Operating System
Important Slides on Process Execution

As part of the OS course

from William Stallings book

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Process Control Block

Contains the process elements

Created and manage by the operating system
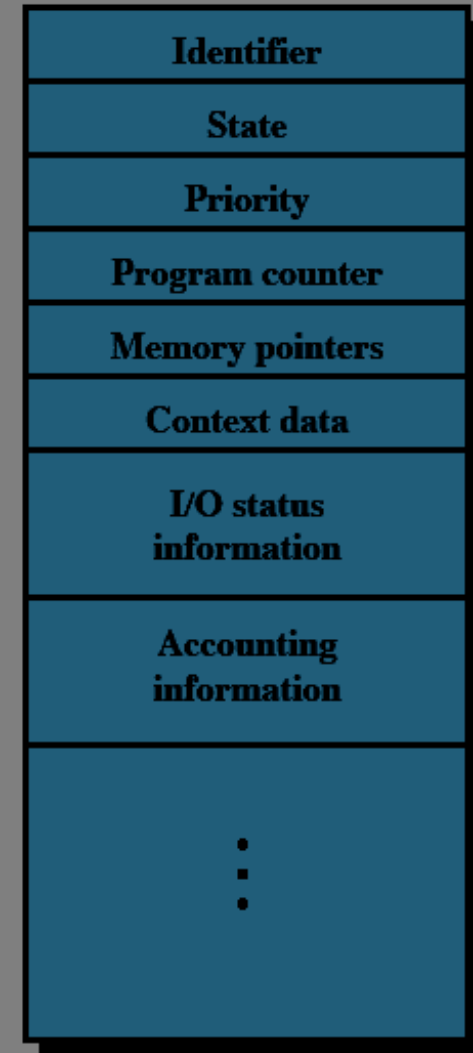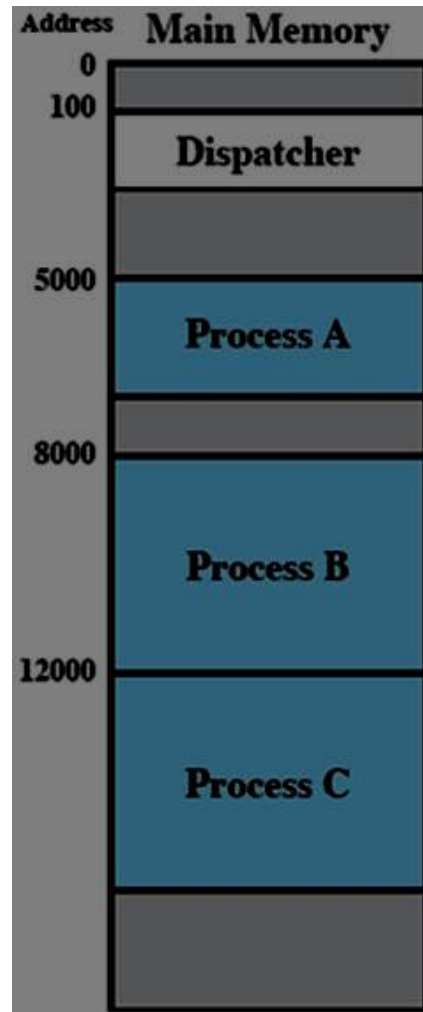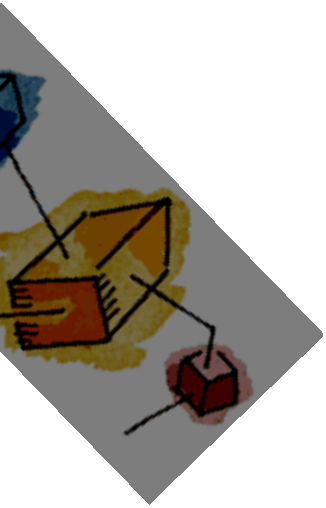
Allows support for multiple processes

Identifier
State
Priority
Program counter
Memory pointers
Context data
I/O status information
Accounting information
⋮

