

# COMP1531

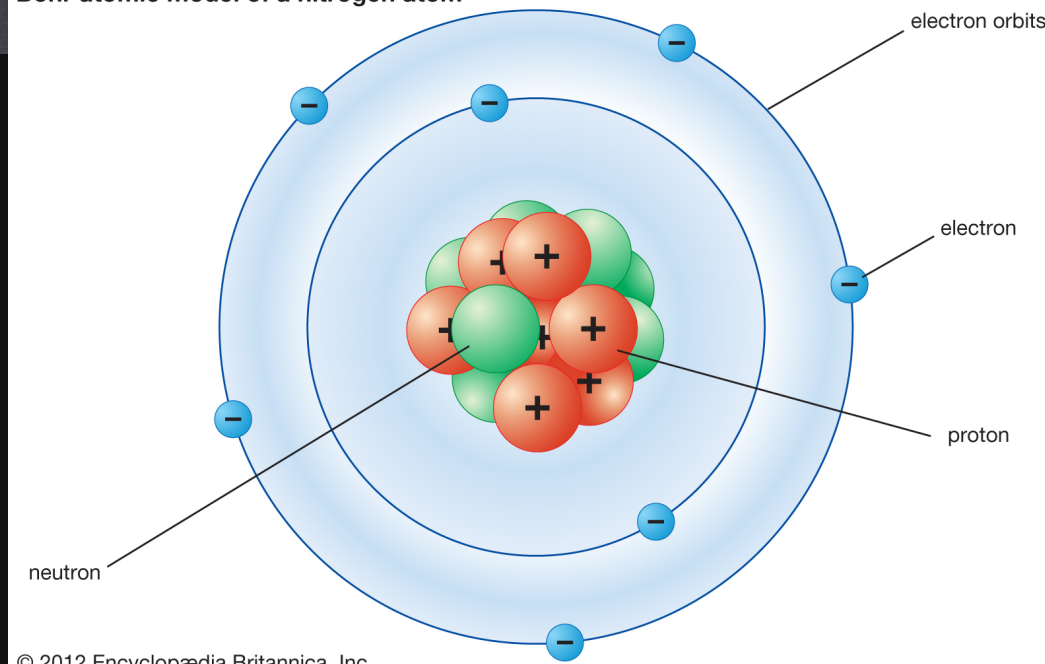
## 7.2 - SDLC Design - System Modelling

**What's a model?**

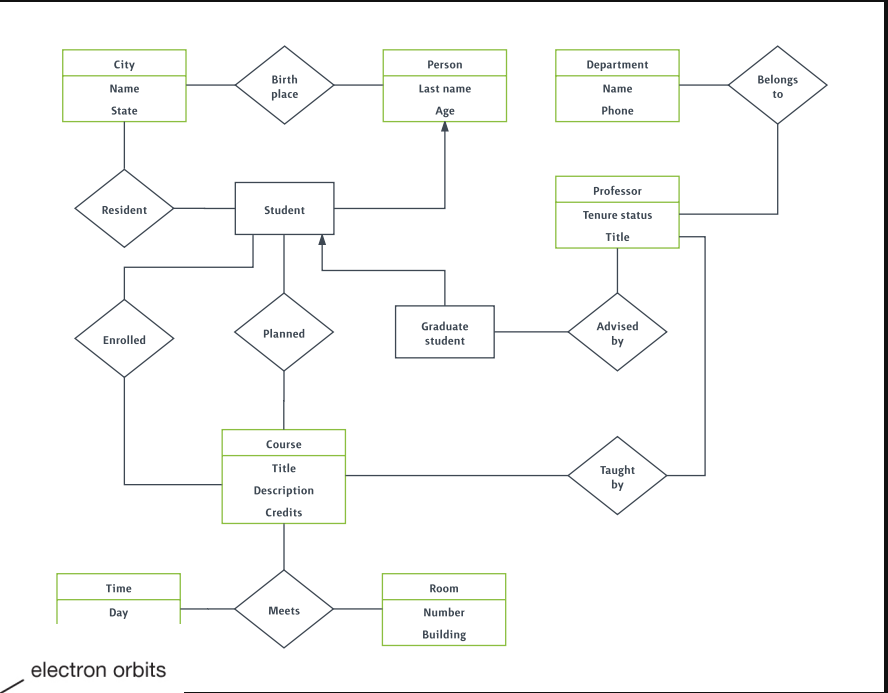




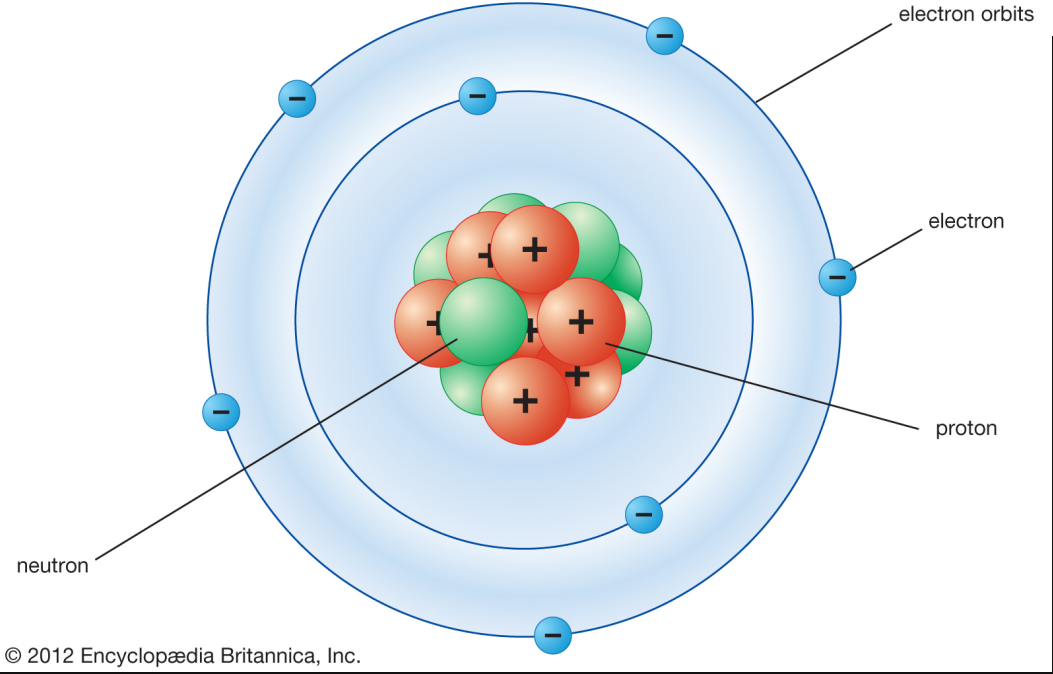
