



# Operating System

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# Description of process life cycle Contd...



## (5) BATCH PROCESSING

It is the execution of a series of programs (jobs) on a computer without manual interaction. Jobs are set up so that they can be run to completion without manual interaction. So all input data are preselected through script, command line parameter or job control language. This is in contrast to online or interactive program which prompt the user for such input. A program takes a set of data files as input, process the data and produces a set of output data files. This operating environment is termed as Batch Processing because the input data collected into batches of files and are processed in batches by the program.

# Description of process life cycle Contd...

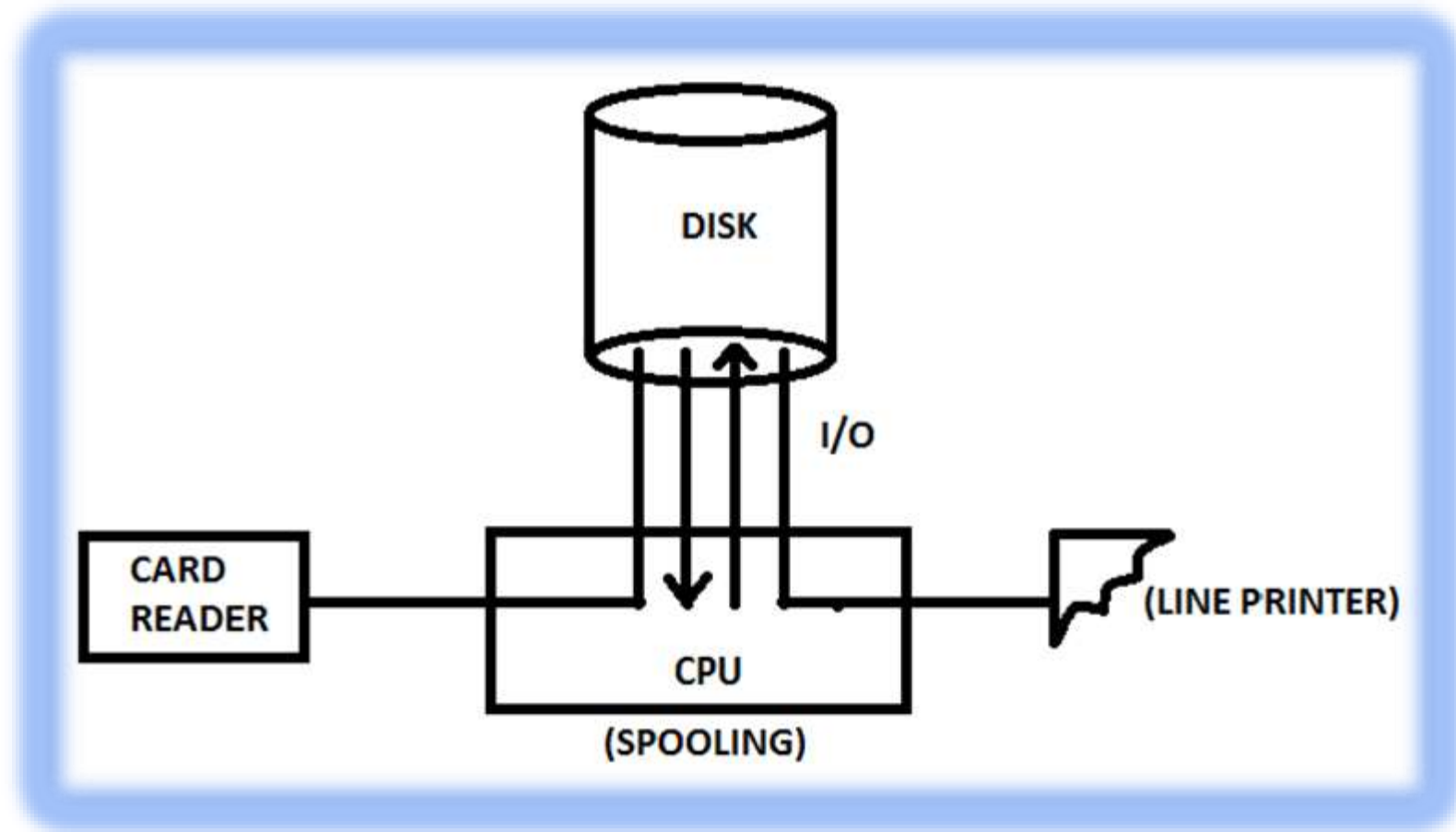


## (6)SPOOLING

- It is an acronym for simultaneous peripheral operation online. Spooling essentially uses the disk as a very large purpose for reading as far ahead as possible on input devices as for storing output files until the output devices are able to accept them. It performs:
- (\*)Online operation
