CWI

A Domain Specific Language for performance modeling

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Agenda

- Introduction
- Example: CWI lunch model
- Demo

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Domain Specific Language

- **Language tailored for a specialized domain**
  - SQL -> databases
  - HTML -> web content
  - Shell script -> Unix/Linux automation
  - Rebel -> Specification of financial products (SWAT CWI)

- **In contrast to general purpose languages**
  - C, C++, java etc.

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Domain: Performance Modeling

- **Limitations of existing tools**
  - Mainly graphical (drag n click)
  - Lack of crucial behavioral primitives
    - Processor Sharing models
    - Synchronization
    - Custom prioritization in queues
- **Using a framework**
  - Implementing too low level details
  - Mostly event oriented
- **Goal:**
  - Process oriented performance modeling language
  - Include modeling primitives from prior modeling experience

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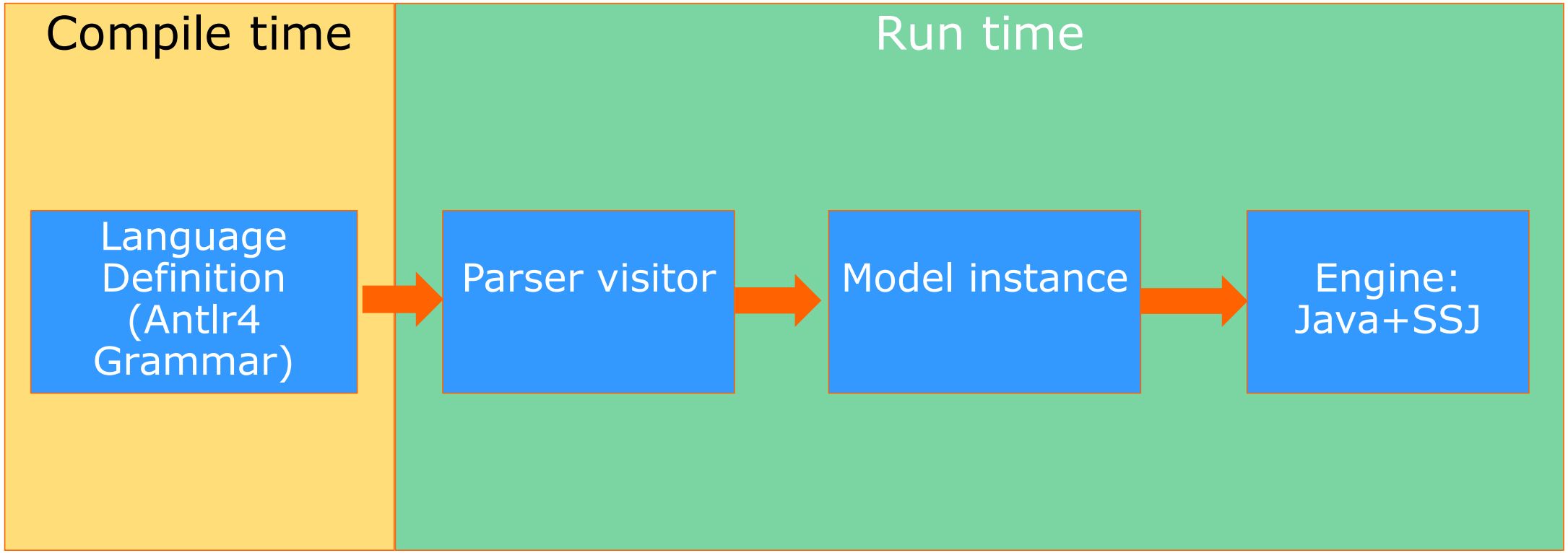
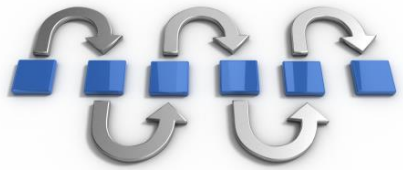
Performance Modeling DSL Tool