Bohr atomic model of a nitrogen atom

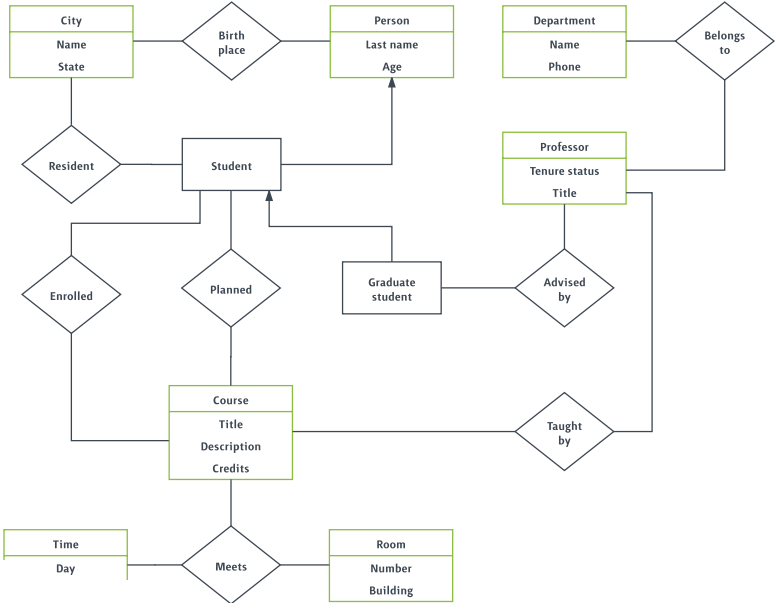


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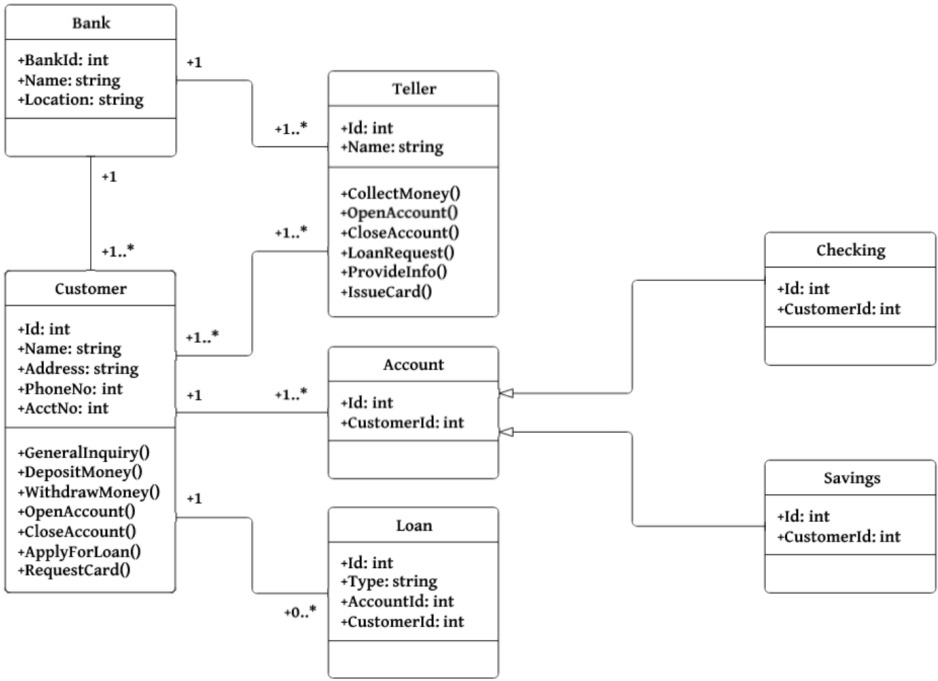