- (\*)Computation of one program and output may be of another program.
- Spooling can be done with magnetic tape. It is possible to read the entire contents of the magnetic tape on to disk before using it. All operations then occur on the disk copy at higher speed and with no wear to the tape. This skim is known as staging a tape.

# Description of process life cycle Contd...

## (6)SPOOLING CONTD.....

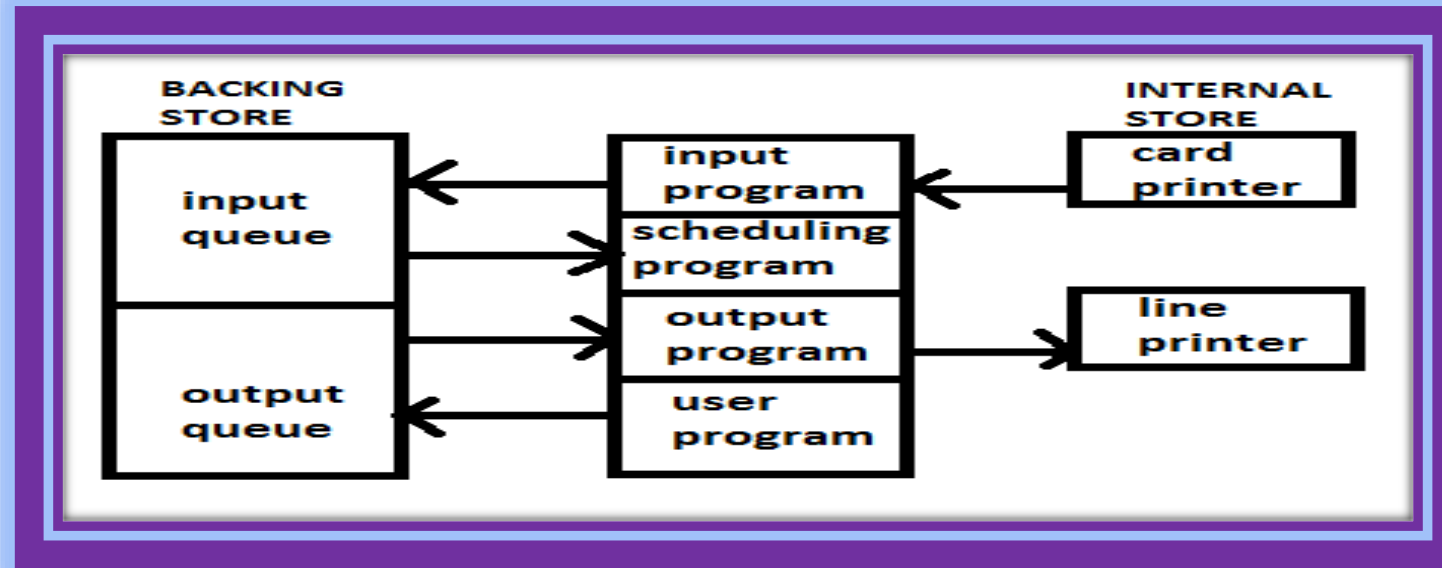


# Description of process life cycle Contd...



## (6)SPOOLING CONTD..

EXAMPLE: A very successful operating system with input or output spooling called EXEC-II was designed by computer science organization (Lynch, 1967 & 1971). It controlled a UNIVAC 1107 computer with an instruction execution time of 4sec. the backing store consisted of two or more fast drums, each capable of transferring 10,000 characters during a single revolution of 33 msec.



# Description of process life cycle Contd...



## (7) REALTIME SYSTEM

In a real time system the time at which output is produced is significant. This is usually because the input corresponds to some movement in the physical world and the output has to relate to that same movement.

