  - What approach will be used to uncover errors made in the design and construction?
  - How will the entity be supported over the long time?



- Software Engineering will answer all the above questions.

Project Management Processes (5 process groups)

Also called **Project Life Cycle** (to be discussed in the following sections)

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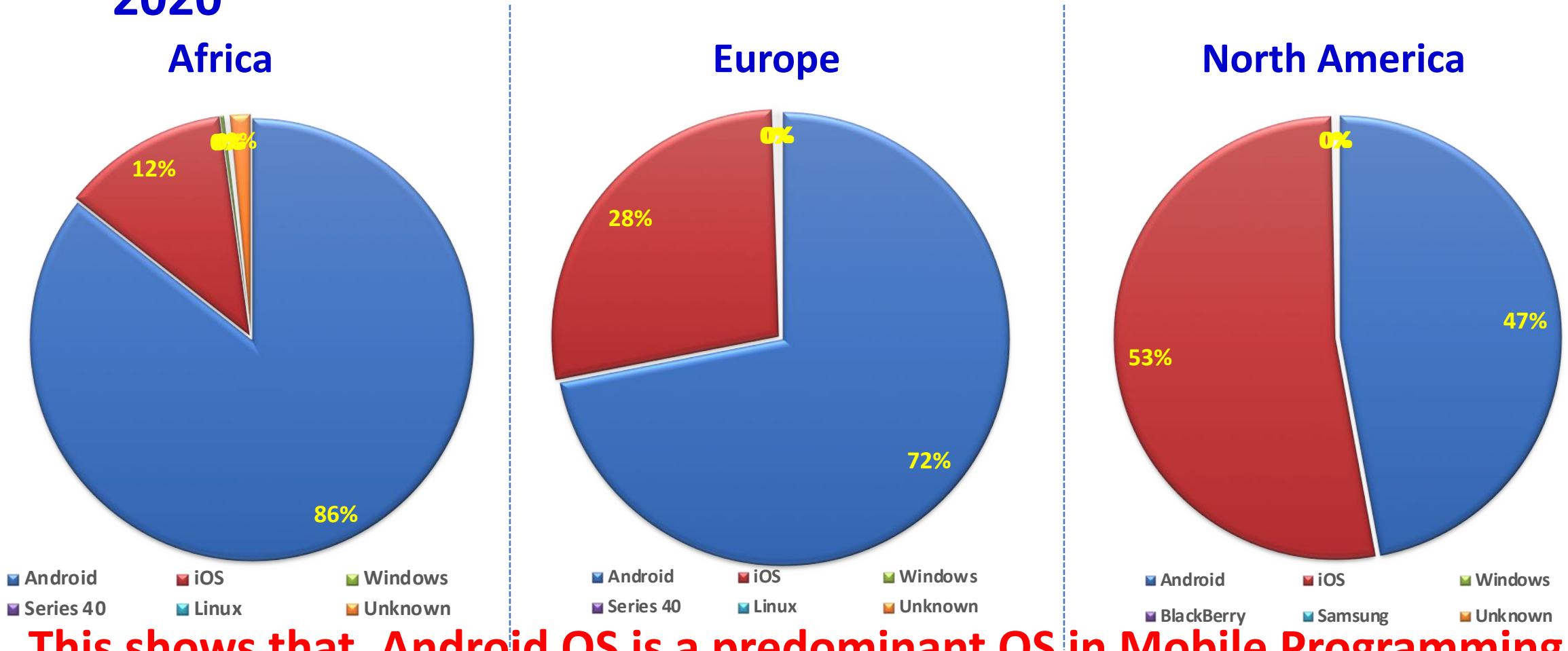
Mobile Programming Fundamentals