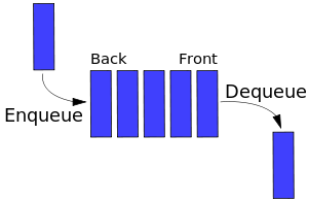


Backend: Discrete event simulation

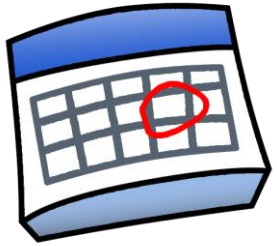
- **Three ingredients:**



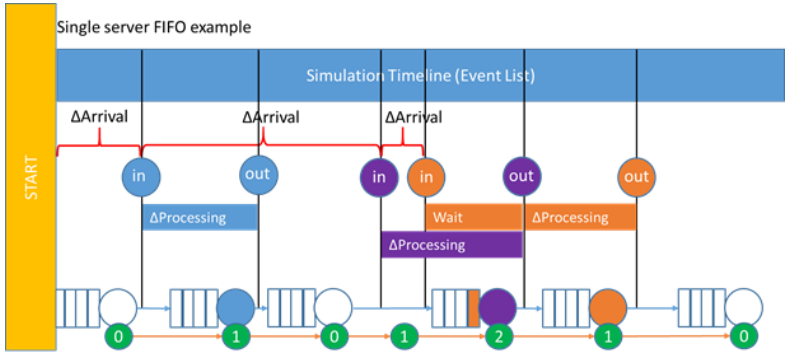
Model (<u>workflow</u>):
- A triggers B
- B waits for C
- Queueing models
- Single/multi process
- FIFO / ROUND ROBIN / RANDOM



Behavior (<u>timings</u>):
- How long?
- How much?
- Based on data/measurements.



Event list (<u>bookkeeping</u>):
- When?
- In what order?
- List of events with time of occurrence



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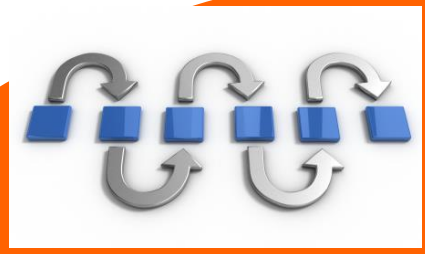

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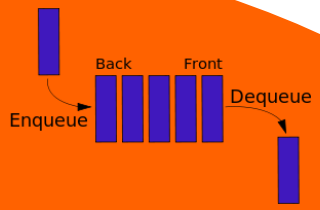

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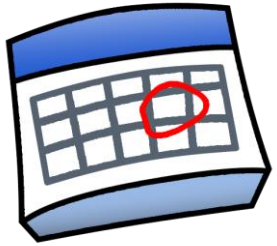

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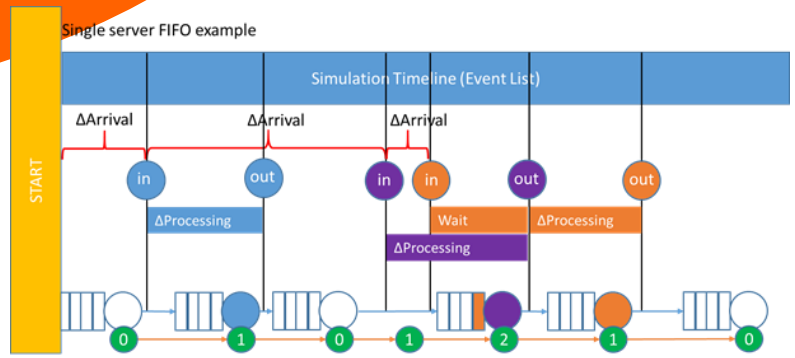

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Language basics (JSON inspired)

- **Declarations:**
- **<identifier> : Type** — **customer : Type**
- **<type identifier> .<identifier> : Type** — **customer.age : number**
- **<identifier> : <attribute> | <component>** — ***a : double, b : ResourcePool(3)***
- **<function> <argument>*= <expression>** — ***f(%x) : %x * %x + 2***

- **Orchestration:**
- **<component> -> <component>** — ***arrival->queue***

- **Expressions:**
- **-Assignment:** **x=2, y='test'**
- **-Comparison:** **x<y, value=='foo'**
- **-Predicate:** **x>2, a&&b**

