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Concepts and principles of IT
– and how they are learnt

- Aim
  - Identify the IT concepts and principles for Assignment 1
  - Determine the level of mastery of these goals
    - according to the Externalisation of concepts model
- Literature:
  - Chapter 5. Understanding IT concepts

1

Functional dependency

- If the value of one component changes when the value of another component changes, the former is functionally dependent on the latter

Which mechanisms for achieving functional dependency are found in
- Office applications
- The web
- The operating system?

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Datas types

- A unit of data
- A set of operations
  - Cell
  - Paragraph
  - File
- Selecting type
  - Information
    - Complete   tiff
    - Loss, compression   jpeg
  - Task
    - Manipulate picture   jpeg or tiff
    - Search through text pdf

Types in word processors?
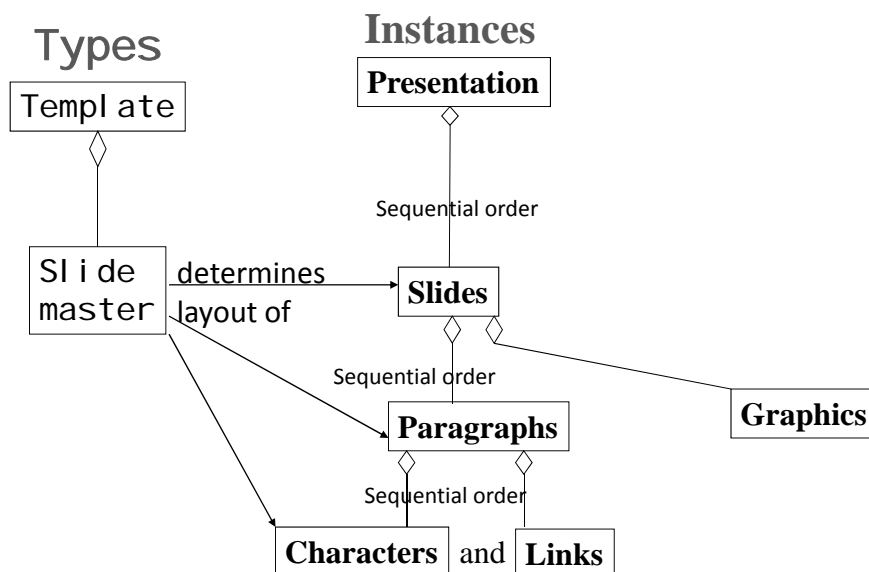Presentation programs?
Relational databases?

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Types or operations?

- Upload BudgetSpreadSheet
- Change all amounts to Currency number format
- Make your own Custom number format
  - similar to Currency but without the denomination
  - Apply to all amounts
- Put the cursor in a blank cell
  - Make some other changes to the Custom format
  - Do the changes propagate to the cells which you formatted with Custom?

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Data structure of a presentation file

Types

Instances

Template

Presentation

Slide master — determines layout of → **Slides**

Sequential order

Sequential order

Paragraphs

Graphics

Sequential order

Characters and **Links**

Data structures

- Hierarchical
  - Aggregation: Whole-parts
- Sequential
  - Part followed by part
- Coordinates

Exercise 1.
Make a model of the structure of
• A word processing file
• A spread sheet file
• The file system of the operating system
• A relational database

The layered architecture of IT

• Layers can be changed independently of each other
  – Layout separated form contents and structure

> What is the difference between tables and columns in a document? Do they determine
> •Layout?
> •Structure?

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Access rights

• Delete
  – The owner
• Change
  – Deleting contents, writing new
• Append
  – Add new contents without deleting anything
• Read only
  – No alterations allowed
• Knowing the existence
  – Without any access to the contents
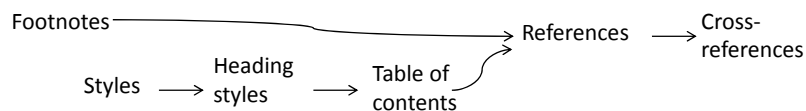
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Users

Data	User group with access rights	User

- Collective
- Individual

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Communication mode and synch

Mode / Synch	Point-to-point	Mass
Synchronous	Chat	TV
Asynchronous	E-mail	Web

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Sequence of learning concepts

Footnotes ⟶ References ⟶ Cross-references

Styles ⟶ Heading styles ⟶ Table of contents ⟶

- Learning a new concept
  - builds on understanding the previous one

Exercise 12.
Make a concept sequence diagram for the import by link case from Chapter 2

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Levels of competence

Synthesize
Analyse
Apply
Explain
Repeat

Expert
Proficient
Competent
Advanced beginner
Novice

Bloom's taxonomy of cognitive competence

Dreyfus and Dreyfus's model of skill acquisition

From talking to talking

From doing to doing

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Externalisation of concepts
– levels of mastery

- **IT skill**
  - Carry out an action which exemplifies the concept
- **IT functional understanding**
  - Refer to the input and output of the action when talking about it, without actually doing it
    - In order to have one cell refer to another, one has to get the coordinates of the other cell into the formula
- **IT conceptual understanding**
  - Refer to the action like an object of its own
  - which can be part of other actions
    - Cell-referencing is an ingredient in formulas

From doing to talking

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Example – master slide

- IT skill
  - I went to view and slide master and then changed the font size, and went back to the normal view.
- IT functional understanding
  - I wanted to change the font size of all the slides, so I changed it at the master slide. Then it will change all the slides.
- IT conceptual understanding
  - Master slides control the appearance of the normal slides. When you change the master, all the others will change too. It's like the page layout in the text processor, which also changes every page.
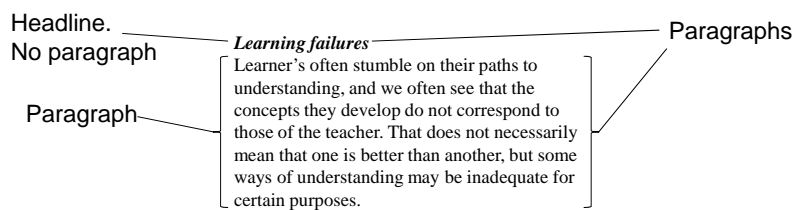
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Interference

Grammar

Word processors

- A paragraph is a sequence of sentences dealing with one point

- A paragraph is a sequence of characters ending with Enter

Headline.
No paragraph

Paragraphs

Learning failures

Learner's often stumble on their paths to understanding, and we often see that the concepts they develop do not correspond to those of the teacher. That does not necessarily mean that one is better than another, but some ways of understanding may be inadequate for certain purposes.

Paragraph

- Choose between two concepts having some similar properties
- Don't consider the consequences of choosing one over the other

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Exercises

8
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7
10

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