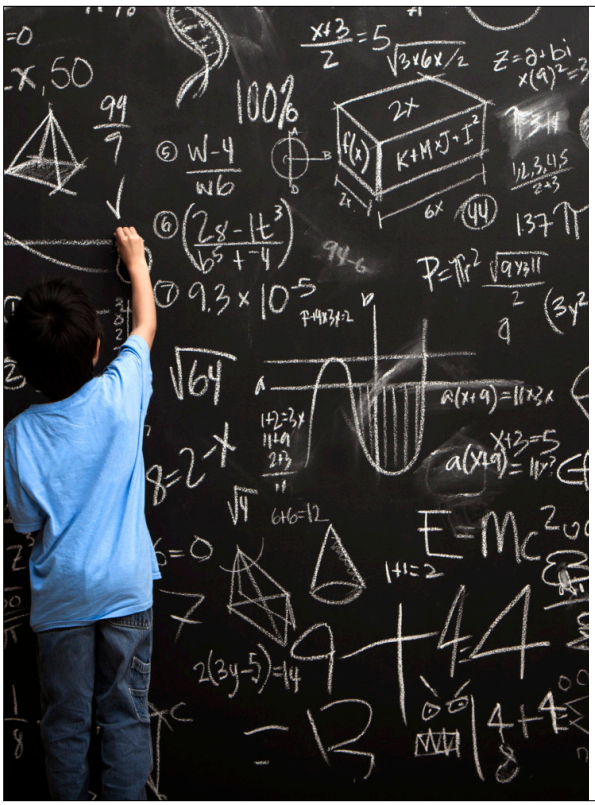
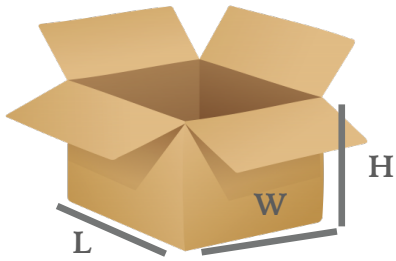


COMP4030 DATA MODELLING AND ANALYSIS (DMA)

Lecture 2: Introduction to Modelling (Examples)

CLASSIFICATION OF MODELS EXAMPLE: BOX OPTIMISATION

- A food company wants to maximise the amount of items they can ship on boxes they send to supermarkets.
- Create a model to calculate the space inside their current shipping boxes.
- You know the box's height (H), width (W), and length (L).
- **S? S_r? M? Q?**
- **What assumptions are we making?**



CLASSIFICATION OF MODELS EXAMPLE: BOX OPTIMISATION

- **Classification?**
  - Phenomenological / mechanistic
  - Static / Dynamic
  - Linear/ Non-linear
  - Lumped / Distributed
  - Natural / artificial
  - Stochastic / deterministic
  - Continuous / discrete
  - Direct/ Inverse
  - Research / Management
  - Field of application?

CLASSIFICATION OF MODELS: POPULATION CHANGES OF RED FOXES

- We want to model the population of urban (red) foxes in London.
  - Model changes in a monthly basis.
- Foxes reproduce quickly and die slowly, which carries a potential risk: overpopulation.
- In London:
  - Foxes reproduce at a monthly rate of $r = 0.25$
  - Foxes die at a monthly rate of $d = 0.1$
- Initial number of foxes in London is estimated at 150.
- **S? S_r? M? Q?**
- **What assumptions are we making?**

CLASSIFICATION OF MODELS EXAMPLE: FOX POPULATION

- **Classification?**
  - Phenomenological / mechanistic
  - Static / Dynamic
  - Linear/ Non-linear
  - Lumped / Distributed
  - Natural / artificial
  - Stochastic / deterministic
  - Continuous / discrete
  - Direct/ Inverse
  - Research / Management
  - Field of application?