Computer Fundamentals

Lecture # 6:
Computer Software

Today's Aim

- Defining a Software
- History of Software
- Software Development Process
- Types of Software
- Different types of Software License
- Attributes of a Good Software

History of Software

- Concept of Programming Developed by Charles Babbage
- First Computer Program by Ada Baron
- Alan Turing's Theory, 1935
- 1958, Term Used by John W. Tukey
- Symbolic Language, Programs, Routines, Procedures, Rules
- Controls functioning of Hardware
- Directs Operations of Hardware
- Needs to be loaded into computer storage
- Consist of "Machine Language"

History of Software

- 1945, Von Neumann's “Stored-Program Technique”
- 1949, “Short Code” :Machine Language
- 1950’s, Assembly Languages
- 1957, Math-Matic :High-Level Language
- 1957, FORTRAN :High-Level Language

Software Development Process

- Concept and Feasibility
- Domain Analysis:
  - Doing the Homework
- Software Elements Analysis:
  - Reading the Customer Requirements
- Specification:
  - Precise Description of the Software
- Planning:
  - Time, Cost and Personnel Estimates
- Software Architecture:
  - Issues Concerned with Software Production and Compatibility
- Implementation:
  - Writing the Code
- Testing
- Documentation

Types of Software (User's view-point)

