







A blue speech bubble with a white outline and a small tail pointing towards the bottom right. The word "DONE" is written in the center in white, bold, uppercase letters.

**DONE**



A blue speech bubble with a white question mark and the word 'ORDER?' inside.

**ORDER?**



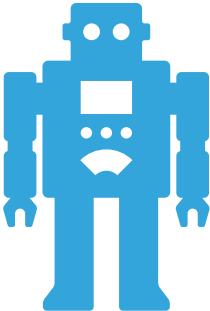
MELTDOWN & SPECTRE FOR ARMV8 ARE PEOPLE

**CONFIDENTIALBURGER: PARALLEL, IN ORDER EXECUTION**



16







waiter













Prizzen  
Ovben

Burgherrin



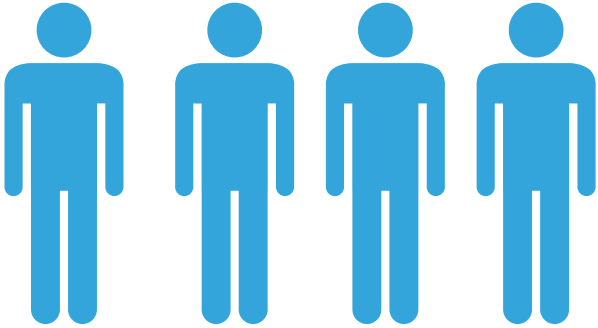


conference machine









- ▶ One customer<sup>1</sup> after another (in order)
- ▶ Each part of the order <sup>2</sup> executed in parallel

I.e. burger and coffee prepared at the same time

- ▶ **PRO: Faster bc. of better resource utilisation.**
- ▶ **CON: Still not perfect, more complex**

▶ Decode instruction into  $\mu$ OPs

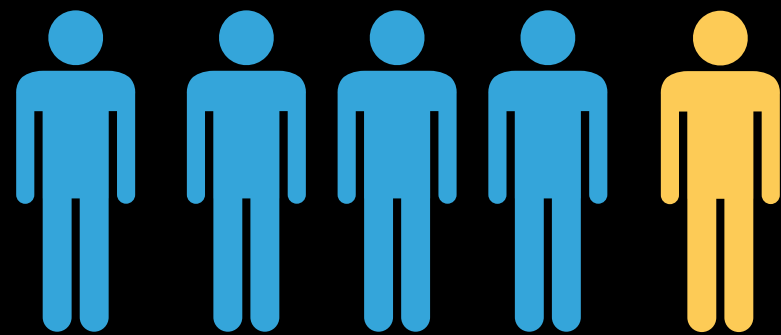
► Schedule pops

▶ run 1st  $\mu OP$  and 2nd  $\mu OP$  (parallel execution of  $\mu OP$ s)

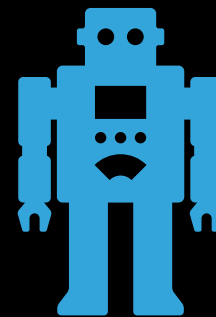
▶ retire instruction (customer)

- ▶ Decode instruction into  $\mu$ OPs
- ▶ Schedule  $\mu$ OPs
  - ▶ run 1st  $\mu$ OP and 2nd  $\mu$ OP (parallel execution of  $\mu$ OPs)
- ▶ retire instruction (customer)

## CONFIDENTIAL BURGERS INC. : PARALLEL, OUT OF ORDER EXECUTION



Customer



Waiter



Pizza oven



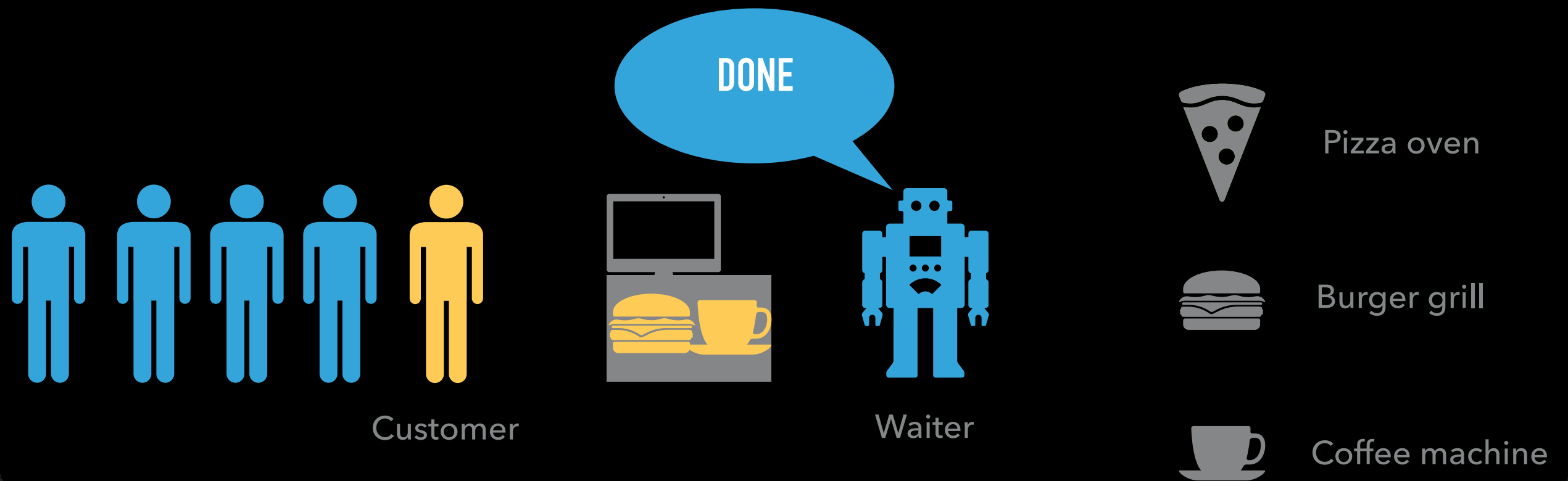
Burger grill



Coffee machine



# CONFIDENTIAL BURGERS INC. : PARALLEL, IN ORDER EXECUTION



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