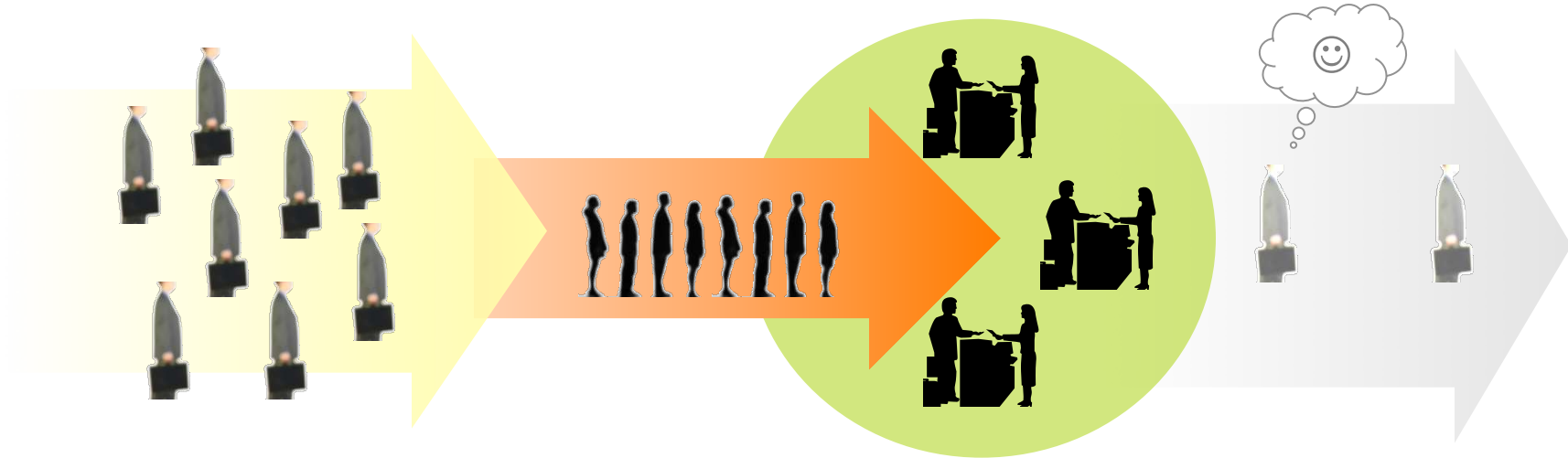


# Why Study Queueing Theory

- Queues (waiting lines) are a part of everyday life.
  - Buying a movie ticket, airport security, grocery check out, mail a package, get a cup of coffee etc.
  - It is estimated that Americans wait 37,000,000,000 hours per year waiting in queues!!!
- More generally, great inefficiencies occur because of other types of “waiting”
  - Machines waiting to be repaired leads to loss of production
  - Vehicles waiting to load or unload delays subsequent shipments
  - Airplanes waiting to take off or land
  - Delays in telecommunication transmissio.
- Queueing theory uses queueing models to represent various types of systems that involve “waiting in lines”. The models investigate how the system will perform under a variety of conditions.

# Basic Queueing Process



## Arrivals

- Arrival time distribution
- Calling population (infinite or finite)

## Queue

- Capacity (infinite or finite)
- Queueing discipline

## Service

- Number of servers (one or more)
- Service time distribution

“Queueing System”

# Examples and Applications

- Call centers (“help” desks, ordering goods)
- Manufacturing
- Banks
- Telecommunication networks
- Internet service
- Transportation
- Hospitals
- Restaurants
- Other examples.....