

Theory Assignment

Q.1. Classify the evolution of an Operating System.

→ Operating systems have been evolving over the years ever since 1945. Let's look at the various generations briefly.

(1) First generation — (1945 – 1955)
(Vacuum Tubes)

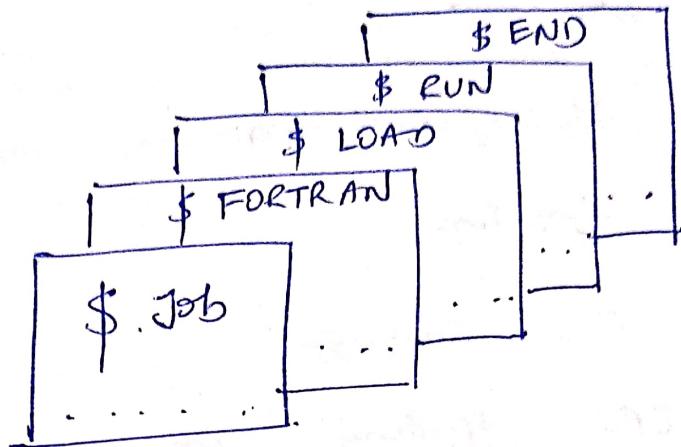
- Operating systems were unheard of at this age.
- Development began mainly due to WW2
- No programming language existed
- Basic operations of the "computer" were written in machine language.
- Computers were mainly used for computing log. and sin tables.
- No reliability as everything depended on Vacuum tubes (20,000 or so). Any one could burst.
- Scheduling, programming, process management done by humans.

(2) Second Generation - (1955 - 1965)

(Transistors and Batch Systems)

- Still mostly the same thing, as size reduced, reliability increased. Computers became smaller than a room.
- To load a program into memory, programmers still had to put it on a punch card and submit it. Computer would then follow it.
- Structure of the process had vastly evolved at this point though, much similar to how it is now.
- Operating was done by people still called "operators".
- A Job was ~~called~~ defined as a bunch of a "Batch" of punch cards.
 - # JOB card
 - # FORTRAN card
 - # LOAD card.
 - # RUN card
 - # End # card

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Batch of punch cards
"called a Job."

③

3rd generation — IC's and Multiprogramming
(1965 - 1980)

- Computers became even smaller, small enough to fit on desks.
- This meant people that had little to no knowledge of programming could now use them.
- That meant OS had to now do a bit of work as people couldn't. computers were also faster, so OS was needed.
- The IBM 360 series meant to cover all audiences, and its development created an OS for it which was buggy. —OS/360.

→ with more users, more programs, or ~~introduce~~
concepts like → ,

- 1 Multi-programming
2 Spooling
3 Time sharing.
4 CPU efficiency improvement.

→ MULTICS OS was introduced with these concepts.

→ A stripped down version of MULTICS was made - UNIX.

→ Other OS developed like BSD, MINIX, and LINUX.

(2) 4th Gen - Personal Computers.

→ Computers became even smaller.

→ OS like MSDOS, DOS, Windows NT etc were created with many modern concepts

→ Graphical user Interface were greatly focused on.

Process States

When a process is set to execute it goes through multiple states before it completes execution.

- (1) New
- (2) Ready
- (3) Running
- (4) Waiting
- (5) Terminated

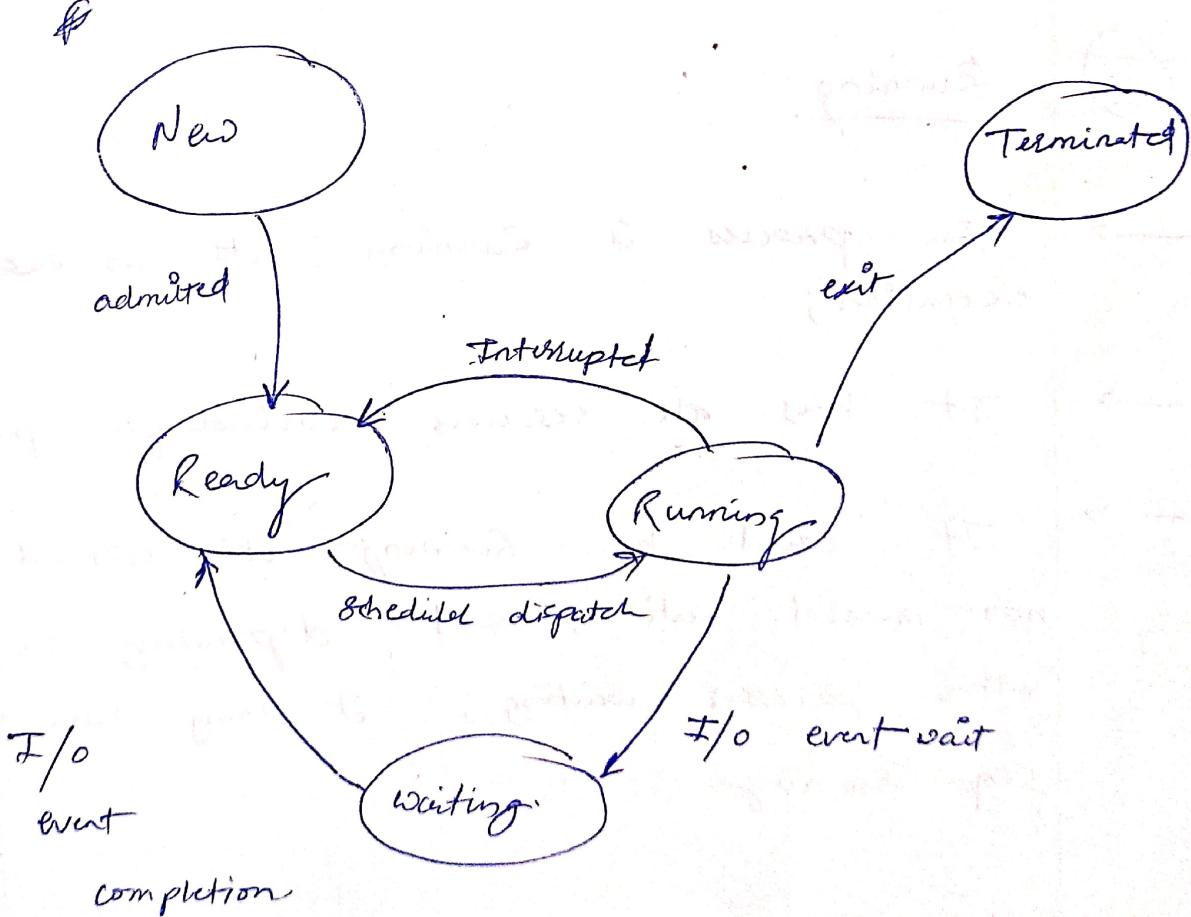


Fig. 2 : Simple, diagram : Process states.

(I)

New : The state that the process is in when it is created.

(II)

Ready : Process is waiting to be assigned to the processor. This depends more now on the scheduling algorithm being used by OS.

→ It also depends on the priority of this process how long it stays in Ready state.

→ At this point ; the process has every other resource except the processor.

(III)

Running :

→ The process is running ; it is executing execution;

→ It has all resources including processor.

→ It could be running its critical or non-critical section, and depending on other processes waiting ; it may have to stop running.

(IV)

Waiting :

→ The process is waiting for some I/O task or any other process to finish.

 It waits for next F/O event to complete
and then goes into ~~beats~~ Ready and then
running state again



 IV

Terminated State

- It has finished executing
- Resources are freed, and cleanup is done.