



Dr Alireza Nili

Information
Technology


Queensland
University of
Technology

IFB103

IT Systems Design

Introductory lecture

Goals for today

- Understand what you're undertaking for the next 13 weeks.
 - Understand, at a high level, what your assignments entail.
- 
- Develop our first definition of systems design.

Unit Coordinator

Dr Alireza Nili

Senior Lecturer

Email: a.nili@qut.edu.au

Key Research & Teaching Areas:

PhD in Information Systems from Victoria University of Wellington, New Zealand

Teaching and research at QUT

Expertise in design and evaluation of IT and digital services which are supported by artificial intelligence (AI), Internet of Things (IOT) and Industrial Internet of Things (IIOT)

Research projects (at federal and state levels): Services Australia (Medicare and Centrelink), Bank of Queensland, Amazon, Cisco, CSRIO's Data61, Geospatial Data Quality project,...

Teaching awards: several awards such as Educator of the Year (Faculty of Science, QUT, ECR/MCR, 2023), Teaching Excellence award (School of Information Systems, 2021),...

Please see the Unit introduction section (Getting started). I have produced a 2-minute video about the unit and myself (unit coordinator).

About the unit...

Unit structure

Assessment

Design for IT

Wrap up

Objectives of the Unit

Learning Outcomes

On successful completion of this unit you will be able to:

1. Apply analysis and design thinking principles, theories, processes, methods, and contexts to produce practical IT solutions to a real-world problem.
Relates to: ACS CBOK: 2
2. Analyse user requirements and apply system analysis and modelling techniques to generate a human-centred design for a client.
Relates to: ACS CBOK: 2, 4, 4.1
3. Apply written, verbal and visual communication skills to explain the design outputs and gain feedback from users and peers.
Relates to: ACS CBOK: 1, 1.4
4. Apply teamwork concepts critically reflecting upon personal performance, and the performance of others.
Relates to: ACS CBOK: 1, 1.2, 1.3
5. Use agile methodologies to produce outcomes within the agreed timeframe.
Relates to: ACS CBOK: 5, 5.2
6. Describe the Information Systems profession and key capabilities and skills required by the industry
Relates to: ACS CBOK: 1, 1.6

**Week 1-7: You will be
sketching and using
software**

Use a notebook and/or laptop.
Bring it to **every** tutorial.

**Week 8-13: You will be
using software**

We will provide details in the
tutorials.

We do not teach and do not use Photoshop

Who teaches week 1 (introductory lecture)?

Dr Alireza Nili (unit coordinator)

Who teaches weeks 2-7 (front-end design)?

Mr Christoph Niesel (lectures) and your tutor (tutorials)

Who teaches weeks 8-13 (back-end design)?

Dr Alireza Nili (lectures) and your tutor (tutorials)

****Please note that Christoph studied his PhD in Information Systems (Information Technology) at QUT and is an industry expert. He is not at QUT.****

Contact information? please see the next slide

Questions?

People who can answer your questions:

For administrative purposes: please contact

First contact: Senior tutor (Mr Geoff Polzin: g.polzin@qut.edu.au) or
Unit coordinator (Dr Alireza Nili: a.nili@qut.edu.au)

For questions related to tutorials and weekly assessment tasks (weeks 1-13):
please ask your questions from your tutor during the tutorial (this should be your first method of communication); contact your tutor via email or the preferred method explained in the tutorial; or contact the unit coordinator or senior tutor.

For questions related to the lectures: please contact

Senior tutor (Mr Geoff Polzin) for weeks 1-7 or unit coordinator (Dr Alireza Nili) for weeks 1-13.

Again, asking your questions from your tutor at the tutorials should be the first method.

How will you fare well?

- By doing!
 1. Watch all Lecture content
 2. Attend all tutorials and actively engage in various design tasks
 3. Keep up to date with your assignments (we give you an outline)
- You should be averaging 8 hours per week on this unit

Need help with maths, science or IT concepts and skills?

Visit HiQ's new learning zones

(GP library, V block, level 2 and KG library, R block, level 3) for:

- drop-in support sessions with STIMulate Peer Learning Facilitators
- online worksheets, texts and other resources
- group support sessions with specialist MSIT Educators

**All QUT
students
welcome!**

For times and more information,
check the student website or
our Blackboard site.



