Sunbeam Institute of Information Technology
Pune and Karad

Module - Concepts of Operating System

Trainer - Devendra Dhande

Email – devendra.dhande@sunbeaminfo.com

1> Assignment Operator

LHS = RHS

no space

2> Operators

op1 opr op2

space

opr op

space

3>

keyword [condition]

space

```
int main(void)
int main(int argc, char *argv[])
```

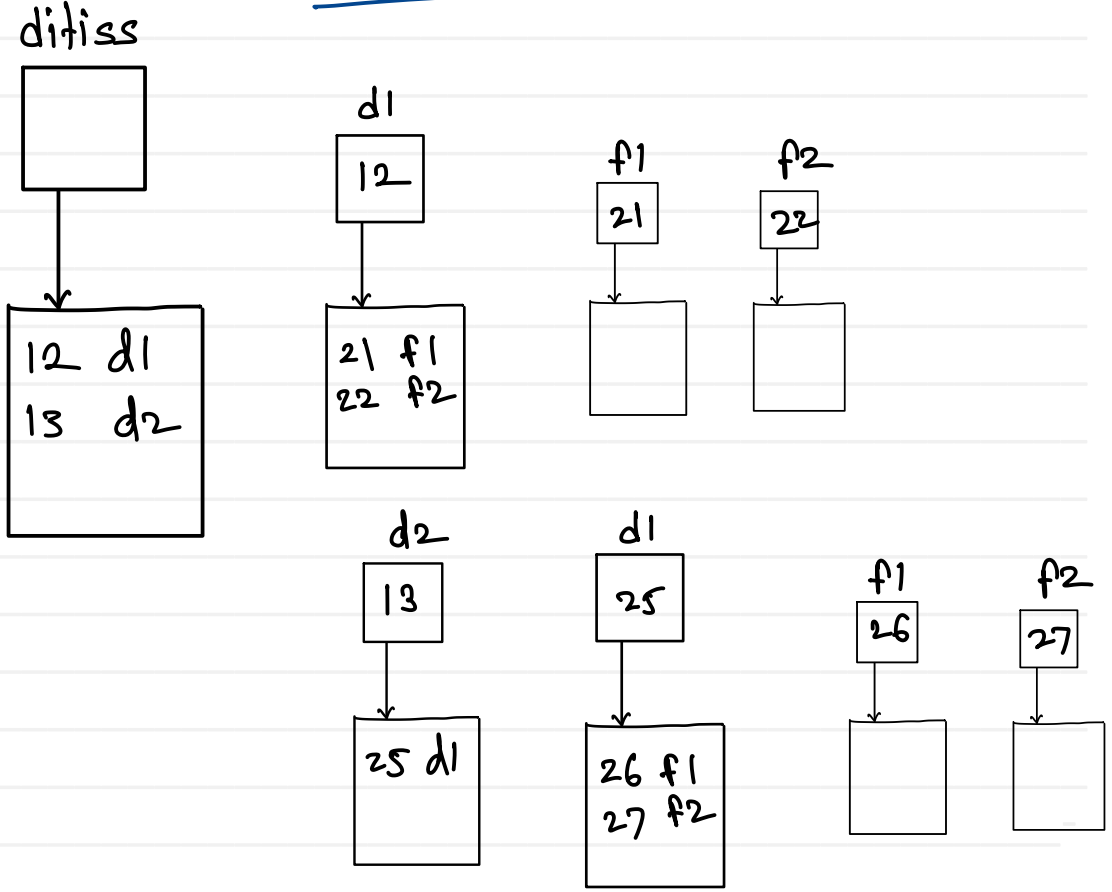
argc: count of cmd line arg

argv: list (array) of cmd line arg

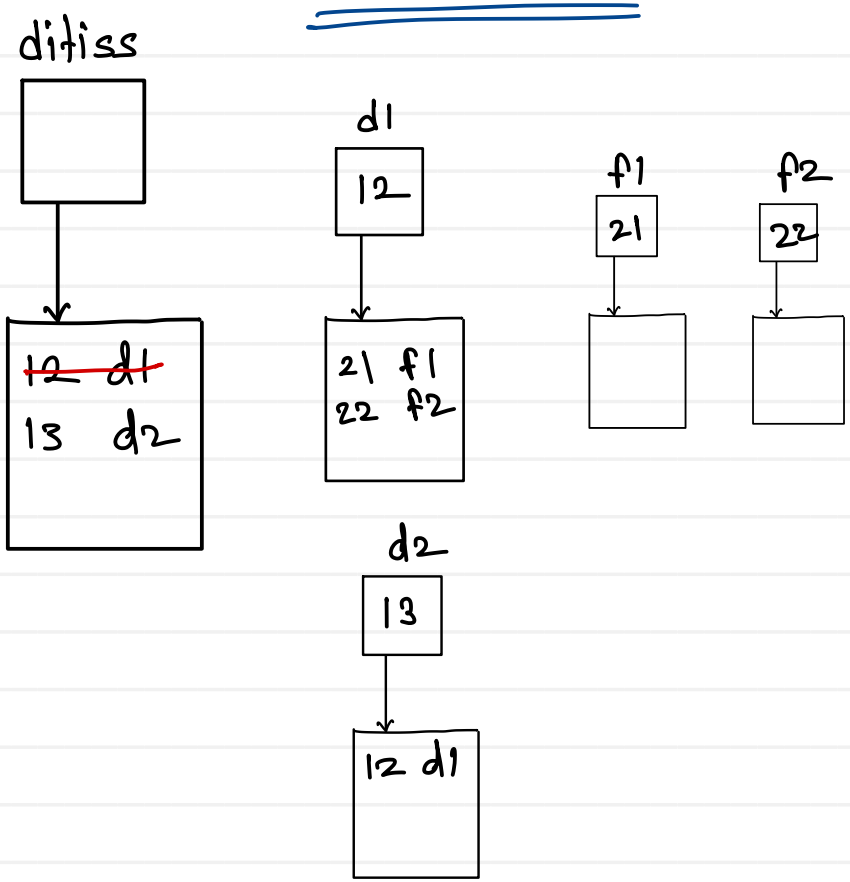
```
int main(int argc, char *argv[], char* envp[])
```

