→ CPU Scheduling

→ Round Robin

→ Threads

→ Multicore vs Single core

[→ Concurrency vs Parallelism]

→ Intro to Multi-threaded coding

* process = small task

CPU ≈ processor

[.txt —process→ .zip]

[Screen share, audio, video, chat, reactions]

Processes

id	arrival time	time to complete	completion time
1	1	~~6 8 4 3 2 1 0~~ → 7	
→ 2	2	3	
3	3	9	
4	3	4	
5	5	11	

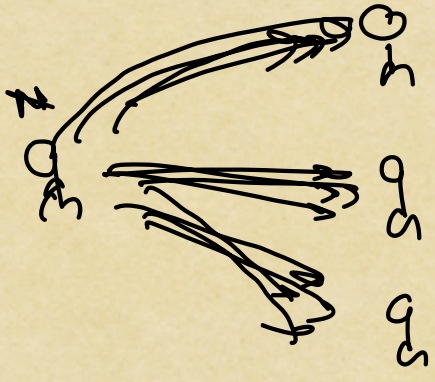
⇒ process it sequentially

6th 7th

⇒ CPU job scheduling

* CPU executes
* it can choose, which process to execute when

⇒ Round Robin CPU scheduling



CPU/procesor ⇒

Round Robin → tasks

→ time burst

* Specific procesing time is given to all processes in the CPU

Process → sequential ⇒ Non-preemptive execution

id	arrival time	time to complete	completion time
1	1	6 ~~5~~ ~~4~~ ~~3~~ ~~2~~ ~~1~~ 0 → 7	
2	2	3	
3	3	9	
4	3	4	
5	5	11	

Round Robin ⇒ 11

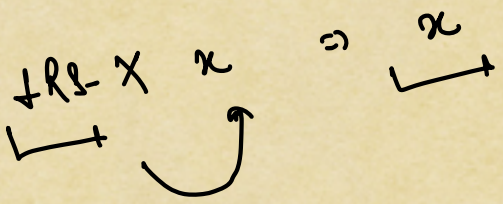
id	arrival time	time to complete	completion time
1	1	~~6~~ 8 4 3	
2	2	~~3~~ 2 1 0	
3	3	~~9~~ ~~8~~ 7	
4	3	~~4~~ 3 2	
5	5	~~11~~ ~~10~~ 9 ;	

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

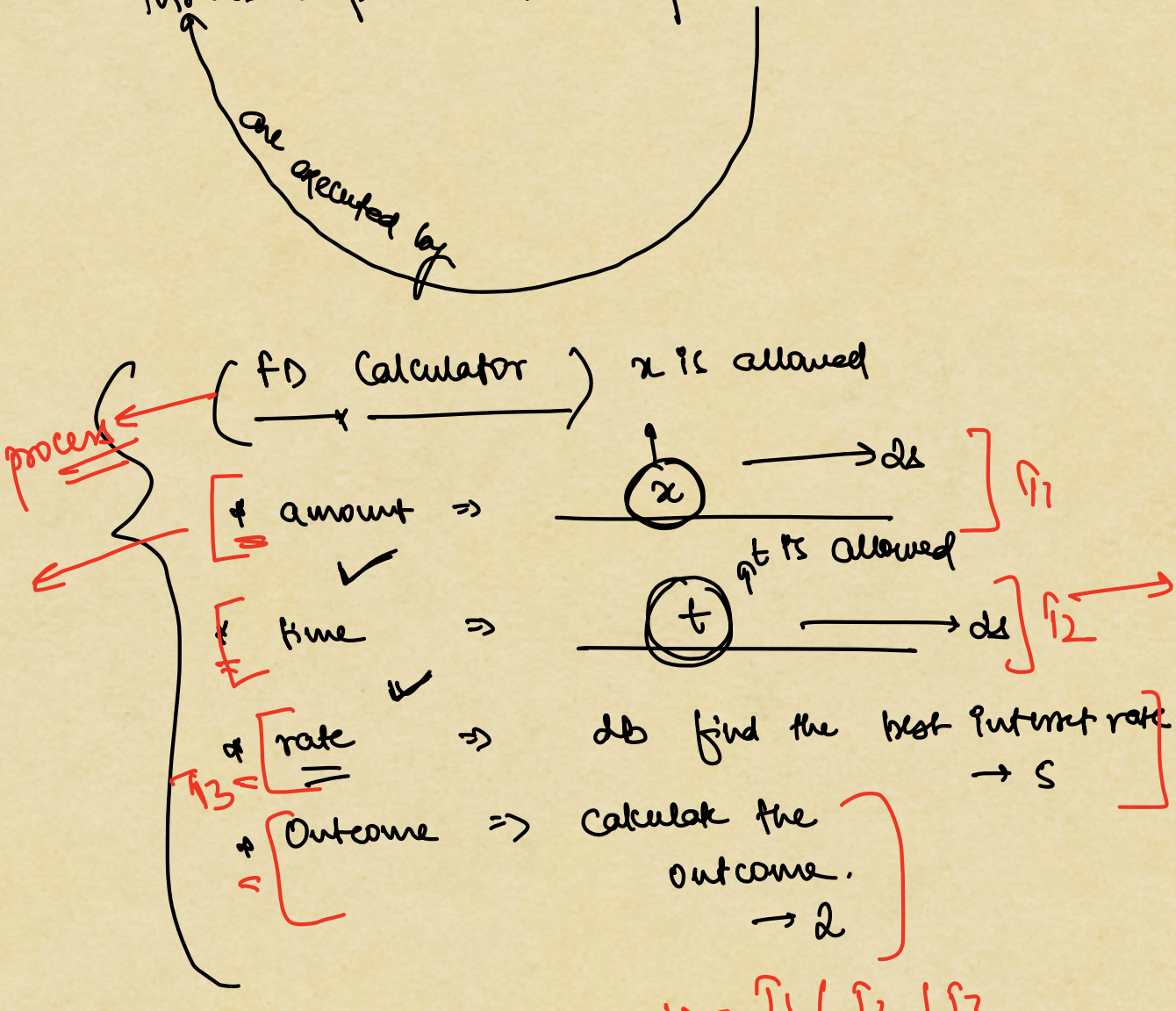
- context switching or preemptive execution