Bohr atomic model of a nitrogen atom





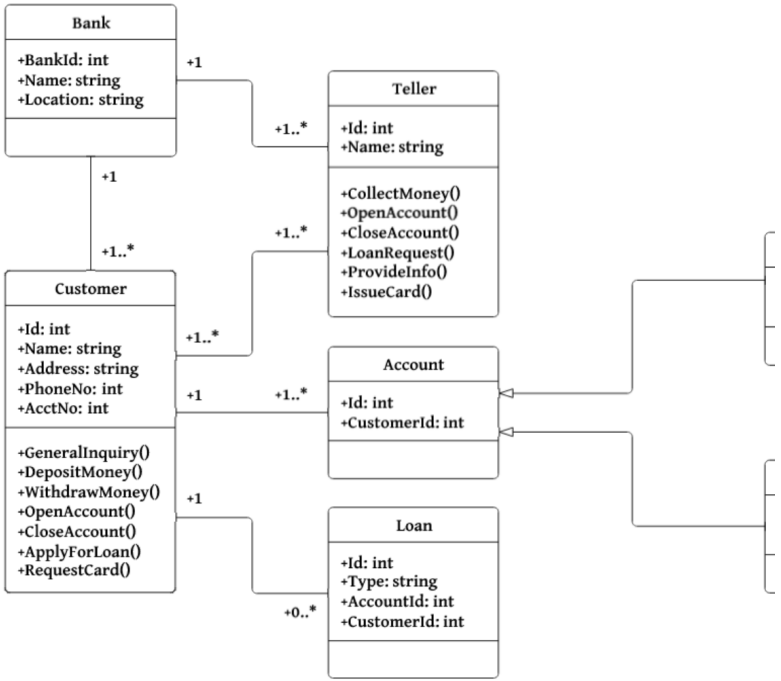
on orbits



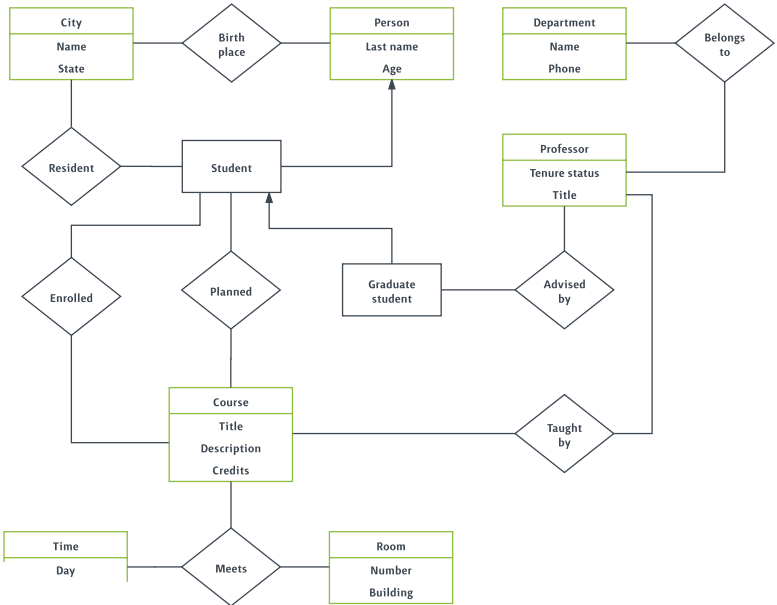
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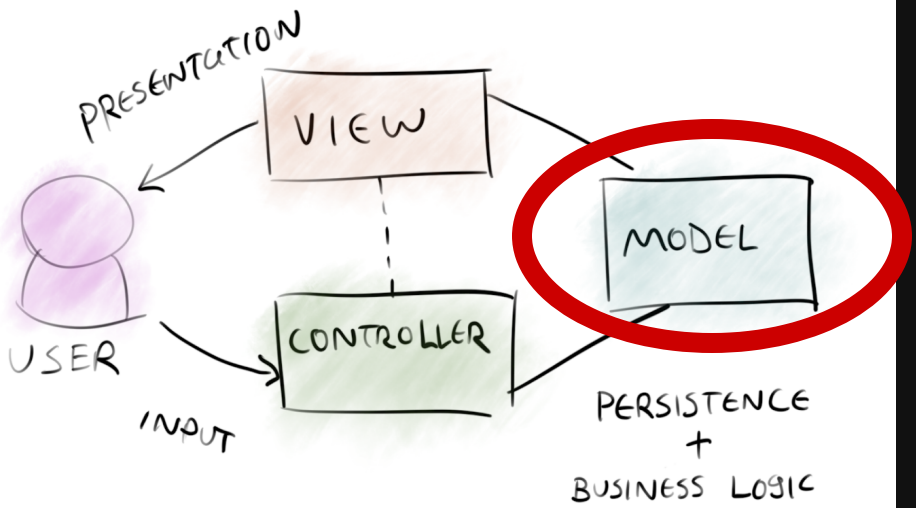