envp: list (array) of environment variables

cp -r d1 d2

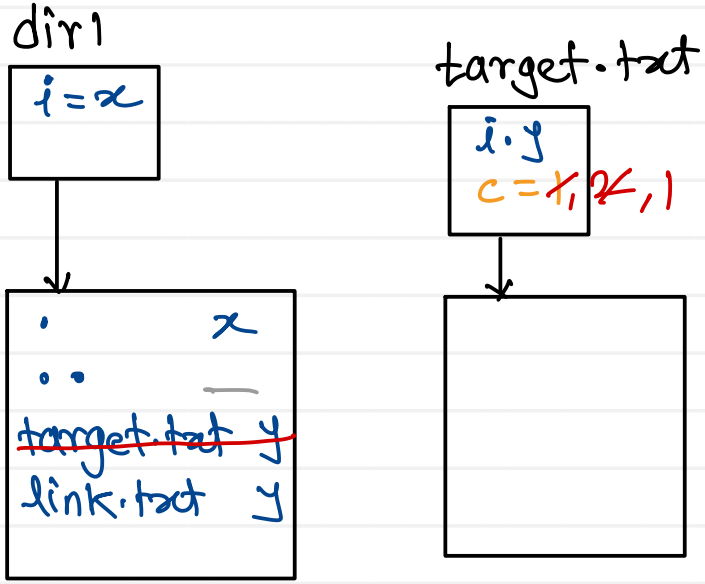


mv d1 d2

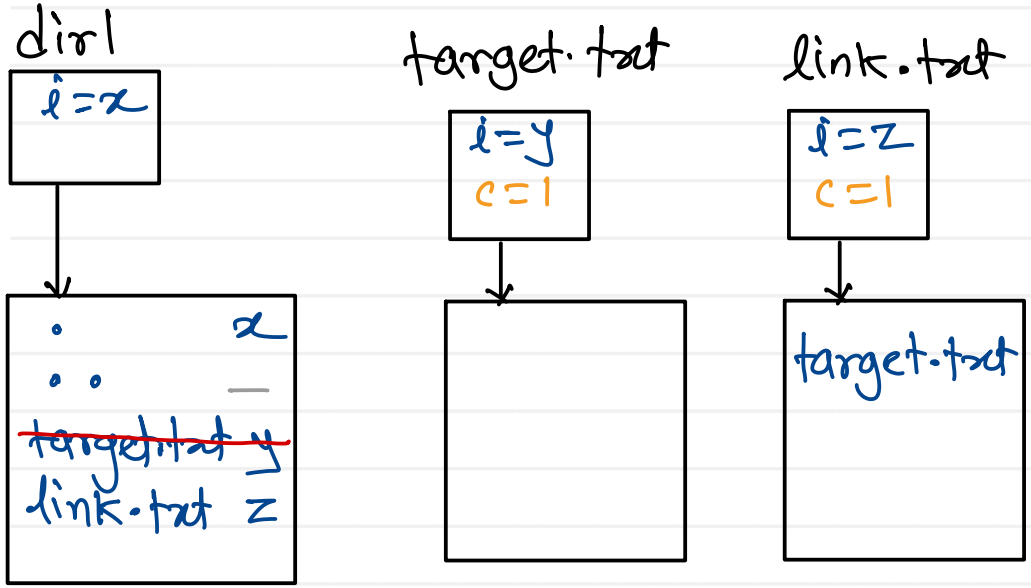


Hard link vs Symbolic link

ln target.txt link.txt



ln -s target.txt link.txt



Context switching

Execution context :

- values of CPU registers

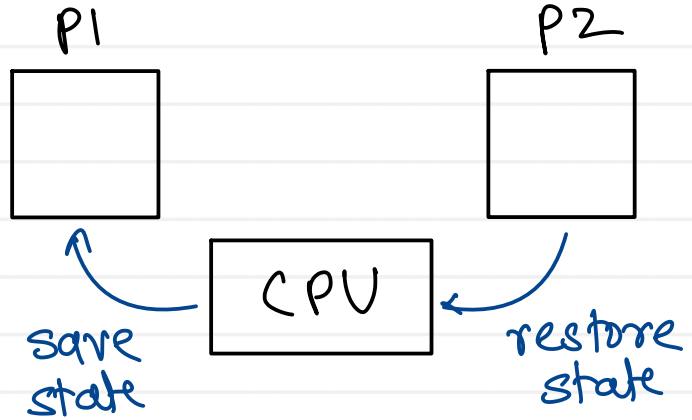
small memory elements present inside CPU

CPU dispatcher loads process on CPU. Execution context of selected from its PCB is loaded on CPU

