

# CS405 Introduction to Empirical Modelling - 2009-10

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**Empirical Modelling ("EM")** is a body of principles and tools concerned with computing activity that is based on observation and experiment (hence 'empirical') ...

... the principal theme of CS405 is alternative ways to think about "computing-in-the-wild"  
- with special attention to computer *programming* and computer *science*

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## Introductory notes for Lab 1

Initial focus will be on "programming" in a non-standard style

More appropriate to regard this as "model-building" rather than traditional programming

Compare the aspirations in:

- object-oriented programming - seeing programming as modelling
- agile development approaches: emphasis on *evolving* specifications and programs

CS405 draws attention to the semantic / philosophical issues that are raised by making these moves

- e.g. what is the status of the traditional story about specification, and program/PL semantics?

Initially focus on DOSTE/DASM [devised and implemented by Nick Pope]

... experimental notation / language developed for research (only exists in prototype)

... in this module, will be studying alongside an older notation (EDEN) that has been used for EM purposes for many years

will make use of a software tool ("tkeden-2.10") that creates a loose integration of EDEN and DOSTE.

Characteristics of tools to be introduced in the model ...

... they are concerned with modelling in which we

- observe meaningful things
- adopt a *constructivist* stance
- exploit an *empirical* approach

that we wish to reconcile / can be reconciled with the more abstract, rationalist, theoretical framework that characterises classical computer science

Key notions: observable - dependency - agent ("ODA")

- an **observable**: - something perceived as having an identity and being subject to change (e.g. a chevron in the Stargate)

- a **dependency**: - a relationship that is perceived to connect a change to one observable to a change to another (e.g. when the orientation of the Stargate changes, so does the orientation of the "puddle" within it)
- an **agent**: - something that can be deemed to initiate change (e.g. the person who presses the "dial" button in the Stargate)

A key issue is that these notions are *subjective* - they are relative to an observer and a mode of observing and interacting.

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About the assessed work - variety of different ways in which can relate to the module

- can choose your own topic for the assessment - which comprises a paper + a model
- can assign a weighting to the written and practical work in the assessment in ratio from 70:30 to 30:70
- can contribute through
  - **model development** (using variety of tools available)
  - extension / commentary / analysis of existing models
  - extension of the tools

You are not expected to understand everything in depth, or to master all the techniques.

Questionnaire to help us gauge the audience ...

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