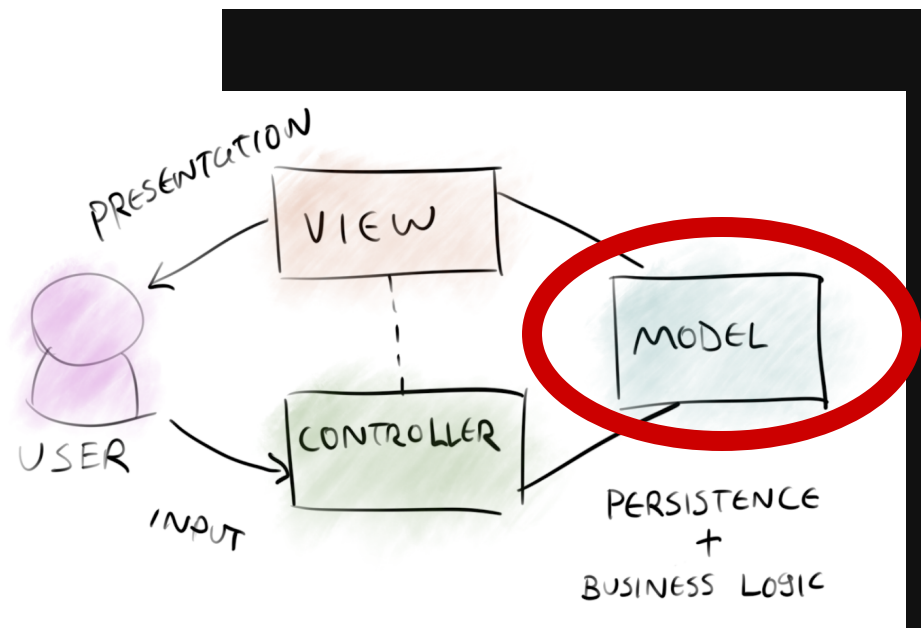
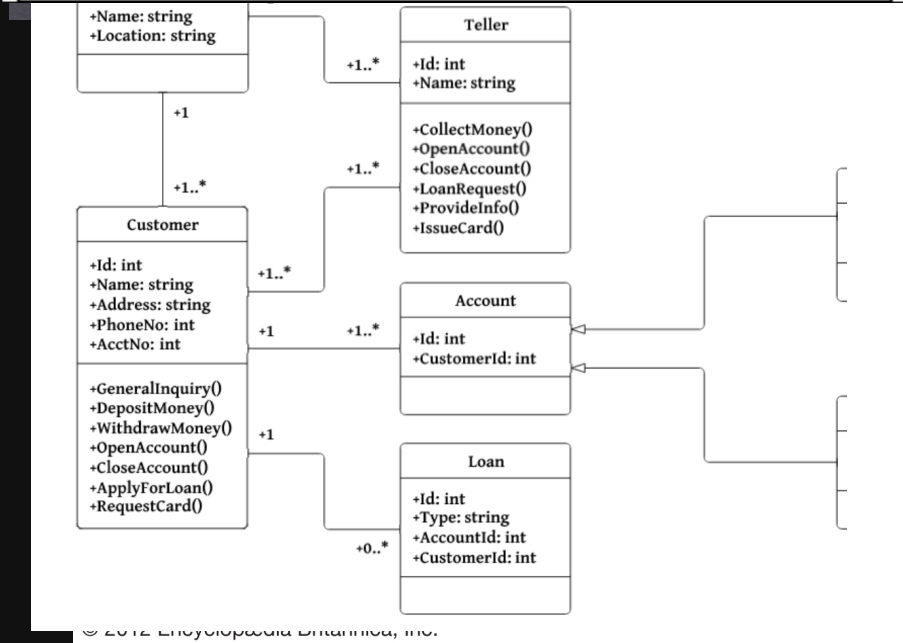
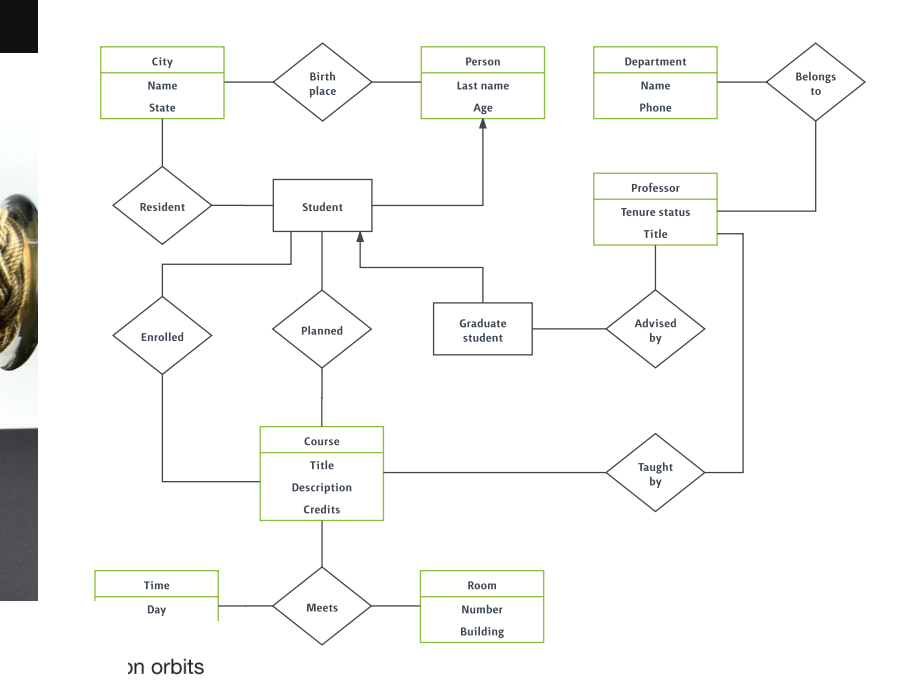
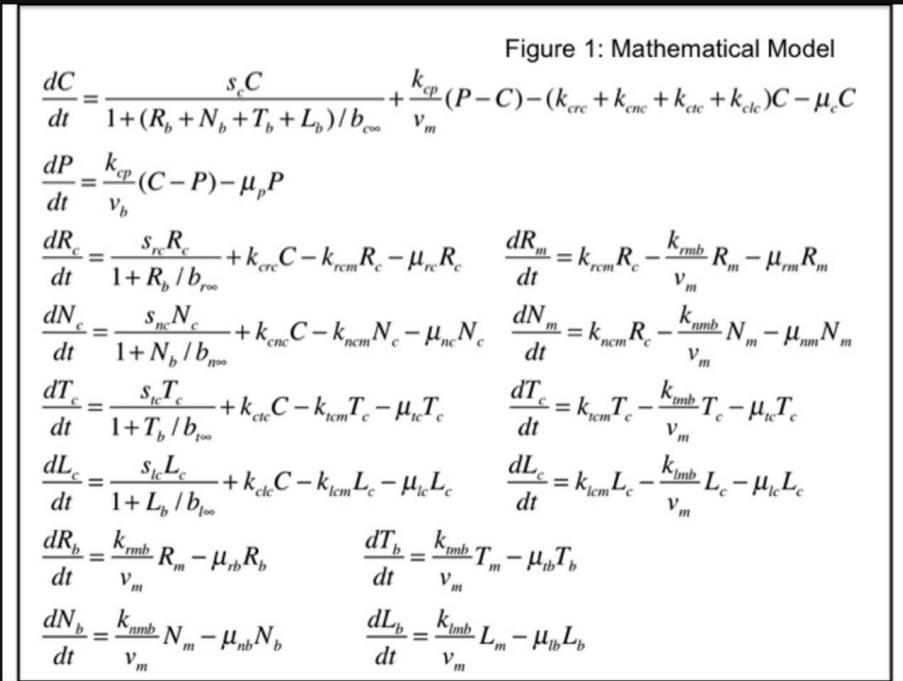


