Scheduling.

Useful lesson - start out w/ completely unrealistic assumptions and progressively relax eliminate them.

This chapter starts w/ Completely impossible assumptions - gives us something to compare with

1. All Jobs run same amt of time
2. " " arrive at same time
3. " " run to completion
4. No I/O
5. We know in advance how long every job takes.

Measures for Performance

Turnaround = time Complete − time arrival

FIFO

each job needs 10 seconds, all arrive at T_0
so pick order

Turnaround $\frac{10+20+30}{3} = 20$ sec avg

Relax Assumption 1 - let jobs run different lengths

Turnaround. $= \frac{100+110+120}{3} = 110_s$

BTW - this is an example of Convoy Effect.
i.e. getting behind a pig/hog

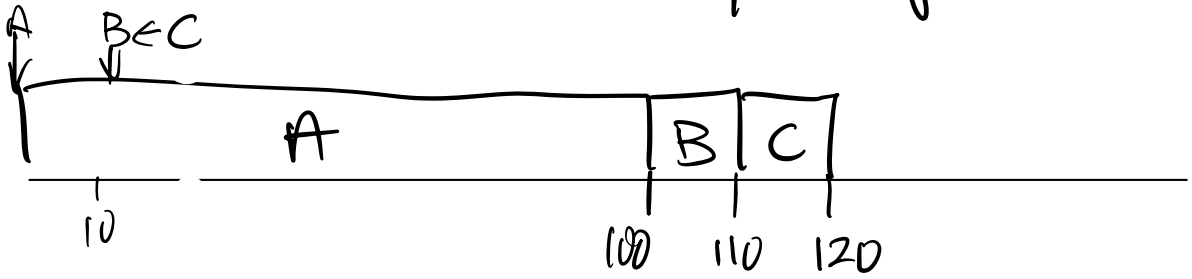
Try SJF Shortest Job First

Turnaround $= \frac{10+20+120}{3} = 50$

Now Relax #2 - jobs arrive at different times. SJF not possible in RL because we cannot predict how long each job will take.

Now relax assumption 2.
Jobs can arrive any time
A arrive at 0
B 10
C

you get



$$\frac{100 + (110-10) + (120-10)}{3} = 103\overline{3}$$

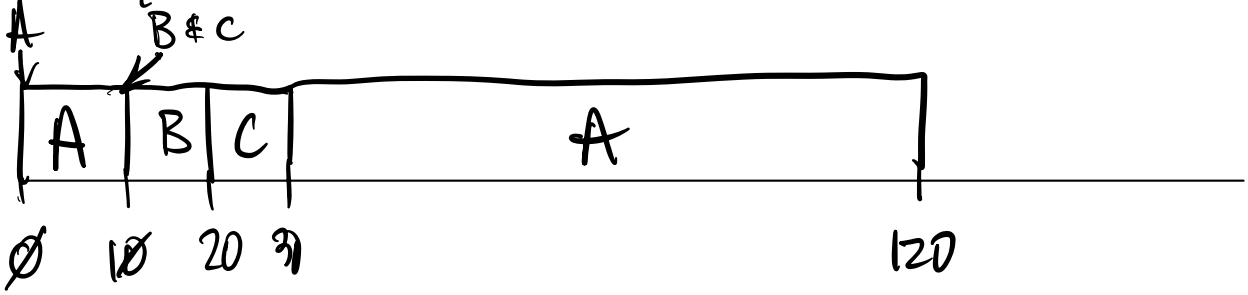
Now relax assumption 3
Jobs don't have to run all the way to completion

STCF shortest time to Completion First

Try same jobs:

A arrive at Ø

B&C " " 10



$$\frac{120 + (20-10) + (30-10)}{3} = 50 \quad \text{cool!}$$

great but still impossible since we don't know how long each job will take.

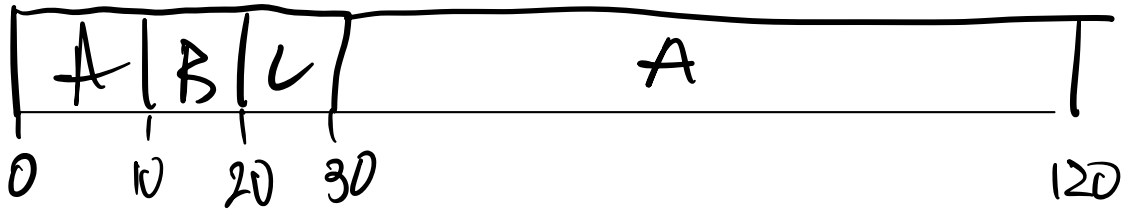
New metrics Response Time.