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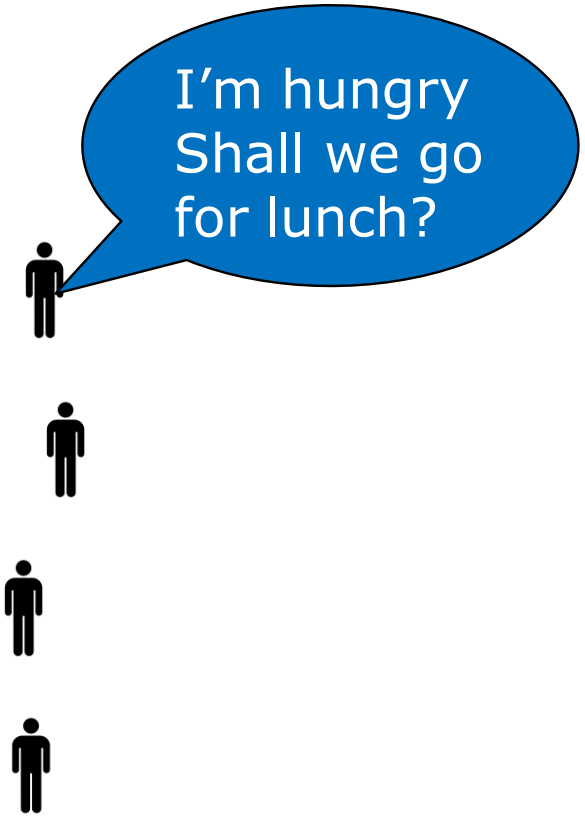

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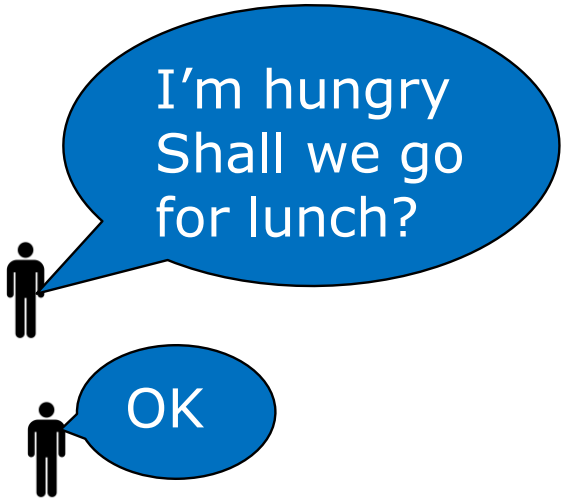

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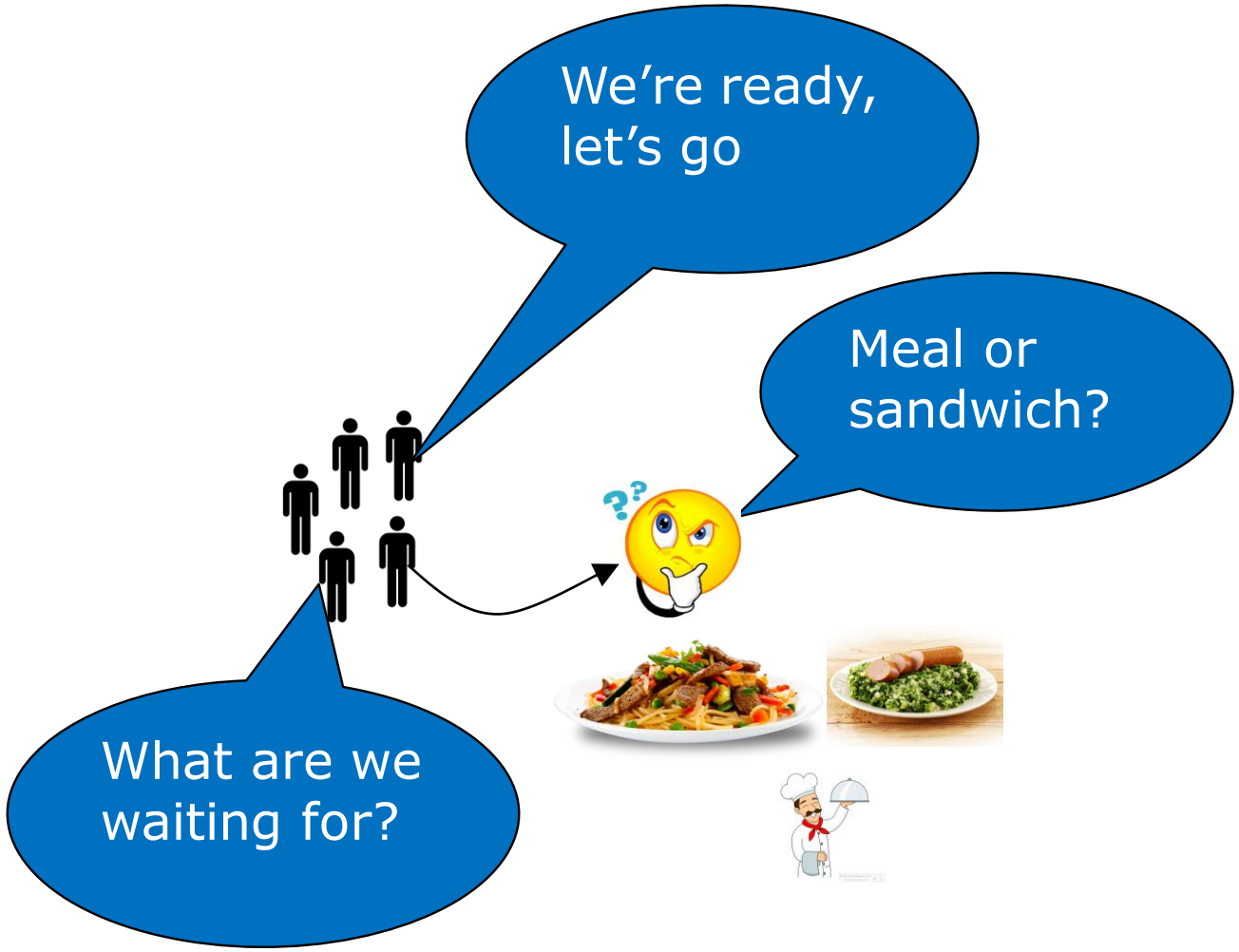