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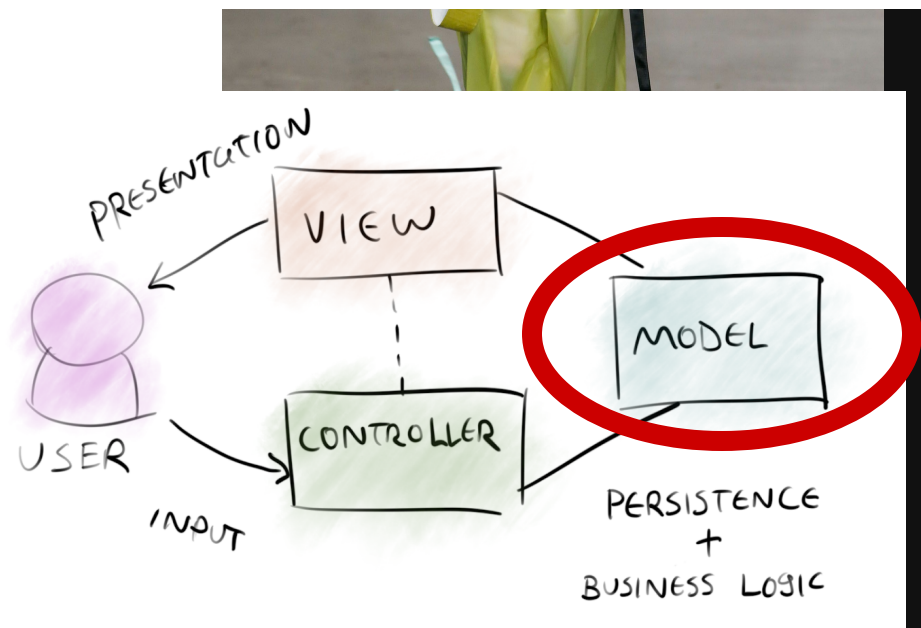