Introduction to Mobile Programming

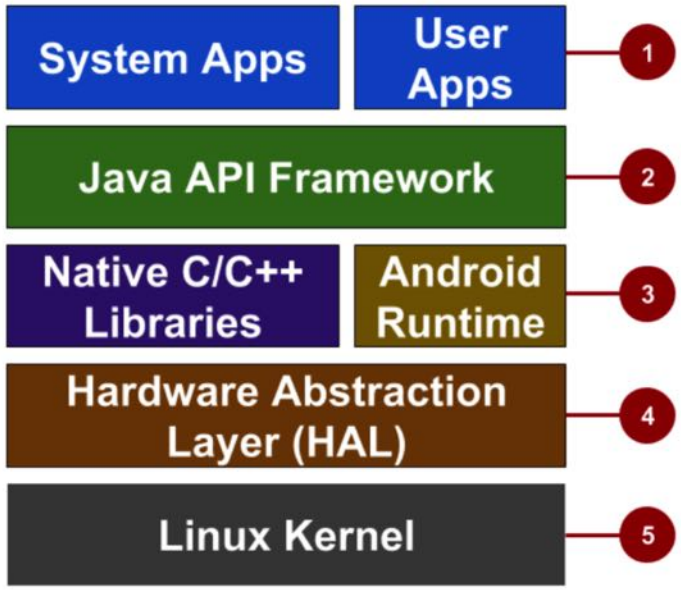
- **Mobile Programming**
  - Different OS available,
  - OS like, iOS, Android, Windows Phone, Linux, BlackBery, Other
  - iOS (is Unix-like OS)
    - majorly Apple's operating systems,
    - C, C++, Objective-C, Swift, assembly language,
    - iPod Touch, iPhone, iPad, Apple TV
    - Uses closed sources/API's, more secure,
  - Windows
    - developed by Microsoft for smartphones ,
    - Use mainly C and C++ as programming,
    - Uses closed sources/API's,
  - BlackBery
    - Developers are BlackBerry Limited and TCL

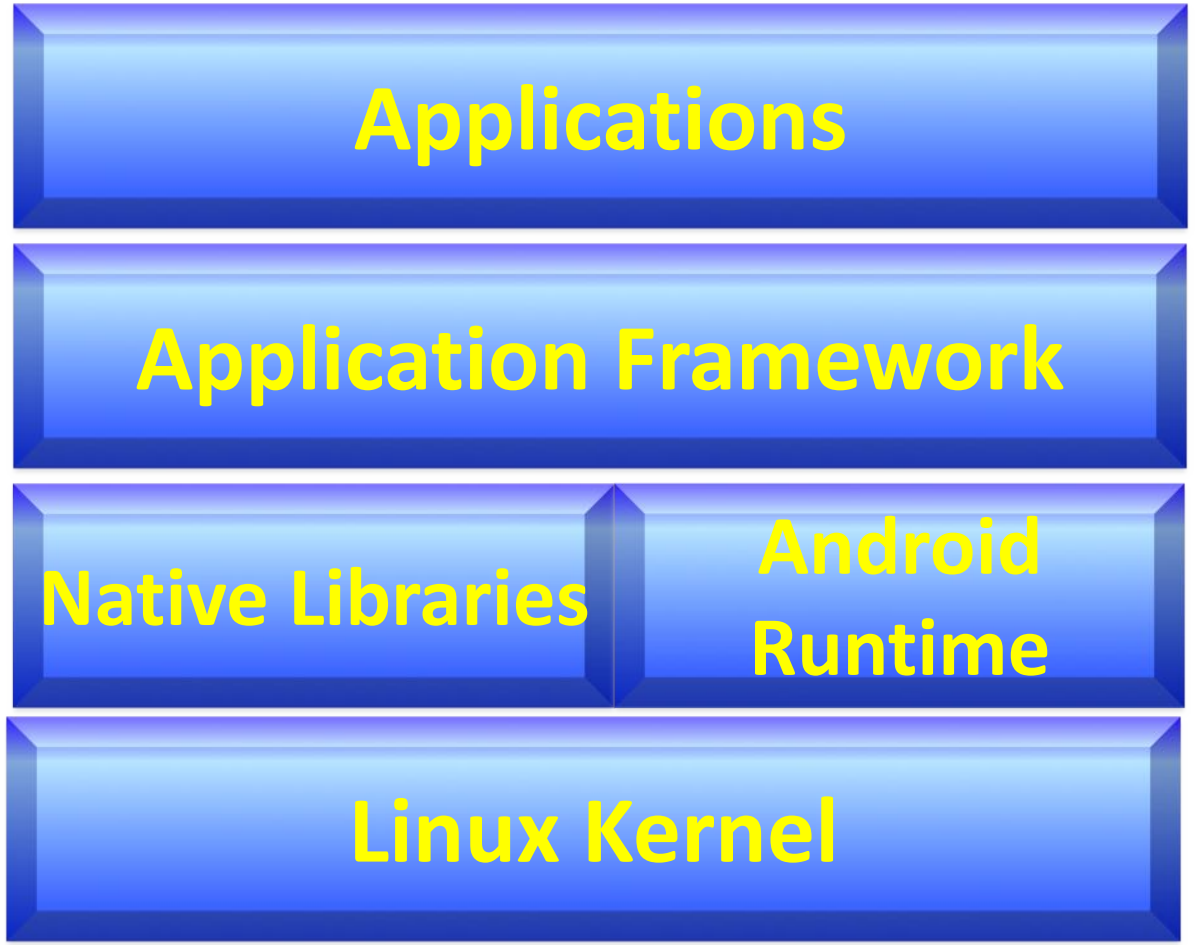
- **Mobile Operating System Market Share Worldwide - February 2020**



