Decision support for queue management systems - some reflections

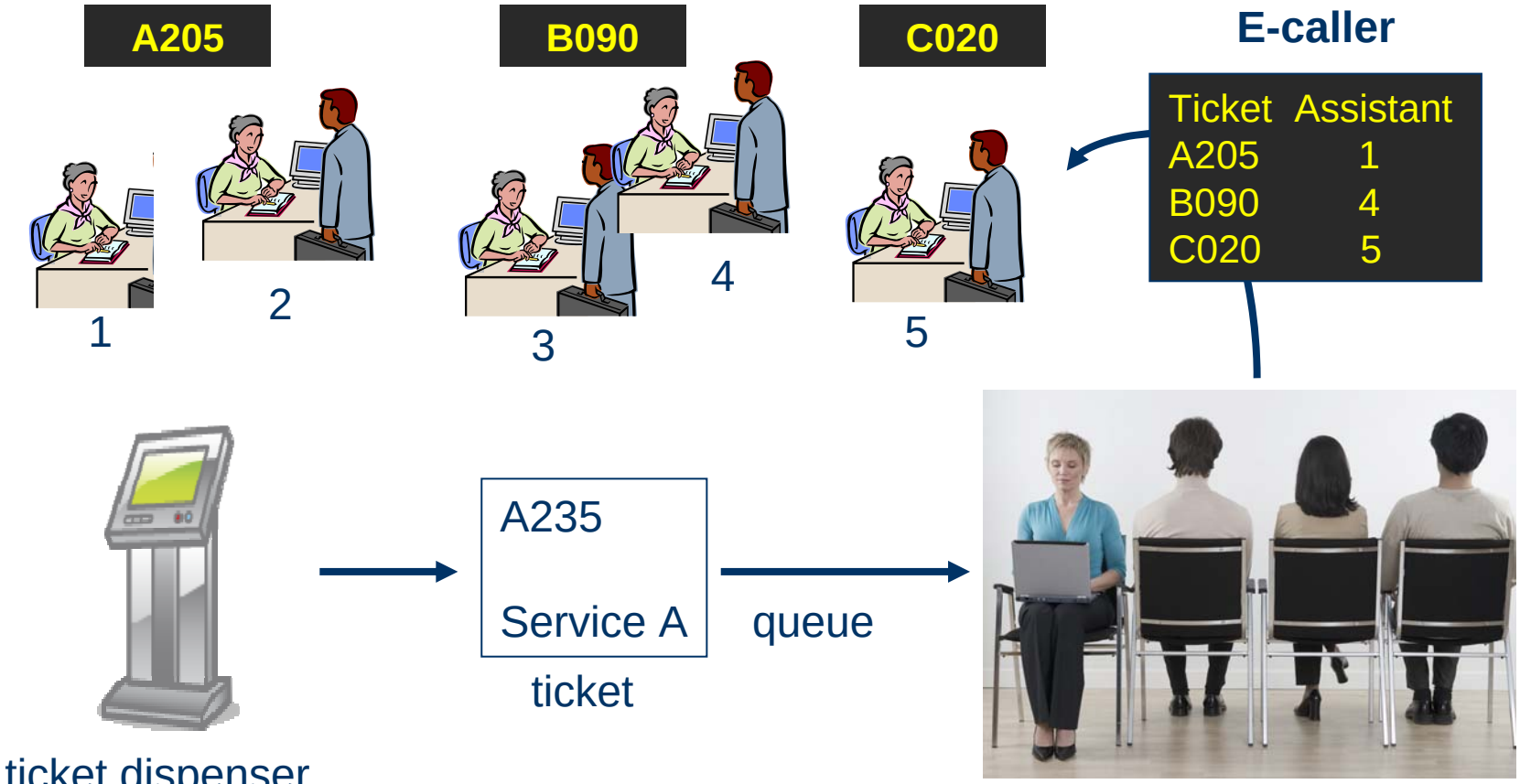
Ana Respício
University of Lisbon
OR Center