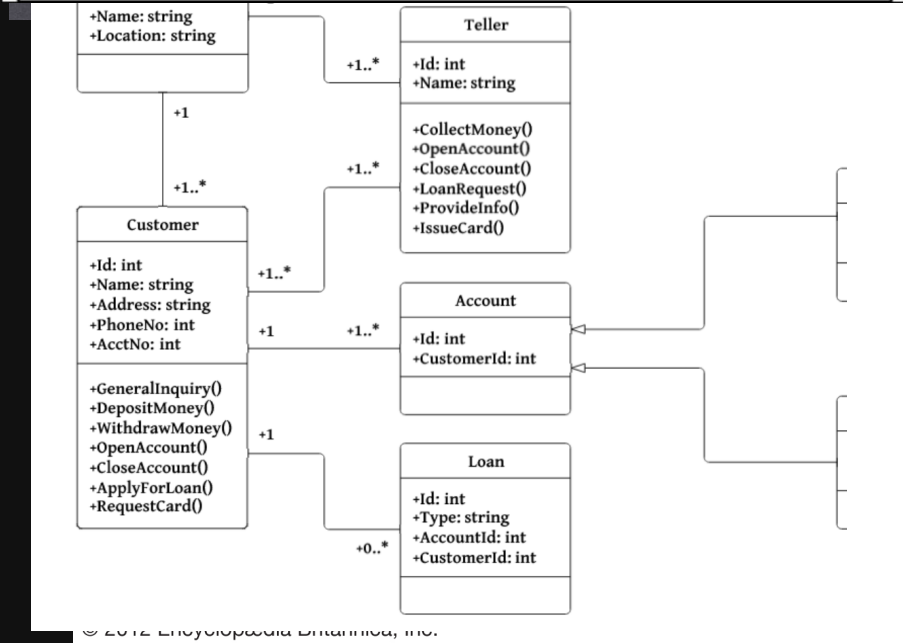
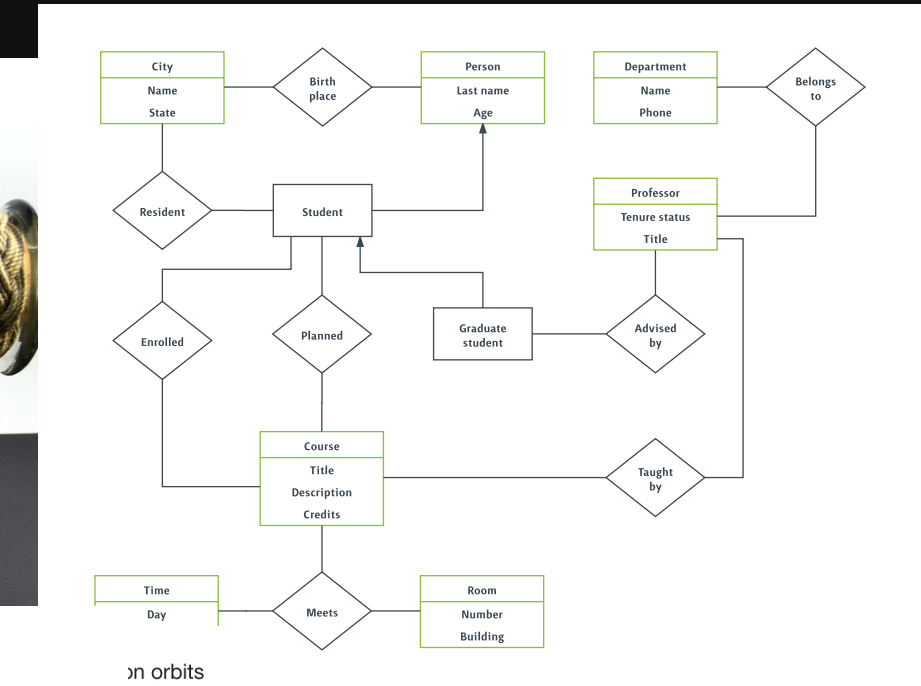
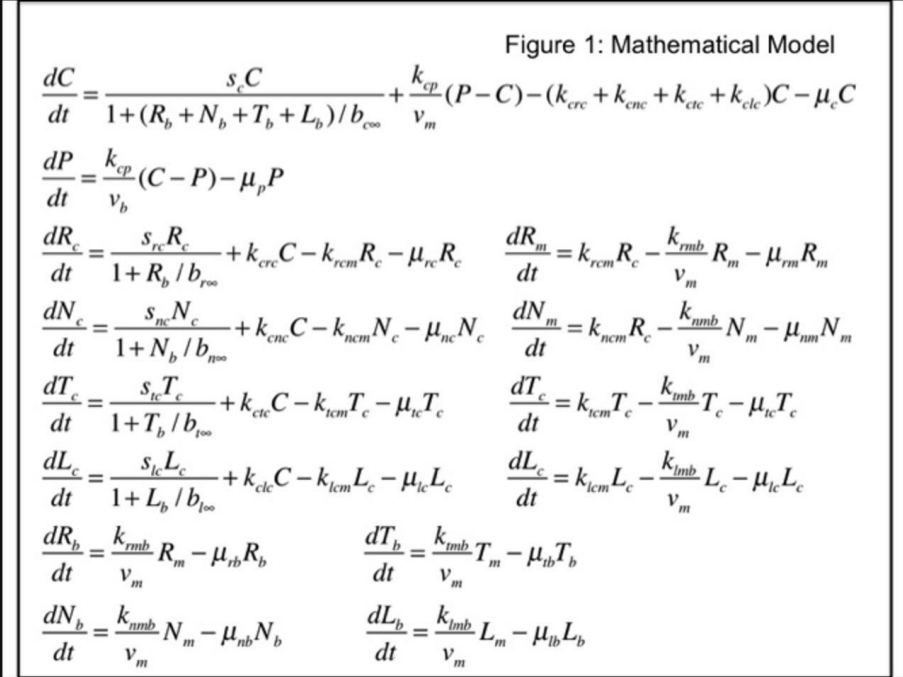


