Operating Systems

Requirements : Reliability, Security, Compatibility, Performance

UNIX —

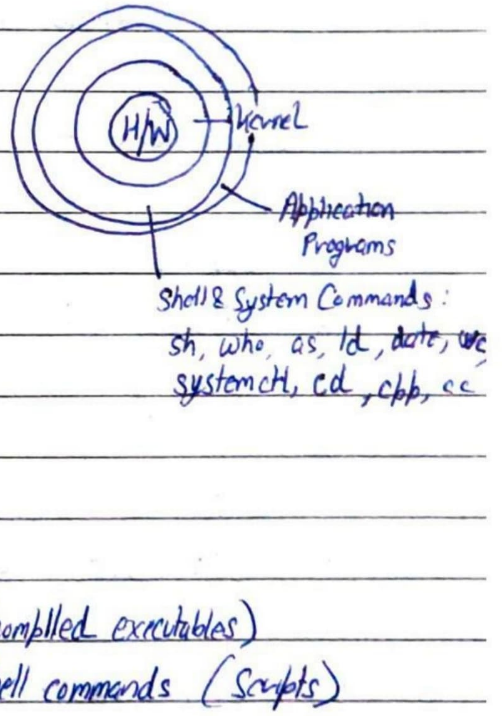
x Written in high-level language (C) :
Allows for ease of modification, understanding, change & portability to other architectures.

x Uses a hierarchical filesystem : Allows easy maintainance & efficient implementation.

x Consistent file format for files : byte stream

Architecture :

Kernel
Shell & System Programs
Utilities



Shell :

- Internal Commands (cd, who)
- Executable files containing object code (compiled executables)
- Executable files containing sequence of shell commands (Scripts)

Background / Async Execution : & (<cmd>&)

Building Blocks -:

- Standard Files : STDIN (FD 0)
  STDOUT (FD 1)
  STDERR (FD 2)
- Redirect I/O : <, > : < use file as STDIN
  > use file as STDOUT
  >2 use file as STDERR

  <file> > <cmd>
  <cmd> < <file>
- Pipe : |

  Redirect STDOUT of <cmd 1> to STDIN of <cmd 2>
  Allows passing data stream across reader & writer processes.

OS Services -:

- × Control Process Execution : Creation, Termination, Communication
- × Process Scheduling (Time-Shared)
- × Memory Management (Private space protection)

Modes of Execution -:

1) User Mode : Access own instructions & data but not kernel instructions & data (or those of other processes)
2) Kernel Mode' : Access user & kernel instructions & data.

- × Exceptions : Occurs Mid-execution, system attempts restart of instruction after handling.
- × Interrupt : Occurs / Happens between two instructions executions, system continues w/ next instruction after servicing.