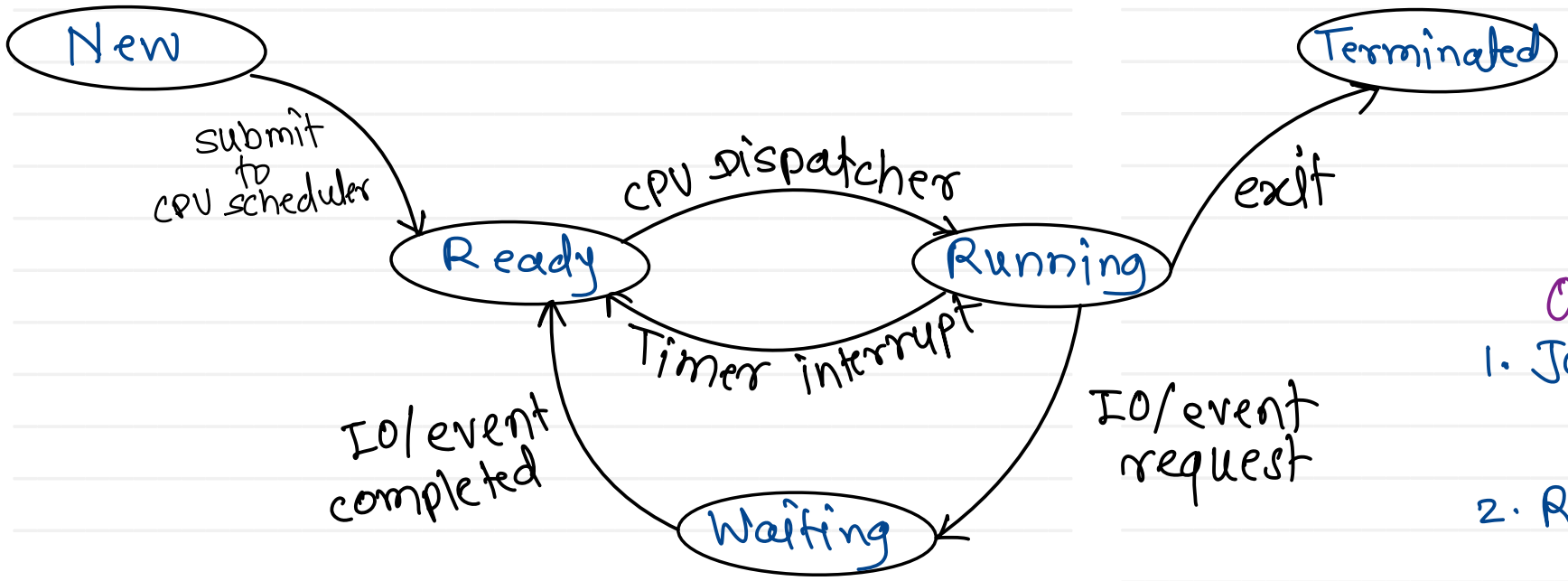
Context switching :

- changing the process of CPU

- execution context of running process is saved into its PCB & execution context of selected process is restored on CPU.



Process life cycle



OS data structures

1. Job queue / process list:
   - all processes of RAM
2. Ready queue:
   - processes which are in ready state.
3. Waiting queue(s):
   - processes which are in waiting state.

CPU scheduling

Cases in which CPU scheduler is called

1. Running → Terminated } voluntarily
2. Running → waiting
3. Running → Ready } forcefully
4. Waiting → Ready

CPU scheduling Criterias :

1. CPU Utilization (max)
2. Throughput (max)
   - amount of work done per unit
3. Waiting time (min)
   - time spend by process in ready queue

   WT = TAT − CPU burst
4. Response time (min)
   - time from arrival to first time execution

   RT = start time − AT
5. Turn Around Time (TAT) (min)
   - time spend by process inside RAM

   TAT = DT − AT

Types of scheduling :

1. Non pre emptive scheduling :
   CPU access is always given voluntarily (co operative process)
   (case 1 & 2)
2. Pre emptive scheduling :
   CPU access is given forcefully
   (case 1 - 4)

CPU scheduling algorithms :

1. FCFS
2. SJF
3. Priority
4. RR

FCFS (First Come First Serve) (Non preemptive)

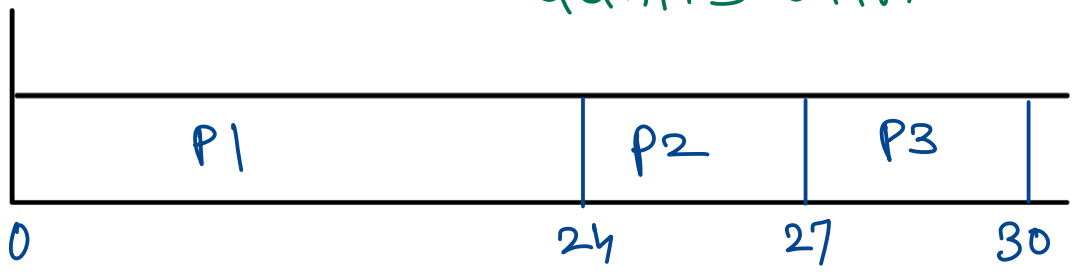
Process	Arrival	CPU Burst
P1	0	24
P2	0	3
P3	0	3