on orbits









# Conceptual Modelling

- *A model that is conceptual*
  - *... with a real world correspondence*
  - *... without a real world correspondence*
- *A model of a concept*

# Conceptual models software engineers care about

- Data models
- Mathematical models
- Domain models
- Data flow models
- State transition models (today)

# How models are used

- To predict future states of affairs.
- Understand the current state of affairs.
- Determine the past state of affairs.
- **To convey the fundamental principles and basic functionality of systems (communication)**

# Communicating models

- Four fundamental objectives of communicating with a conceptual model:
  1. Enhance an individual's understanding of the representative system
  2. Facilitate efficient conveyance of system details between stakeholders
  3. Provide a point of reference for system designers to extract system specifications
  4. Document the system for future reference and provide a means for collaboration

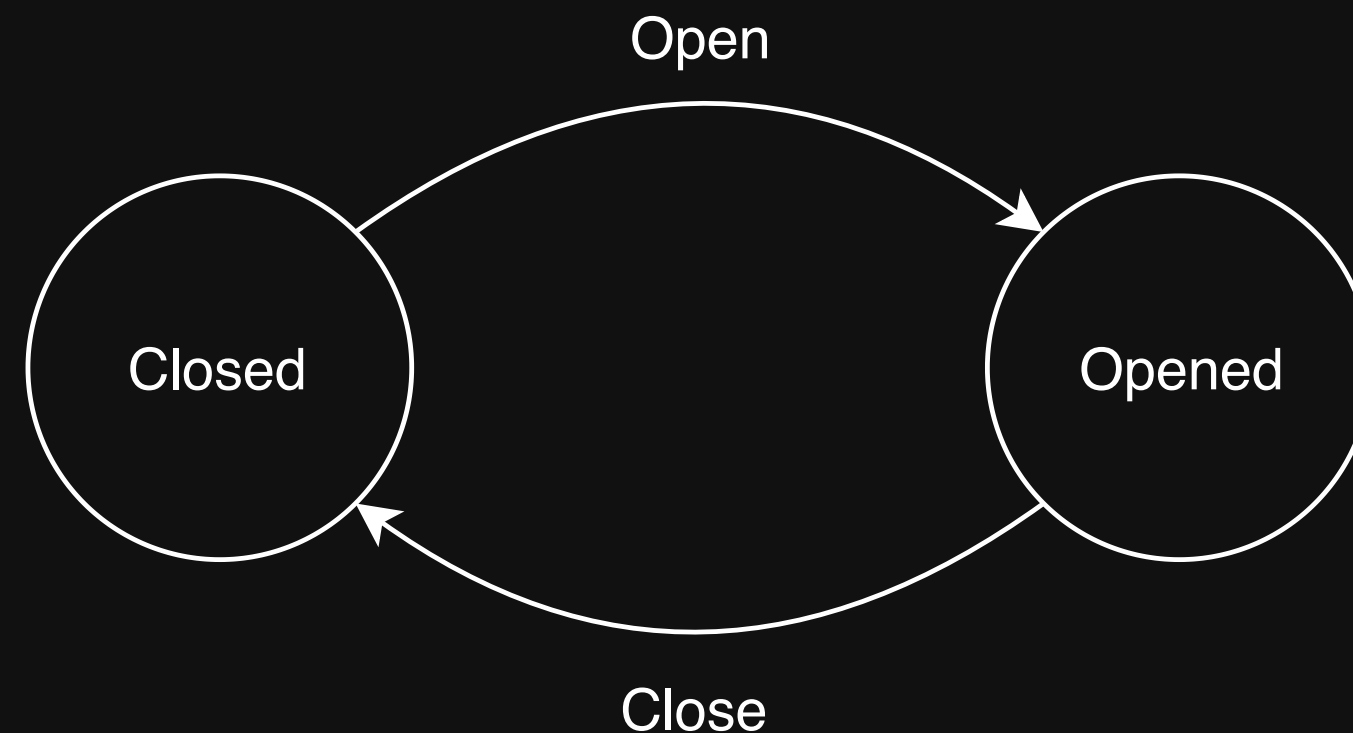


# System Modelling

- Structural – Emphasise the static structure of the system
  - UML class diagrams
  - ER diagrams
  - ... many others
- Behavioural - Emphasise the dynamic behaviour
  - State diagrams
  - ... some others

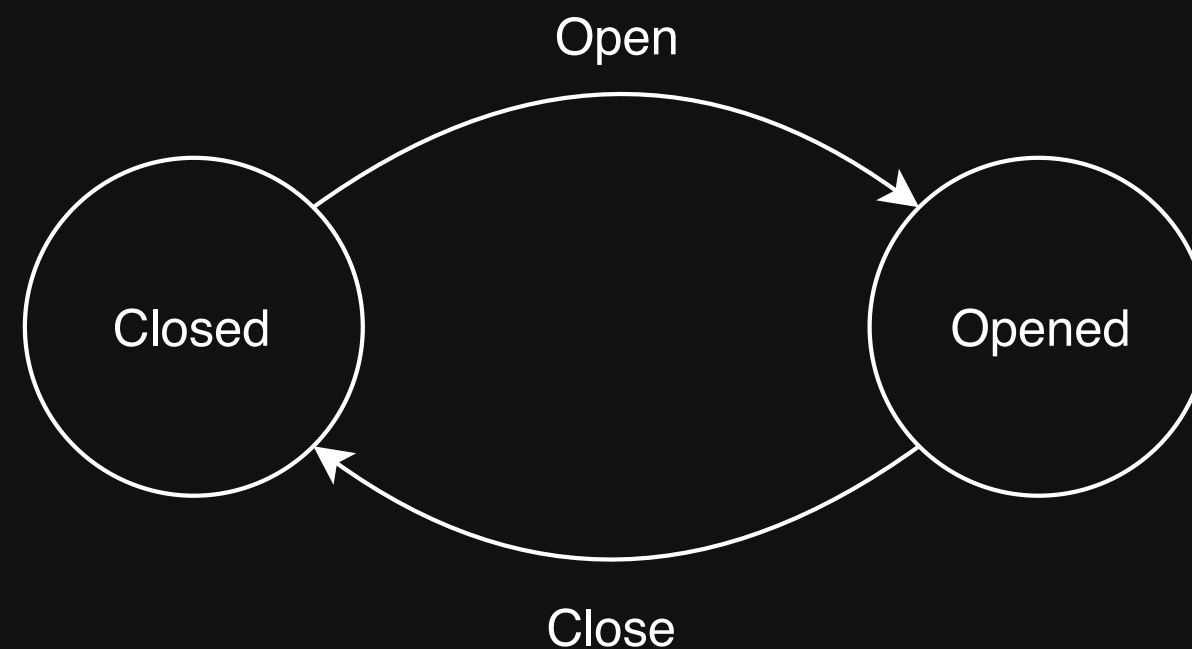
# State Machines

- Machines made up of a finite number of states.
- The machine can be *transitioned* from one state to another
- Simple example: a door