<https://www.student.qut.edu.au/learning-and-assessment/workshops-and-academic-help/academic-help>



www.tinyurl.com/stimulate-bb

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Weekly contact

Lectures – E-Content available online

Please watch weekly. Linked to the weeks' learning.

Tutorials – start **week 2**

2-hour sessions, online or offline.

Essential to attend as this is where learning occurs.

Rolls are kept.

Opportunity for detailed consultation with tutors.

Personal consultation with your tutors as needed



Tutorial Structure

We release tutorial assessment structure weekly. They let you know explicitly what is expected of you before and during that week.

Week 4 assessment structure (this is an example)

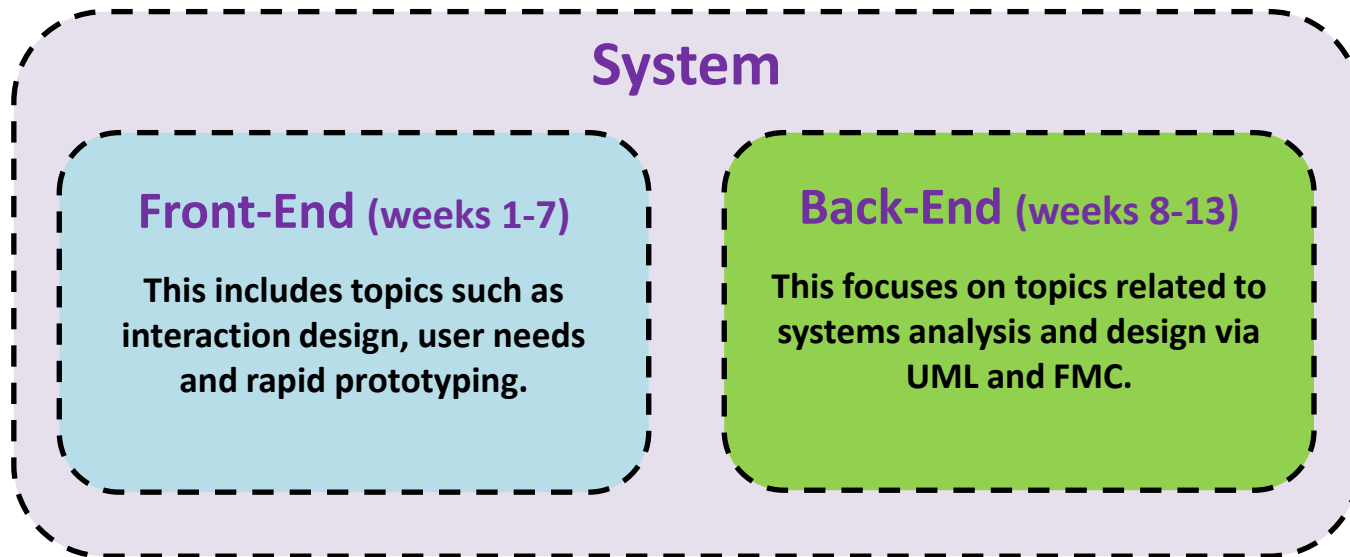
Before your week 4 tutorial

1. Interviewed 2 members of the public in order to understand your teams current ideas for sample problem spaces in tech. Redefine your problem space (as a group). **[Assessed item: design log]**

During your week 4 tutorial

1. Select your focal topic for DC 1 during our first Scrum meeting. Ensure your tutor has approved your topic.
2. Complete the provided Multi-Criterial Decision Making template as a team for the new project. **[Assessed item: design log]**
3. Begin creation of your first low fidelity prototype as a group. Ensure you record this version of your prototype in your logbook or as a series of digital screenshots or images. **[Assessed item: design log]**
4. Begin thinking about what aspects of your prototype you would like to test with users in order to harvest rich user data.

Please head over to Canvas now to familiarise yourself with the structure



Why do we teach the front-end part before the back-end part?