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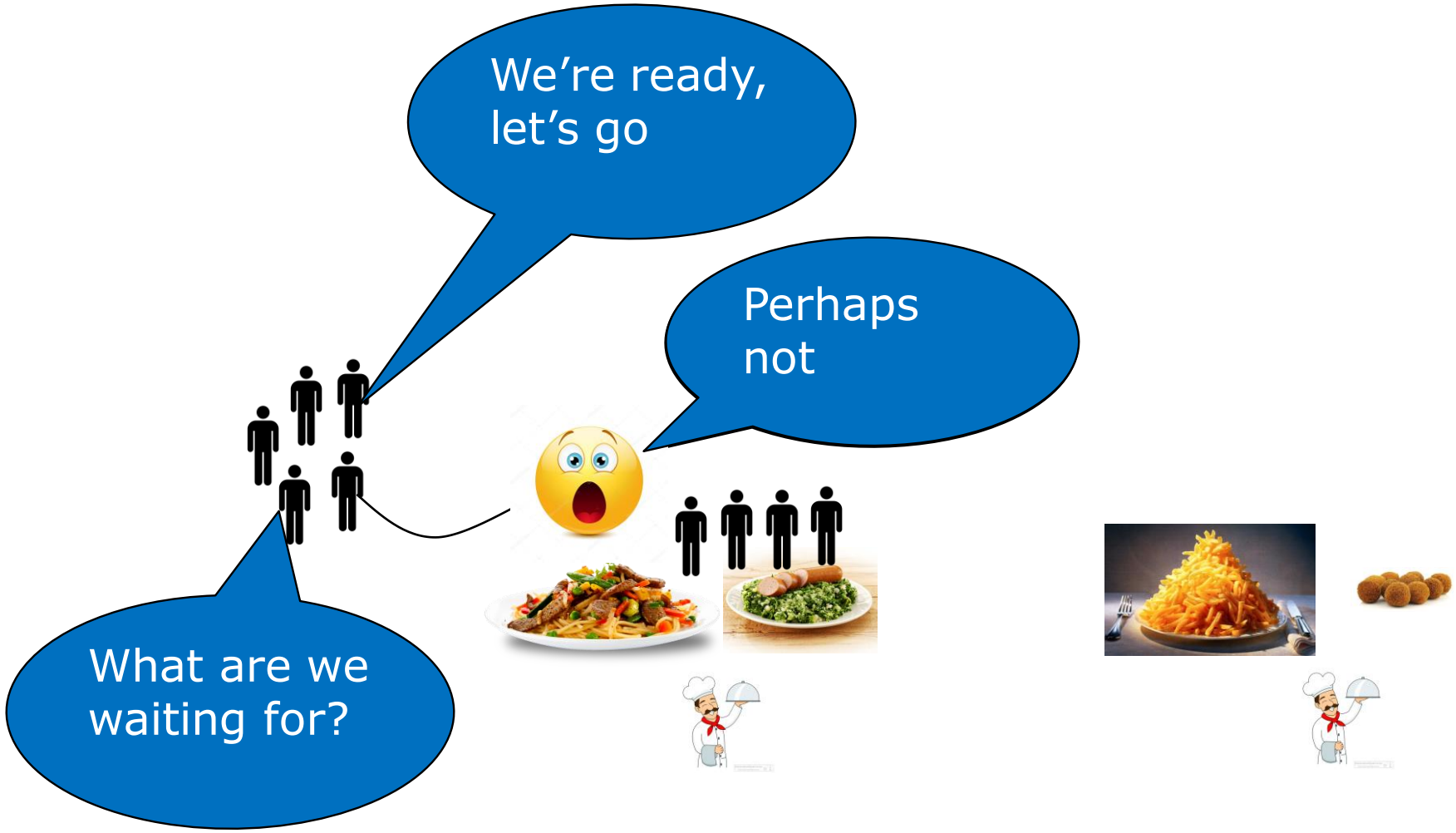

