

Major Requirements of an Operating System

- Interleave the execution of several processes to maximize processor utilization while providing reasonable response time
- Allocate resources to processes
- Support interprocess communication and user creation of processes

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Process

- Also called a task
- Execution of an individual program
- Can be traced
 - list the sequence of instructions that execute

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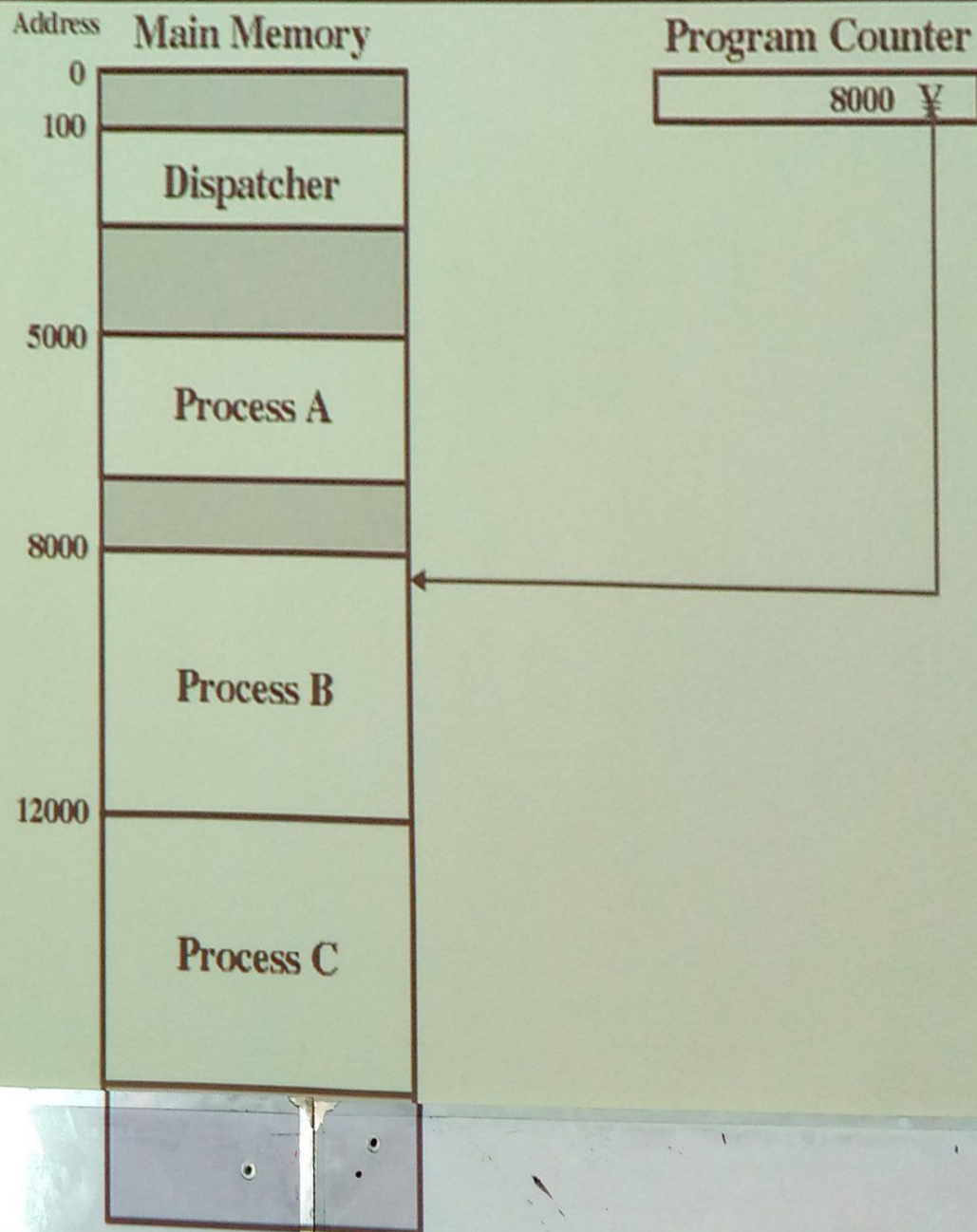


Figure 3.1 Snapshot of Example Execution (Figure 3.3) at Instruction Cycle 13

5000
5001
5002
5003
5004
5005
5006
5007
5008
5009
5010
5011

8000
8001
8002
8003

12000
12001
12002
12003
12004
12005
12006
12007
12008
12009
12010
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 3.2 Traces of Processes of Figure 3.1

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1	5000		27	12004
2	5001		28	12005
3	5002			-----Time out
4	5003		29	100
5	5004		30	101
6	5005		31	102
	-----Time out		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			-----Time out
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
				-----Time out