Figure 3.1 Simplified Process Control Block

Process Execution

Address Main Memory
0
100
Dispatcher
5000
Process A
8000
Process B
12000
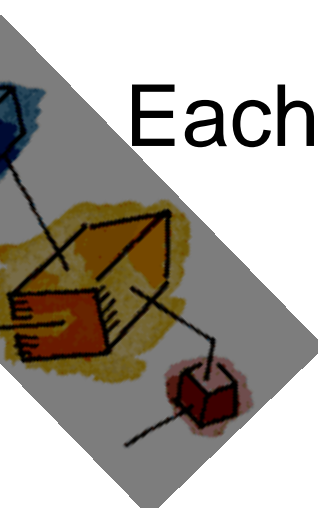**Process C**

Consider three processes being executed

All are in memory (plus the dispatcher)

Lets ignore virtual memory for this.

Trace from the
processes point of view:

Each process runs to completion

5000	8000	12000
5001	8001	12001
5002	8002	12002
5003	8003	12003
5004		12004
5005		12005
5006		12006
5007		12007
5008		12008
5009		12009
5010		12010
5011		12011
(a) Trace of Process A	**(b) Trace of Process B**	**(c) Trace of Process C**

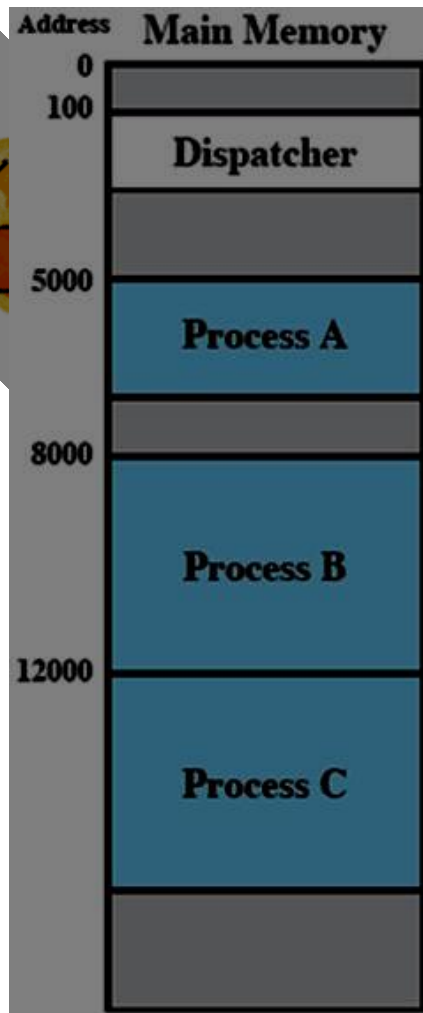5000 = Starting address of program of Process A
8000 = Starting address of program of Process B
12000 = Starting address of program of Process C

Figure 3.3   Traces of Processes of Figure 3.2

Trace from Processors point of view

Address	Main Memory
0	
100	Dispatcher
5000	Process A
8000	Process B
12000	Process C

Time out

1	5000	27	12004
2	5001	28	12005
3	5002	------------- Timeout
4	5003	29	100
5	5004	30	101
6	5005	31	102
------------- Timeout		32	103
7	100	33	104
8	101	34	105
9	102	35	5006
10	103	36	5007
11	104	37	5008
12	105	38	5009
13	8000	39	5010
14	8001	40	5011
15	8002	------------- Timeout
16	8003	41	100
----------- I/O Request		42	101
17	100	43	102
18	101	44	103
19	102	45	104
20	103	46	105
21	104	47	12006
22	105	48	12007
23	12000	49	12008
24	12001	50	12009
25	12002	51	12010
26	12003	52	12011
		------------- Timeout

100 = Starting address of dispatcher program

Shaded areas indicate execution of dispatcher process;
first and third columns count instruction cycles;
second and fourth columns show address of instruction being executed

Figure 3.4 Combined Trace of Processes of Figure 3.2