Agenda

- Queue systems
- Motivation
- Problems/ sub-problems
- Envisaged system

Traditional queue

Queue management system



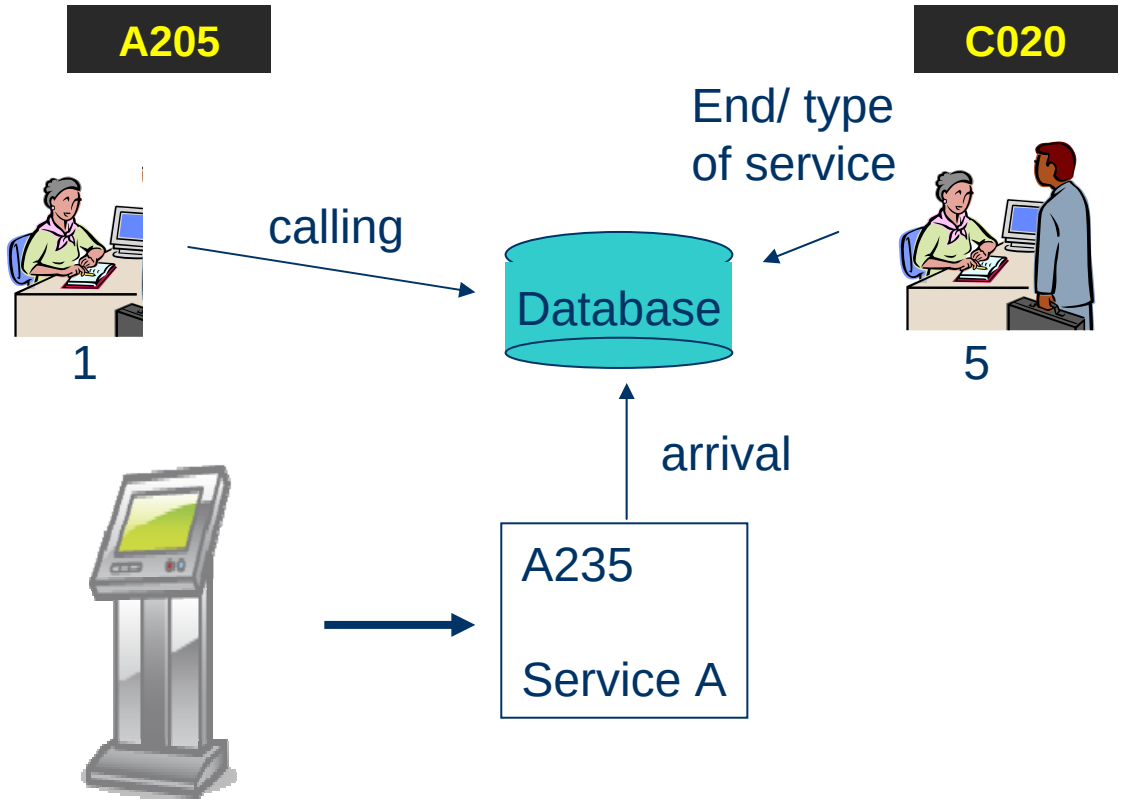
Queue management system

- A multiplicity of queues are created.
- Services are differentiated by letters – allowing people to approach the right assistant.
- Modern systems for very crowded organizations / services already send text to phone giving customers information about the queue state, or Web publish it.

Image and efficiency

- Modernity and efficiency.
- Customer satisfaction – customers can use waiting time doing other activities rather than “just waiting”.
- Sense of better quality of service.

Events


A205
C020
End/ type
of service
calling
Database
1
5
arrival
A235
Service A

Data collected

- For each customer:
  - Arrival time,
  - Starting service time,
  - Ending service time,
  - Type of service/sub-services,
  - Assistant serving.

Statistics

- Number of customers.
- Number of customers for each service.
- Number of customers giving up before service.
- Waiting time, service time.
- Sales (services and sub-services).
- Serving times for assistant/service.

Performance management

- Evaluating publicity campaigns.
- Quality of service evaluation.
- Evaluating/comparing stores performance.
- Human resources efficacy evaluation.

Decision support

1. Data mining
   - Analysing correlations.
   - Extracting tendencies.
2. Forecasting
   - Making aggregate predictions for service requests over medium term planning period, e.g, a month.
   - Making predictions for service requests over a short planning period, e.g., a week.

Decision support

3. Planning assistance counters.
4. Planning human-resources.
5. Real time decision support
   - Monitoring and providing alerts and suggestions.

Planning assistance counters/ human-resources

Scheduling workers

- Defining how many assistants should be assigned to each service for each daily working period (shifts) – morning, evening, night – during a given period of time, e.g., a week,
- ensuring a good quality of service.