100 = Starting address of dispatcher program

shaded areas indicate execution of dispatcher process;

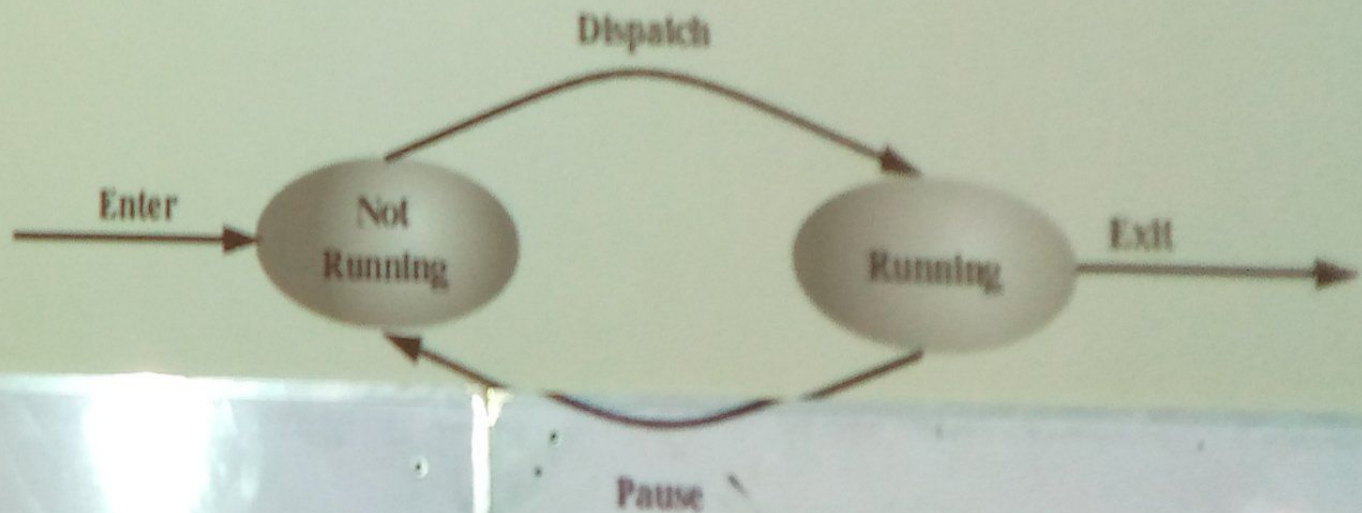
first and third columns count instruction cycles;

second and fourth columns show address of instruction being executed

Figure 3.3 Combined Trace of Processes of Figure 3.1

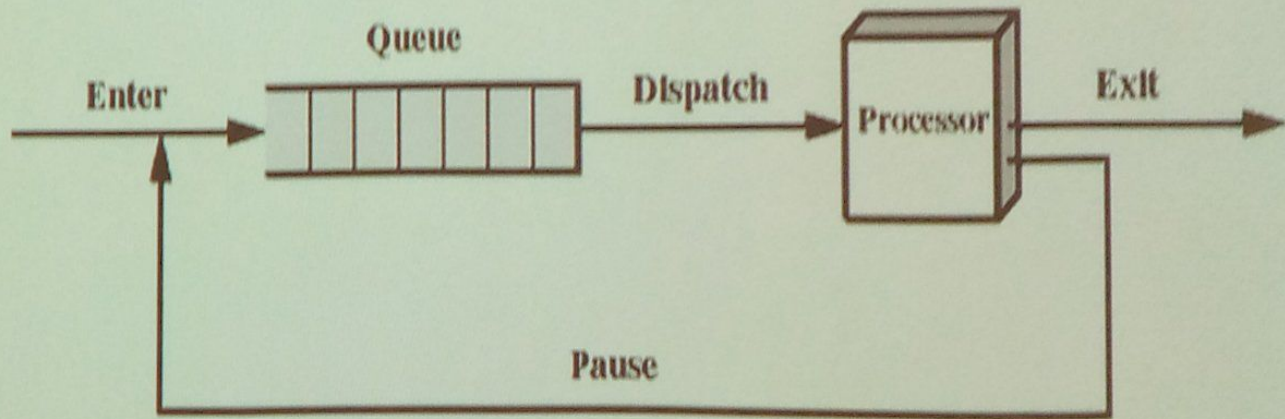
Two-State Process Model

- Process may be in one of two states
 - Running
 - Not-running



(a) State transition diagram

Not-Running Process in a Queue



(b) Queuing diagram

Process Creation

- Submission of a batch job
- User logs on
- Created to provide a service such as printing
- Process creates another process