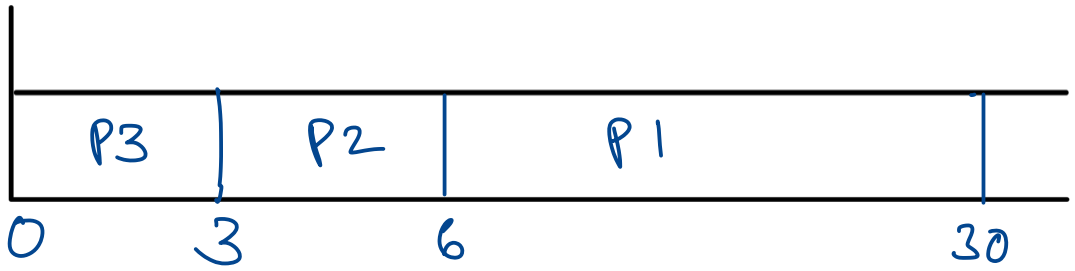
WT	RT	TAT
0	0	24
24	24	27
27	27	30

Process	Arrival	CPU Burst
P3	0	3
P2	0	3
P1	0	24

WT	RT	TAT
0	0	3
3	3	6
6	6	30

Gantt's chart





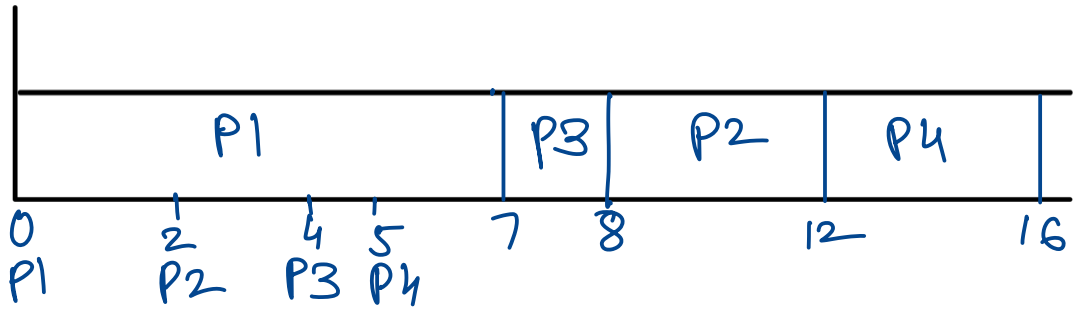
Convoy effect :
due to arrival of longer process early
all other processes need to wait for longer time

SJF (Shortest Job First)

Non preemptive

Process	Arrival	CPU Burst
P1	0	7
P2	2	4
P3	4	1
P4	5	4

WT RT TAT

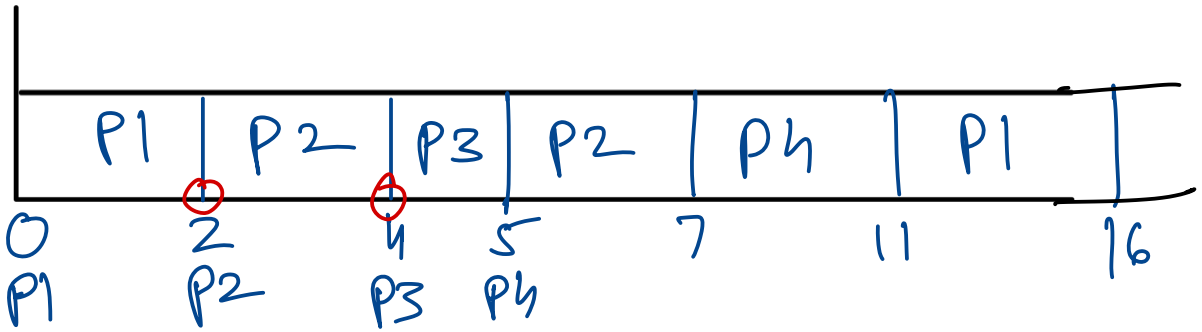


Shortest Remaining Time First (preemptive)

Process	Arrival	CPU Burst
P1	0	7
P2	2	4
P3	4	1
P4	5	4

WT RT TAT

5
2X
X



Starvation :
For longer time process do not get chance to execute on CPU due to longer CPU burst.

Thank you!!!

Devendra Dhande

devendra.dhande@sunbeaminfo.com