CS305: Computer Architecture

Instruction Pipelining

https://www.cse.iitb.ac.in/~biswa/courses/CS305/main.html

https://www.cse.iitb.ac.in/~biswa/

COVID19 Vaccination Schedule

Single cycle: one hour per person

verification: 25 minutes

5 minutes for vaccination

20 minutes post-vaccination

10 minutes, certificate ☺

COVID19 Vaccination Schedule

Single cycle: Three hour, three persons

verification: 25 minutes

5 minutes for vaccination

20 minutes post-vaccination

10 minutes, certificate ☺

COVID19 Vaccination Schedule

Multi cycle: Book four slots

verification: 25 minutes

5 minutes for vaccination

20 minutes post-vaccination

10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Single cycle: one hour per person

Stage 1 verification: 15 minutes

Stage 2 verification: 10 minutes

Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Single cycle: one hour per person

Stage 1 verification: 15 minutes

Stage 2 verification: 10 minutes

Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Single cycle: one hour per person

Stage 1 verification: 15 minutes

Stage 2 verification: 10 minutes

Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Single cycle: one hour per person

Stage 1 verification: 15 minutes

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Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Single cycle: one hour per person

Stage 1 verification: 15 minutes

Stage 2 verification: 10 minutes

Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Pipelined: One hour: Three persons

Stage 1 verification: 15 minutes

Stage 2 verification: 10 minutes

Stage 3: 5 minutes for vaccination

Stage 4: 20 minutes post-vaccination

Stage 5: 10 minutes, certificate ☺

COVID19 Vaccination Pipelined Schedule

Pipelined: One hour: ? Persons, first person: 100 minutes ☹, after a while throughput= 3 persons/hr

Stage 1 (20 mins): verification

Stage 2 (20 mins): verification

Stage 3 (20 mins): 5 minutes for vaccination

Stage 4 (20 mins): 20 minutes post-vaccination

Stage 5 (20 mins):10 minutes, certificate ☺

Think about variable stages, does it improve latency and throughput?

Computer Architecture

Let's pause a bit

Single cycle: CPI: 1 , Cycle time: long

Multi cycle: CPI: >1, Cycle time: short

Pipelined: CPI: 1, Cycle time: short (improves throughput but not latency)

Computer Architecture

Pipelining and Richard Feynman

https://www.youtube.com/watch?v=9miKIWIYi4w

Jump to 1:25

Computer Architecture

감사 해요