$$T_{response} = T_{first\ run} - T_{arrival\ time}$$

Does SJF do well w/ response time

A arrive at 0 runs for 10

B&C " " 10 " " 10



picture in book wrong

T_{resp} A = 0 − 0 = 0 $\quad \frac{0+0+10}{3}$

B = 10 − 10 = 0

C = 20 − 10 = 10

C must wait

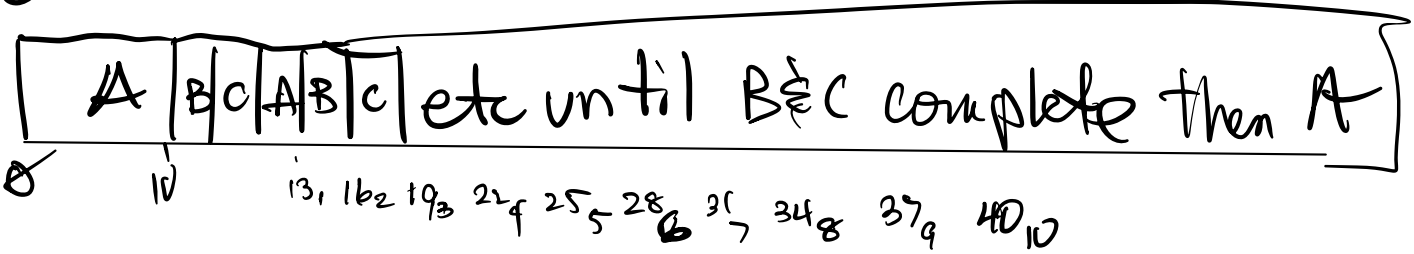
Round Robin

depart from book

A arrive at 0 runs for 100

B&C " " 10 " " 10

assume time slice (Quantum) of 1



$T_{completion} - T_{arrival} = T_{turnaround}$

$T_{first\ run} - T_{arrival} = T_{response}$

	Arrive	First Run	Completion	T_t	T_R
A	0	0	120	120	~~0~~
B	10	10	~~36~~	28	~~0~~
C	10	11	~~39~~	29	1
				59	1/3

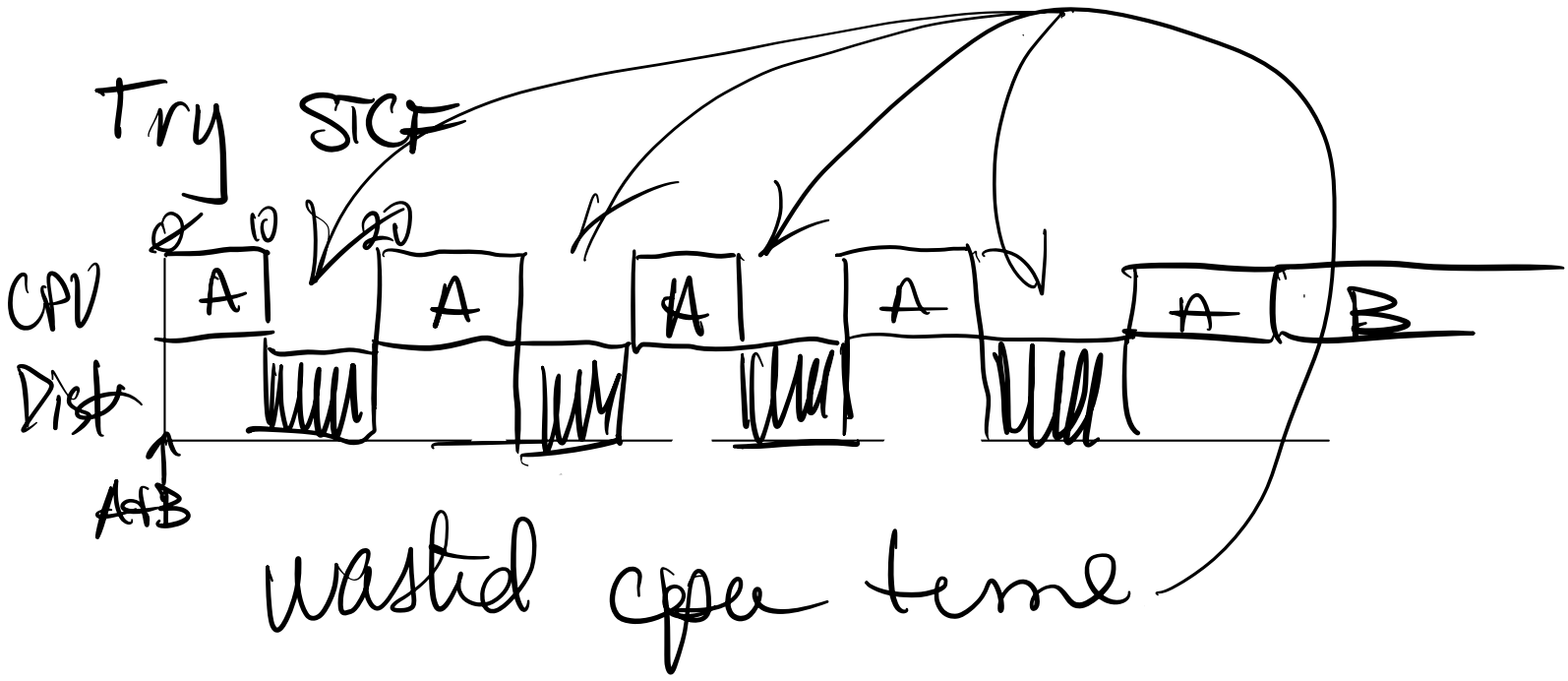
slightly worse than optimal

even better than SJF

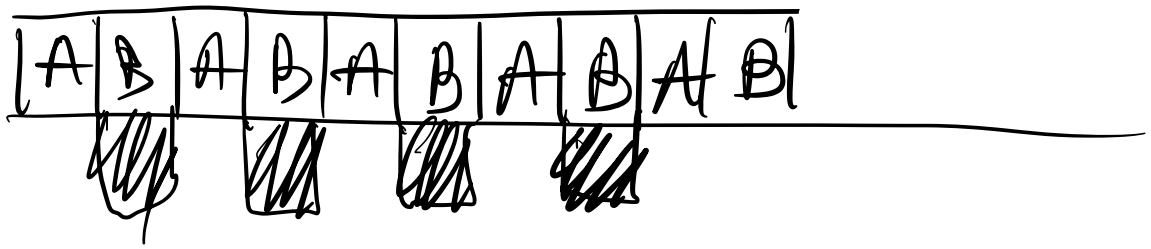
RR is Fair

Now Add I/O

Give 2 jobs A, B each need 50 units
A does I/O every 10 taking 10 units
B does no I/O



Better



Now relax last assumption

ie. we don't know in advance how long each job will need.