* Threads

Smallest unit of task in process.



threads help to execute processes.



* Multicore vs Singlecore

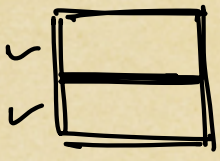
Pentium 1,2,3,4 → Single core

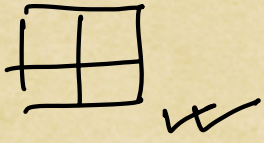
↓

Dual core | Core 2 duo → dual core

↓

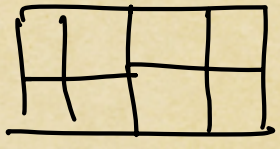
i3 | i5 | i7 | i9 → dual core
quad core
octa core





* core executes 1 thread at a time

* [hyperthreading] ⇒ allows us to execute 2 threads in 1 core at the same.



CPU ⇒ n cores ⇒ threads ⇒ 2*N

↓

4 core ⇒ 8

8 core ⇒ 16

* Concurrency vs Parallelism

Py ⇒ single core → 1 process → 1 thread

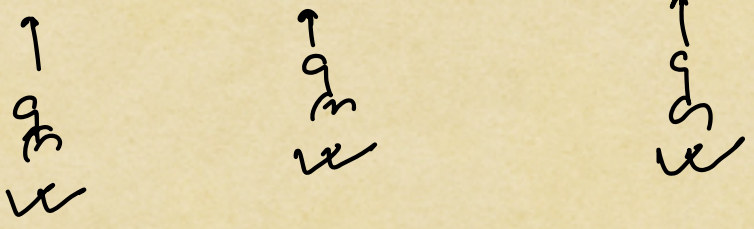
* Concurrent processing

→ sequential ✗

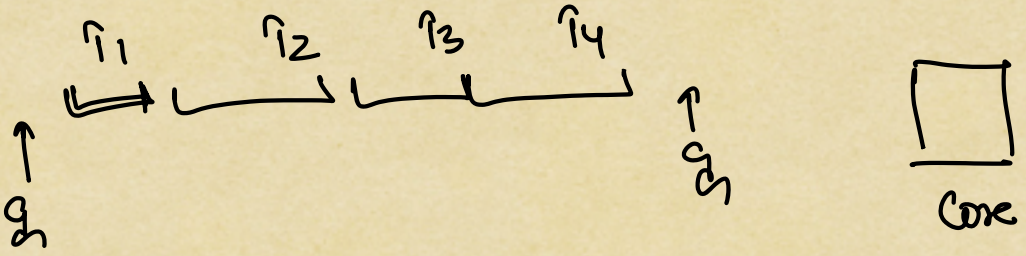
→ context switching

id	arrival time	time to complete	completion time
1	1	~~6~~ 5	
2	2	~~3~~ 1	
3	3	~~2~~ 8	
4	3	~~4~~ 7	
5	5	~~11~~ 10	

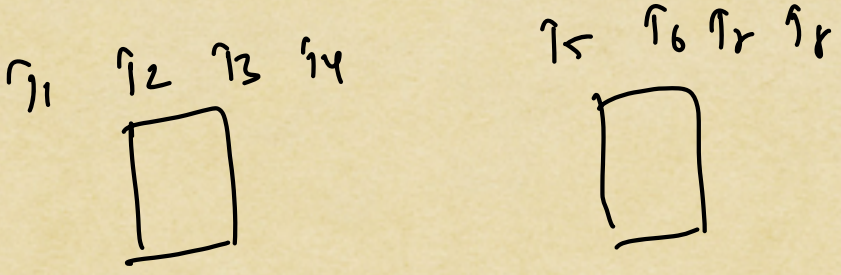
1 2 3 4 5 6 7 8 9 10 11

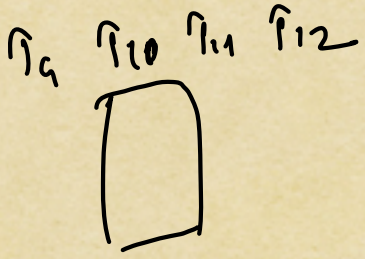


* concurrency is an assumption of parallel processing



{ each core of a multi-core machine executes concurrently }





Parallelism

parallel processing