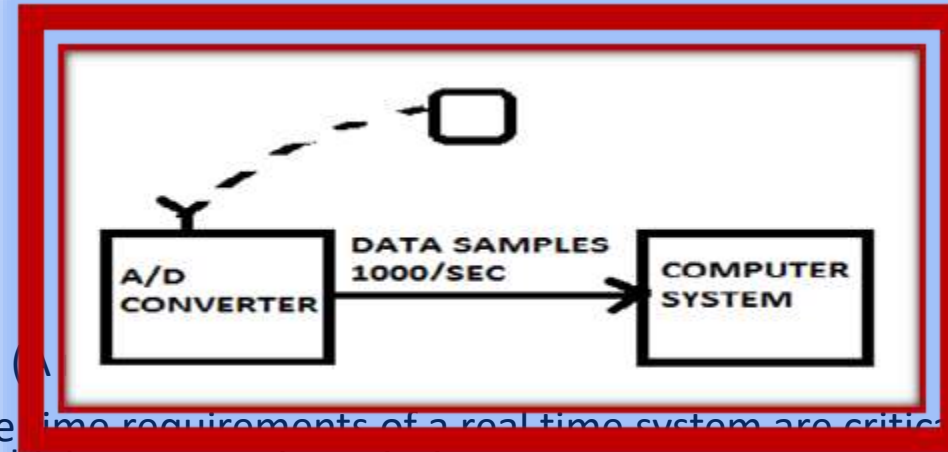
The main advantages of real time system is that the response time is of order milliseconds

Or

In the real time system, digitized samples are generated at the rate of 1000 samples per second. The computer is only required to store these samples in a specified file. Since a new sample comes in every in every “store the sample” request in less than 1ms. If it fails to do so, a sample would be lost and the real time application would have malfunctioned. The worst case response time is 1ms.

# Description of process life cycle Contd...

## (7) REALTIME SYSTEM CONTD...



Since the response time requirements of a real time system are critical, the real time application would be given higher processing priority.

### Note

In a real time system the response time is of order millisecond.

In an interactive system the response time is of order second.

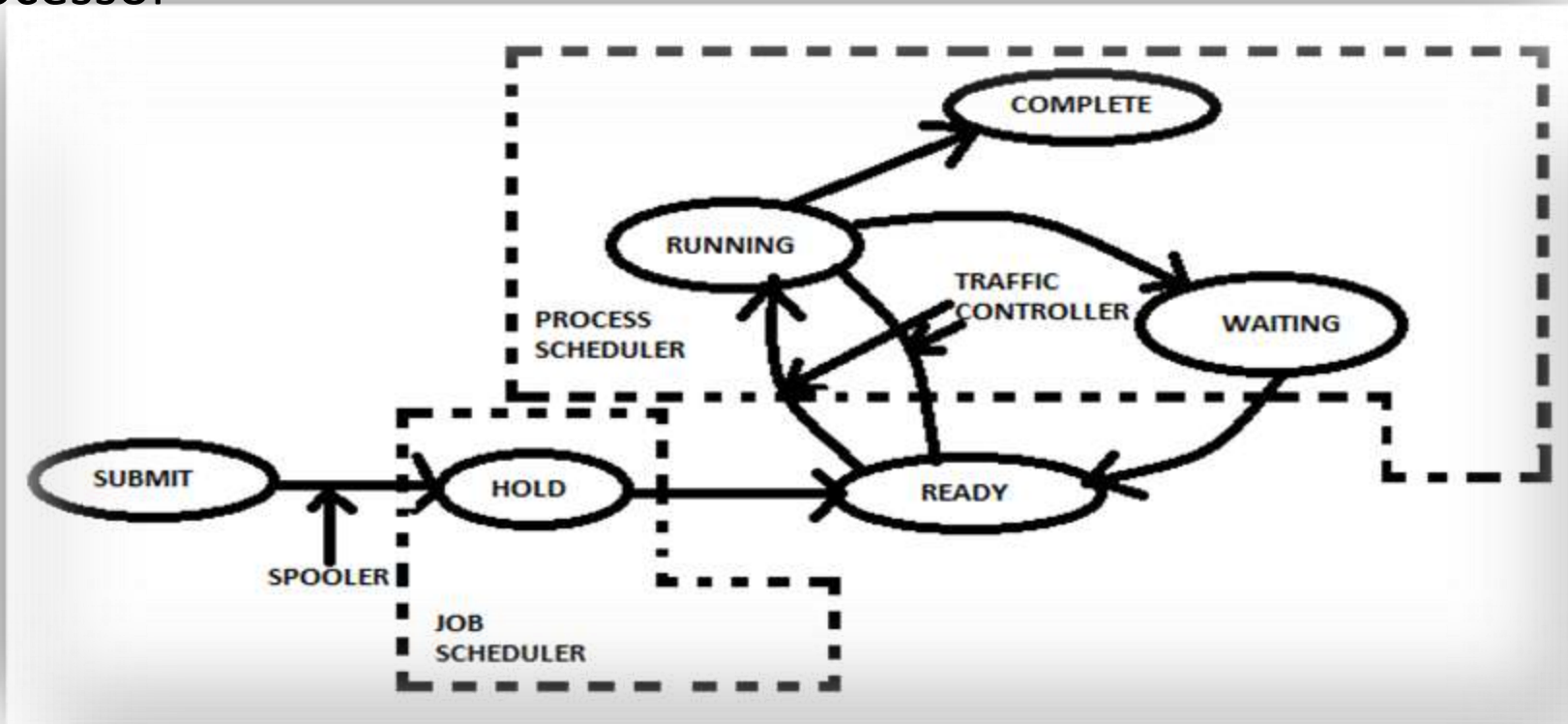
In a batch system the response time is of order hour.