Planning human-resources

Rostering

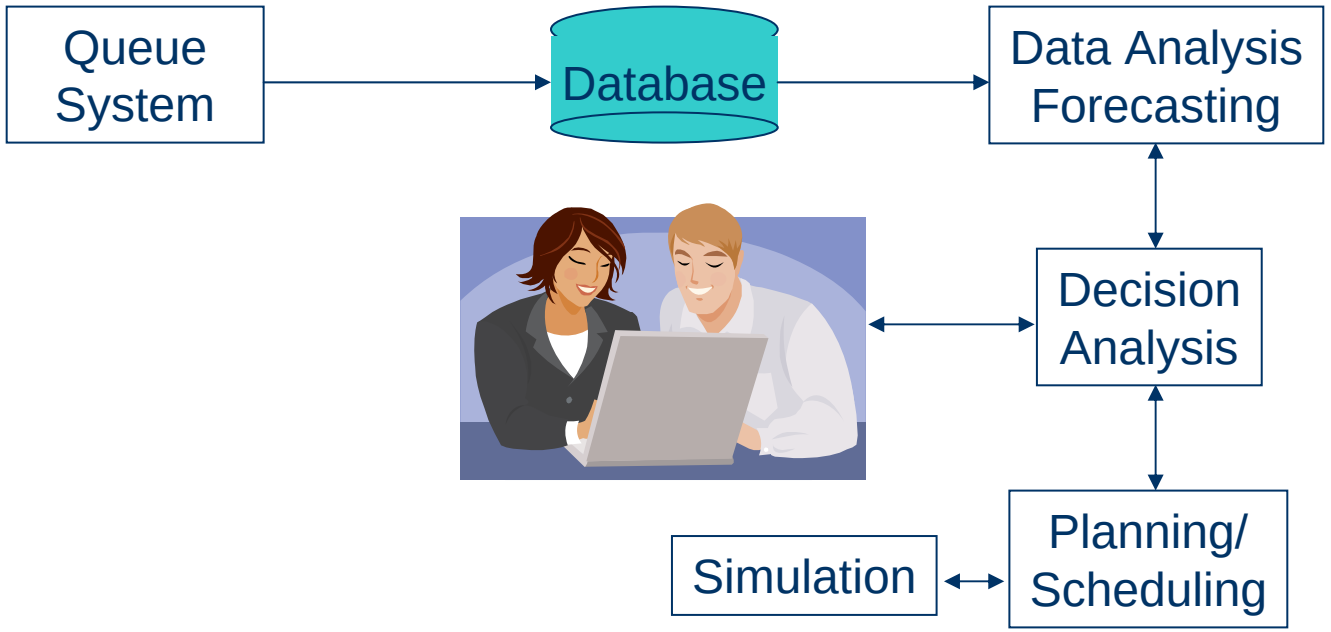
- Defining which assistants should be assigned to each service at each shift, during a given period, e.g., a week,
- complying with legal and institutional rules, namely Labour Law, labour agreements and the company's regulations.
- providing a equitable distribution of work,
- at lowest cost.

Planning human-resources

Re-scheduling/re-rostering

- Re-assigning assistants to services due to absences.
- Re-assigning assistants to services due to unexpected increasement or decreasement of arrivals.

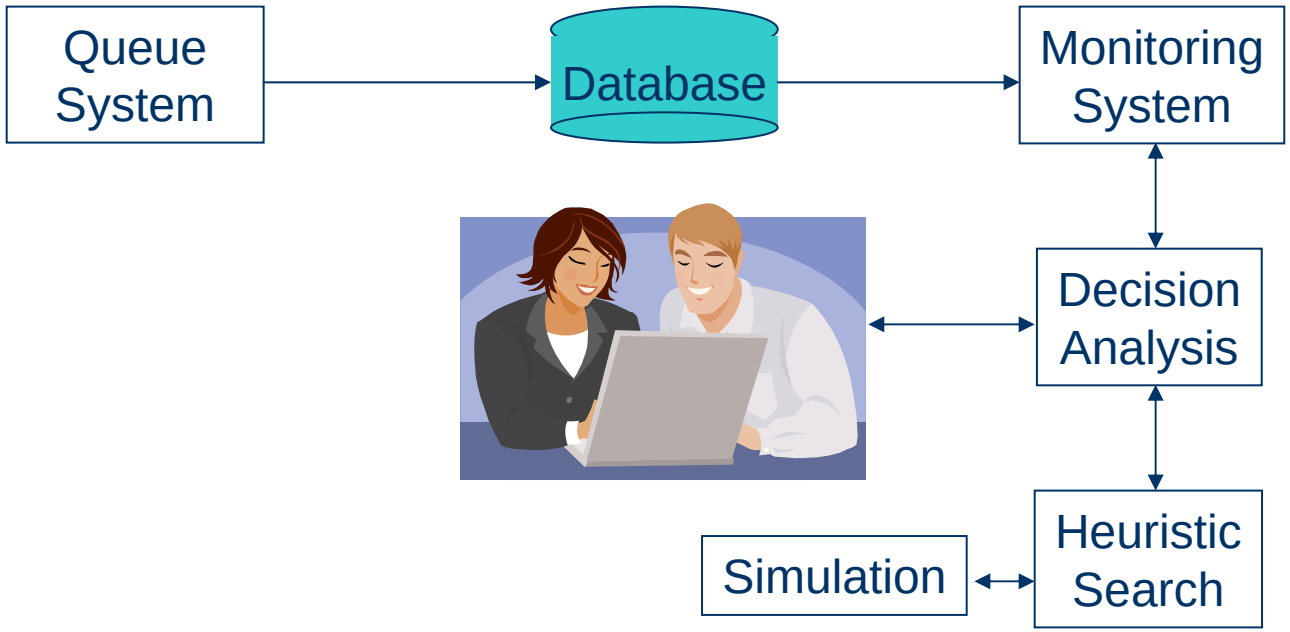
Analysis/Planning/Scheduling



Real time decision support

- Defining metrics (KPI) to be monitorized and used to generate alerts
- Maximum/average people in queue
- Maximum/average waiting time for each service/assistant
- Maximum/average people giving up

Real time decision support



Discussion

…

Thank you