Software used

- **UI Prototyping tools**

- MarvelApp
- Adobe Creative Suite
- Pop App
- Mockplus
- Figma

- **UML and FMC models:**

- **Signavio**
- **Visual Paradigm Community** version here (<https://www.visual-paradigm.com/download/community.jsp>).
- **LucidChart** may also be used for a small percentage of the unit.
- **Draw.io**. An online tool used to draw UML Models. Available here: www.draw.io

Don't be in a hurry. We will provide more details in the tutorials.



Visual Paradigm



draw.io

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Announcements

NO EXAM 😊

Allocate to a tutorial if you have not already - **vital for your assessment.**

Teams **must** be formed within your **week 2** tutorials.

*Detailed documents outlining the week-to-week requirements for each assessment will be **available on the unit's site.***

Due dates

IT Careers Insight

Due date: Weeks 4

Design Challenge 1

One topic, two parts to the Assessment Item

1 Presentation: (group mark and individual mark).

1 Design Logbook: (individual mark)

Due date: Weeks 7

Design Challenge 2

Due date: Week 13

Important:

What if you cannot submit your assessment files before the official deadline (e.g. if you are sick and you have an approved extension of deadline)?

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An Overview of Week 1-7

**Front-end design: An overview of the overall
iterative design process**

Design is not art

It's a distinction understood by practicing designers, but it still eludes many.

In a talk at the Guggenheim Museum in New York City, graphic design legend Milton Glaser gave the best definition of the practice of design.

"Design is the process of going from an existing condition to a preferred one," said the 2010 National Medal of Arts recipient. "Observe that there's no relationship to art."

This confusion is not just a matter of semantics. In businesses, schools, offices, even newspapers, design is often associated with the art department. That's a fundamental misunderstanding of the aim of design. In truth, good designers are primarily problem solvers.

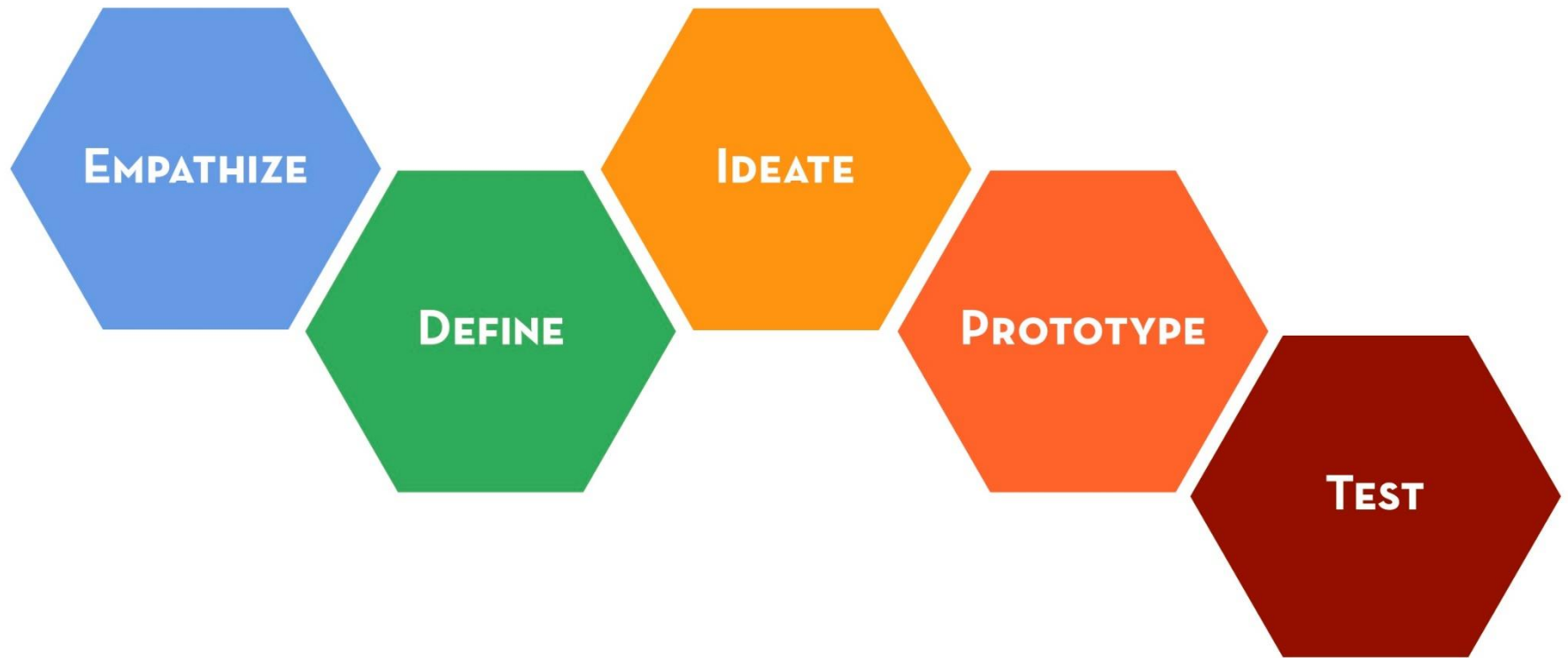
From: <http://qz.com/823204/graphic-design-legend-milton-glaser-dispels-a-universal-misunderstanding-of-design-and-art/>