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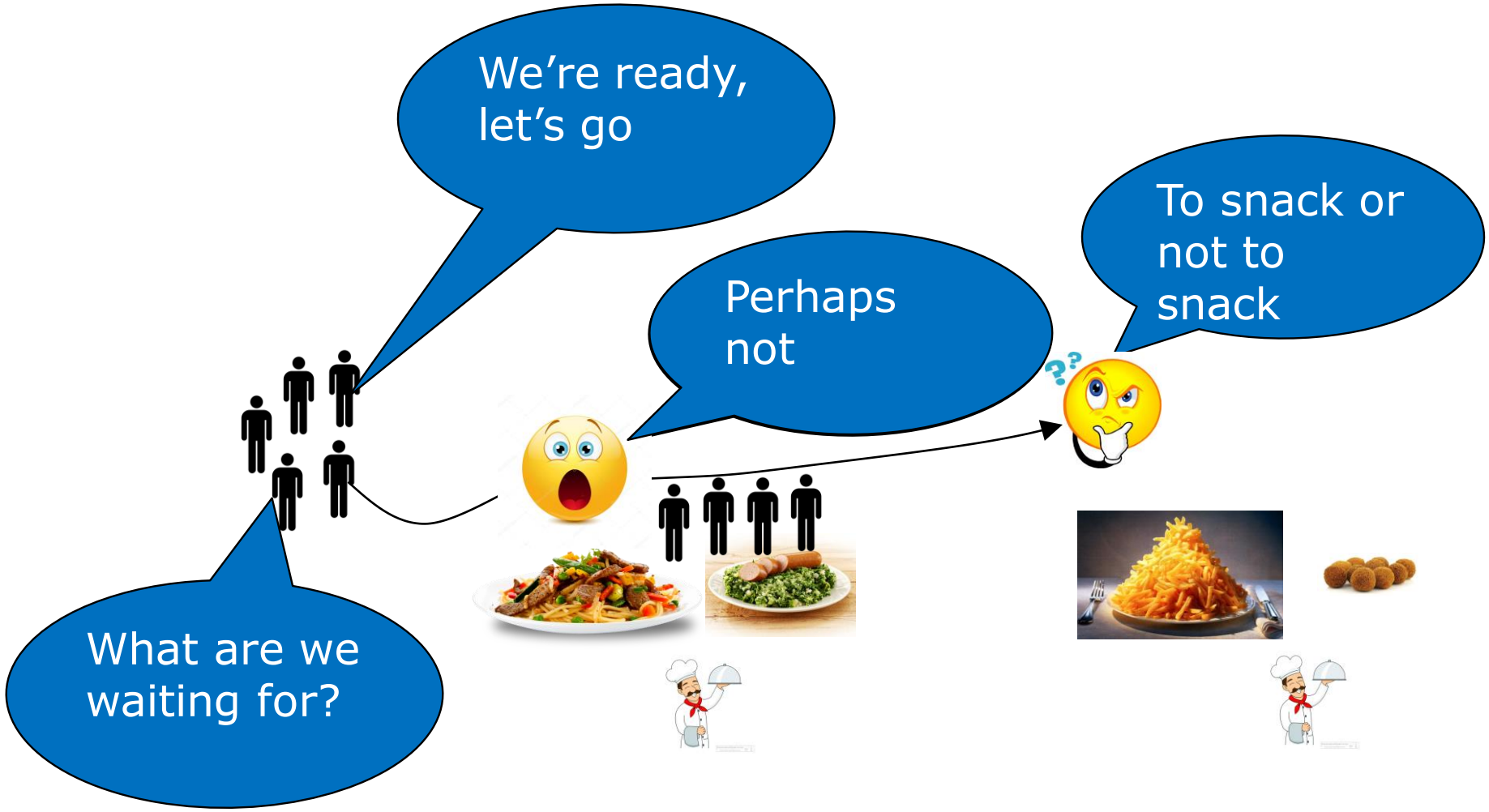