# State diagrams

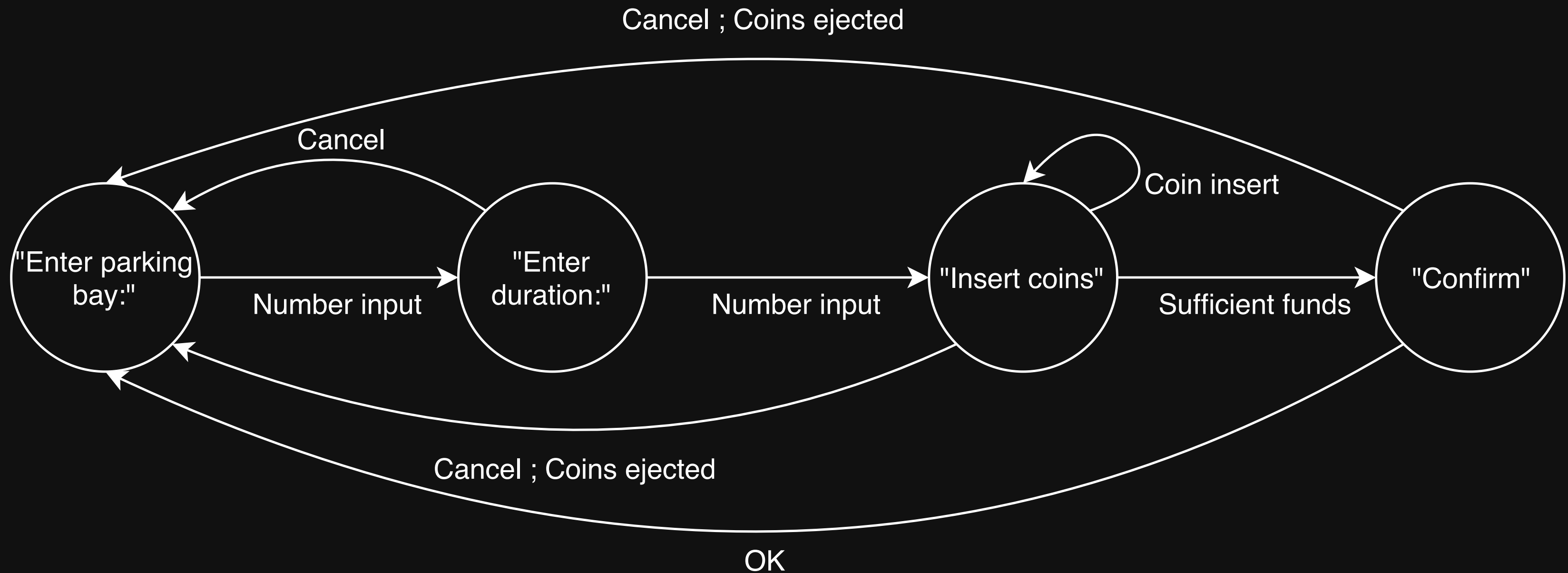
- A diagrammatic representation of a state.
- Some variation in notation.
- Typically: states are circles, transitions are labelled arrows connecting them



# State machines

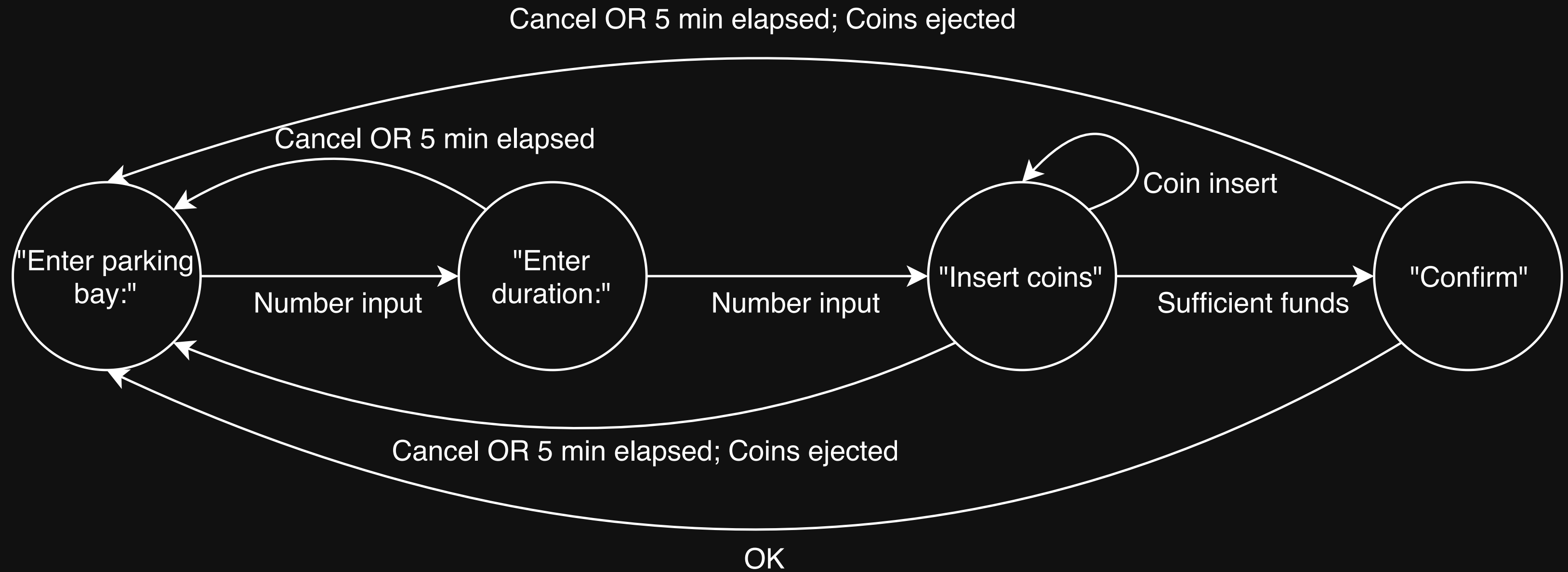
- Useful for modelling systems that have clearly defined states. For example:
  - UIs with different screens
  - Network protocols
  - Conversational interfaces

# Parking meter





# Parking meter



# Opal Card

- Can we model the opal card system as a state machine?