This shows that, Android OS is a predominant OS in Mobile Programming

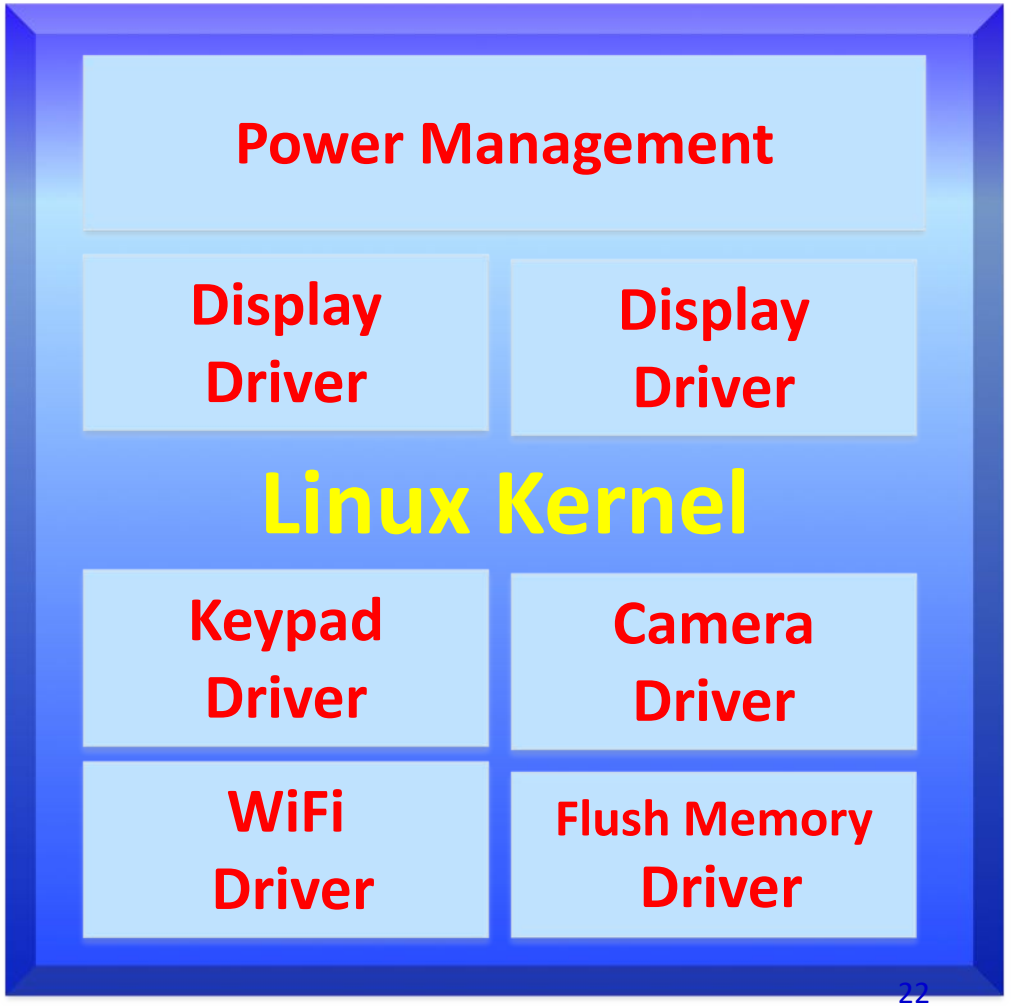
- Android Programming (Architecture)
  - Android is built on the Linux kernel, but Android is not a Linux.
  - Refer also Introduction: on PIAZZA