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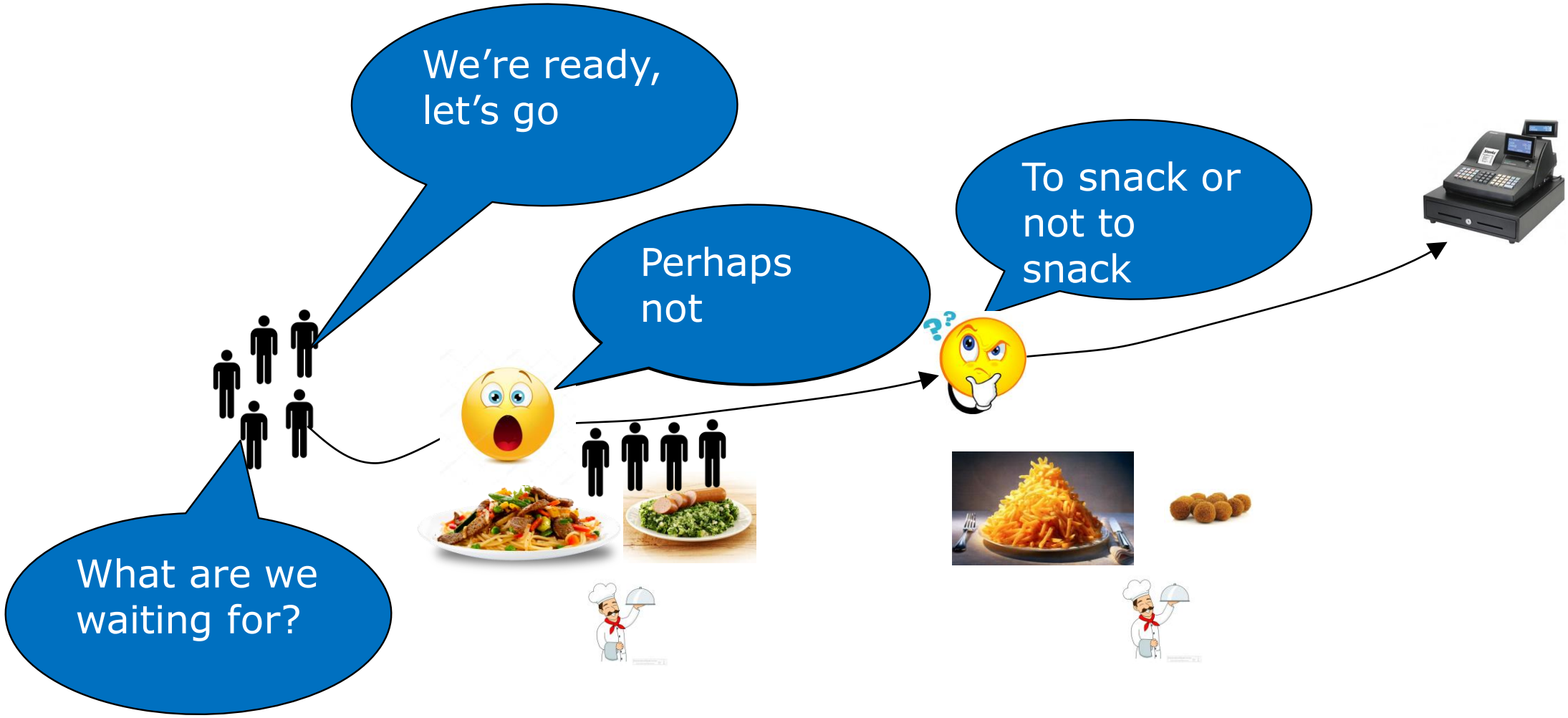

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Demo

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Questions