# Description of process life cycle Contd...



## (8)PROCESS MANAGEMENT

The fundamental function of the processor management component is to organize the execution of user jobs on the central processor



STATE MODEL



# Description of process life cycle Contd...



## (7)PROCESS MANAGEMENT CONTD..

The following are the modules of processor management

### **SPOOLER**

Place all submitted jobs into a form for processing by the job scheduler.

### **JOB SCHEDULER**

- Keeps tracks of all the jobs in the system.
- Select a job to run and creates corresponding process.

### **PROCESSING SCHEDULING**

- Select a process to run.
- Allocate a processor.

### **TRAFFIC CONTROLER**

- Keep track of the status of all processes.
- Provide the mechanics of changing process states.
- Co-ordinate inter-process synchronization and communication.

# Description of process life cycle Contd...



## **(7)PROCESS MANAGEMENT CONTD..**

### **JOB SCHEDULER**

It is a program module which keeps track of all the available jobs. It uses a policy that which job is to be selected and when to be selected in a non multiprogramming environment.

### **PROCESS SCHEDULER**

It keeps track of all available jobs. It uses a policy that which of the ready processes receives a processor at what time and how long in a multiprogrammed environment.

# Description of process life cycle Contd...

## (7)PROCESS MANAGEMENT CONTD..

### JOB SCHEDULING



The job scheduling algorithm of a batch system takes into account not only the time a job arrives but also priority, memory needs, device needs, processor needs and system balance.

One mechanism for keeping track of jobs is to have a separate job control block (JCB) for each job in the system. When a process is placed in hold state, JCB is created for it with entries regarding its status and position in job queue.

The job scheduling process does these steps as below:

Keep track of status of all jobs. It must note which job need some i/o operation and the status of all jobs being serviced i.e., they are in ready , running or hold state.

- Choosing the policy for transferring the job from hold state to ready state. The decision is made on the basis of priority, resources requested or system balance.
- Allocate the resources for the schedule job by use of memory device and processor management.
- De-allocate the resources when job is completed.

# Description of process life cycle Contd...

## (7)PROCESS MANAGEMENT CONTD..

### JOB SCHEDULING PERFORMANCE

Definition and notation

$n$  : no of jobs

$A$  : job arrival time

$X$  : execution time required by the job

$C$  : job completion time

$(C-A)$  : job turnaround time ( $t$ )

$(C-D)$  : dead line overrun

$(C-A)/X$  : weighted turn around ( $w$ )

$1/n \sum (C-A)$  : mean turnaround time ( $\bar{t}$ )

$1/n \sum \{(C-A)/x\}$  : mean weighted turn around ( $\bar{tw}$ )

Throughput =  $n/\text{turnaround time}$

$n/\{\max(C)-\min(A)\}$