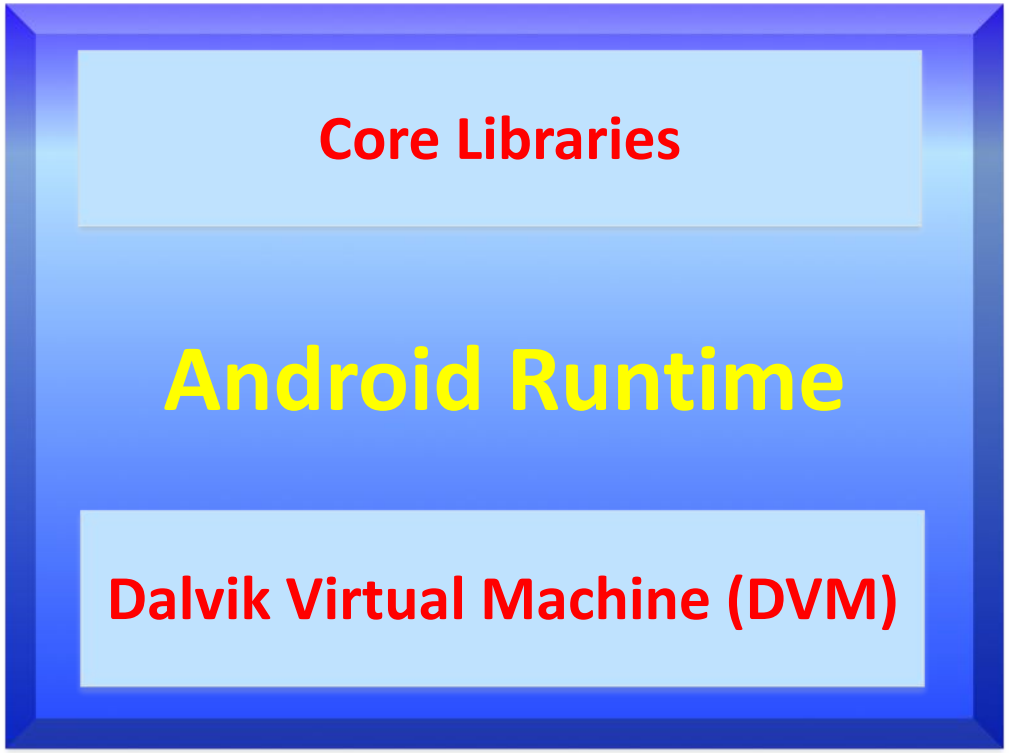


Introduction to Mobile Programming …..

- Android Programming (Linux Kernel)
  - Linux Kernel contains different drivers and power management,
  - Android to take advantage of Linux-based security features,
  - Contains Hardware abstraction layer (HAL) to interfaces higher-level Java API framework



- Android Programming (Android Runtime)
  - Each app runs in its own process, with its own instance of the Android runtime,
  - includes a set of core runtime libraries that provide most of the functionality of the Java programming language,



- Android Programming (Native Libraries)
  - Native Libraries are written in C and C++
  - Available to apps through the Java API framework,
  - Interface through Java,
  - Surface manager – Handling UI,
  - Windows 2D and 3D graphics Media
  - SQLite, Browser engine

Introduction to Mobile Programming …..

- Android Programming (Application Framework)
  - All features for Android development, different managers for development,
  - Such as UI components, resource management, and lifecycle management,
  - API interface
  - Activity manager – manages application life cycle.

Introduction to Mobile Programming …..

- Android Programming (Applications)
  - All developed Applications,
  - For example email, SMS messaging, calendars, internet browsing, contacts, maps, etc.
  - Built in and user apps

Introduction to Mobile Programming …..

- **Android Programming**
  - Kotlin, **Java**, and C++ languages
  - Java Compiler
    - Basic Java programming,
    - Exceptions Inner Class, Interface,
    - Java IO, Thread, Socket etc.
  - Android Studio,
    - integrated development environment for Google's Android OS,
    - Built on JetBrains'
    - Android SDK 2.0 or higher,
  - The Emulator or Android Virtual Device (AVD)
    - Simulates Android devices on your computer,
    - Test your application on a variety of devices and Android API levels,
    - Virtual device,

End of this Class

- Install the SDK or Eclipse on your machine (see the procedures)
- Understand some basics in the area (on PIAZZA)
  - Unit 01.1: Your first Android App, Hello Worls,
  - **Unit 01.2A: Your first interactive UI**