- System Software
- Application Software
- Programming Software

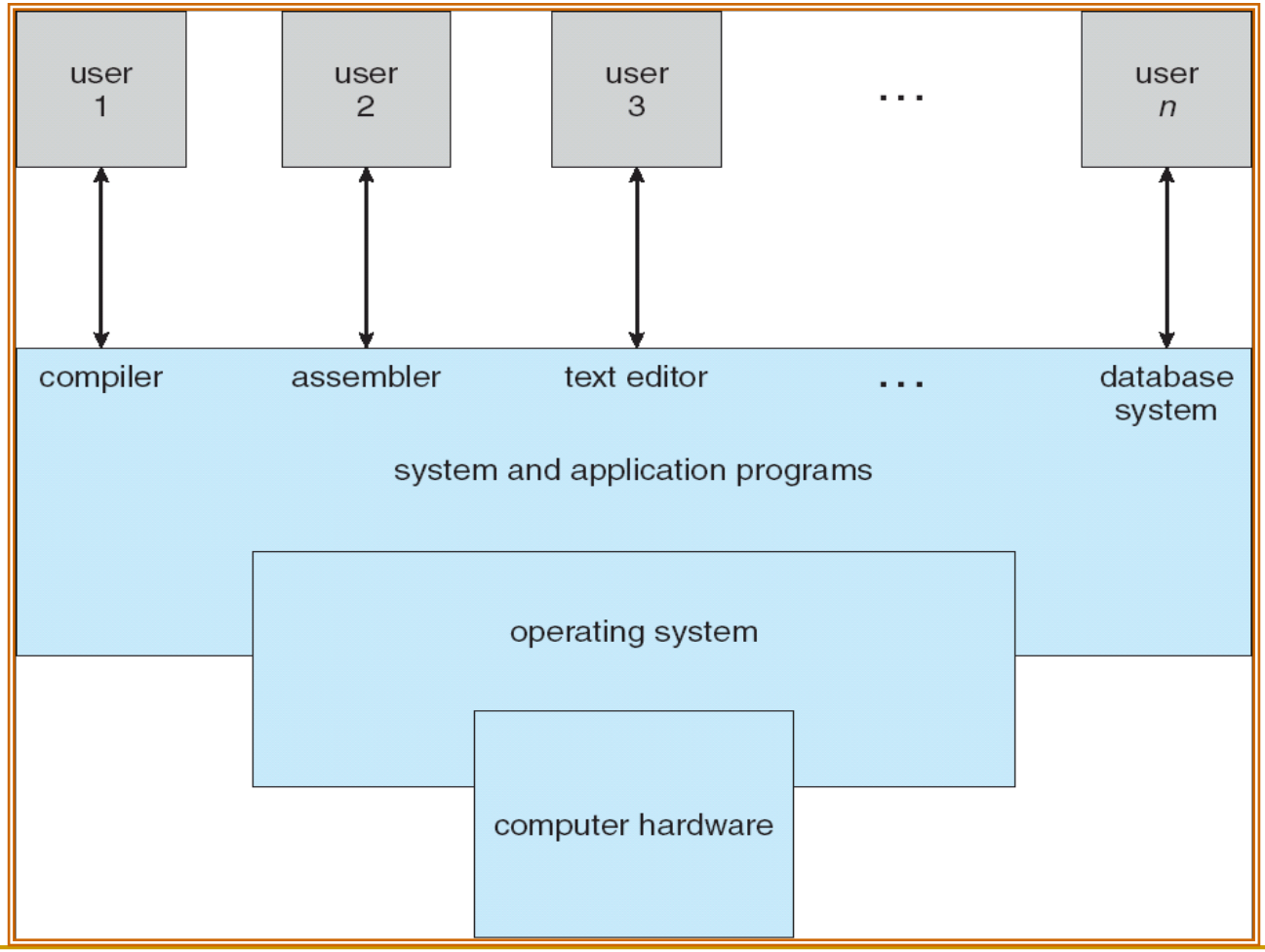
System Software

- Control the overall operation of the computer
  - OS
- Interact directly with HW
  - Device drivers
- Perform system management & maintenance
  - Utilities
- Used to develop or maintain other programs
  - Language translators

System Software

- Operating System
  - Manages Sharing of Resources
    - Process Management
    - Memory Management
    - File System Support
    - Networking
    - Security
    - Graphical User Interface
    - Hardware Management
  - Examples?

Role of the Operating System



System Software

- Device Drivers
  - Work as Interface
  - Translates Instructions and Data from OS and Application Software into Device Specific Form
  - Necessary for Hardware Compatibility

System Software

- Utilities
  - For providing a particular functions
  - Maintain and manage systems
  - Examples:
    - Anti-virus SW
    - Data compression SW
    - Disk optimization SW
    - Disk backup SW

System Software

- Language Translators
  - Assembler
    - Converts Assembly Language into binary code
  - Compiler
    - Converts a high-level language into binary code
  - Interpreter
    - Converts and executes one instruction at a time

Application Software

- Direct Interaction with User
- Indirect Interaction with Hardware (through drivers)
- Scientific/engineering/graphics SW
  - Matlab; AutoCAD; EWB; PSpice
- Business SW
  - The billing system for the mobile phone company
- Productivity SW
  - Word processors; Spreadsheets
- Entertainment SW
  - Games
- Educational SW
  - Electronic encyclopedias

Programming Software

- Used by Programmers
- Assists in Writing Programs
- IDE; Integrated Development Environment
- Language Translators also fall into the same category

Types of SW (Production Point of View)

- Shrink-Wrapped:
  - Retail Software
  - OEM (Original Equipment Manufacturers') Software
- Custom Built.
- Other types:
  - Shareware
  - Crippleware / Trialware
  - Adware
  - Demoware
  - Spyware
  - Freeware
  - Public Domain Software

Software Licensing

- Software Protection
  - Trade Secrets
  - Copyright
  - Patents
  - Trademarks
- Allows Ownership to stay with the Manufacturers

Types of Licensing

- Proprietary
  - License for ‘Use only’ is Bought
  - Manufacturers retain Ownership
  - Counters Piracy
  - Examples : Shrink-Wrapped
  - Types:
    - Single-User
    - Multiple-User
    - Concurrent-User
    - Site

Types of Licensing

- Freeware:
  - Downloaded from Internet
  - Manufacturer retains Ownership
  - User is Free to Use
  - Examples: Public Domain SW
  - Types:
    - Open-Source
    - Closed-Source

Types of Licensing

- Shareware:
  - Downloaded from Internet, or Ordered on Websites
  - Manufacturer retains Ownership
  - Payment made Upon Satisfactory Performance
  - Reasons
  - Types:
    - Trialware
    - Crippleware

Attributes of a Good Software

- Maintainable
- Reliable
- Efficient
- Appropriate and interactive Interface
- Cost Effective

Objectives Achieved In Today's Lecture

- Defining Software
- Types of Software
- Attributes of Software
- Software Licensing