What is Design Thinking?

- Design Thinking is a series of analytic and creative approaches and mindsets.
- A solutions-based approach
 - it centres around understanding user/customer needs.
 - iteration through rapid prototyping.
 - Design Thinking does not depart from traditional scientific methods:
 - The feedback from iterative design simply creates needs that are informed by the user, rather than testing observable evidence.

Brown, T. and Katz, B. (2011), Change by Design. *Journal of Product Innovation Management*, 28: 381–383.

Design Thinking Modes



Why is it important for IT experts?

Design Thinking allows designers to work closely and to the specific needs of the user.

It creates outcomes that have been rigorously tested through multiple iterations and are contextually appropriate to the needs of a particular demographic.

Design Thinking is often used in systems design for new and existing services, systems and technology-based artefacts.

Design Process begins next week

Next week you will form a “Design & Development Team” of 4-5 persons.

You will step through the 5 stages of design thinking by making an interactive mobile prototype, culminating in a presentation of your work in week 7.

This will involve stepping through and testing low, medium and high-fidelity prototypes during the semester.

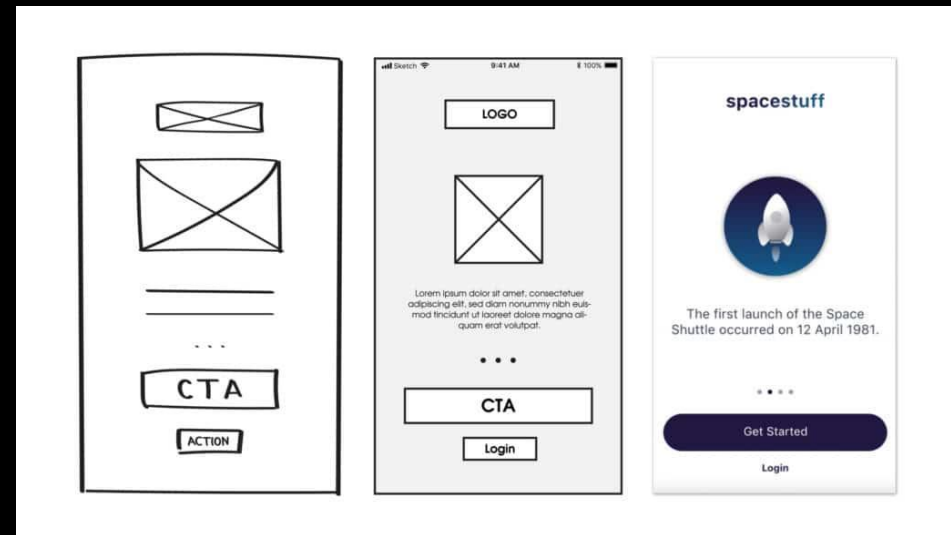


Image: Tsvetelina Lazarova. Mentormate.com

An Overview of week 8-12

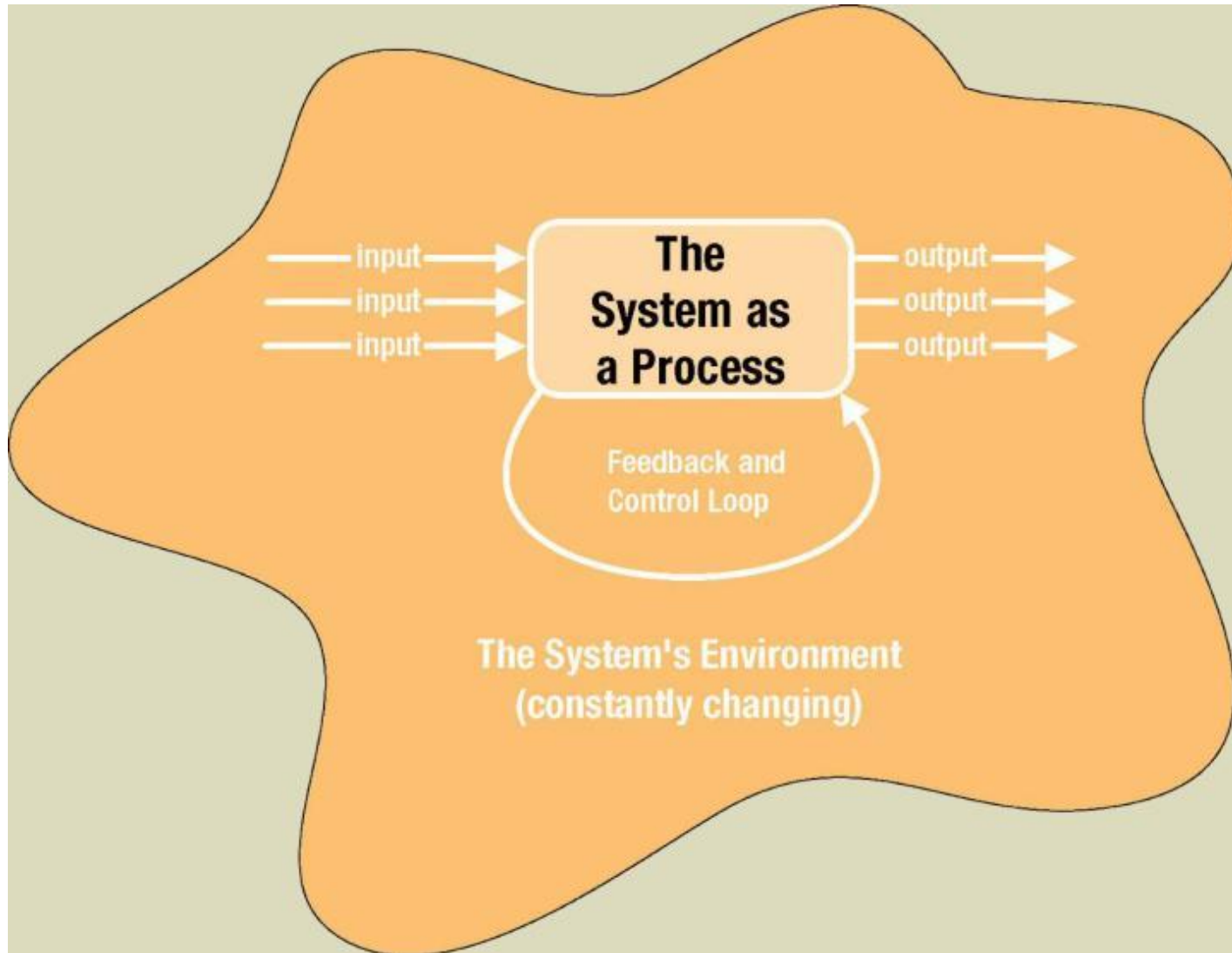
**Systems Analysis and design: the back-end of
the overall design**

Great news: there are many job opportunities for systems analysts and designers in Australia.

There will be some level of competition (low to very high). If you don't have prior relevant work experience, employers look at your GPA and the grades you get for important units such as IFB103.

The “System” Concept:

A popular view: system as a process



Reminder:

As **IT people** who aim to focus on **users' needs**, we aim to design a system type of artefact, such as a system that improves productivity at workplace, a mobile app, an online shopping website...

We need to consider both the front-end and back-end of the **overall design thinking process**.

For the back-end, we focus on 'detailed' systems analysis and design activities.

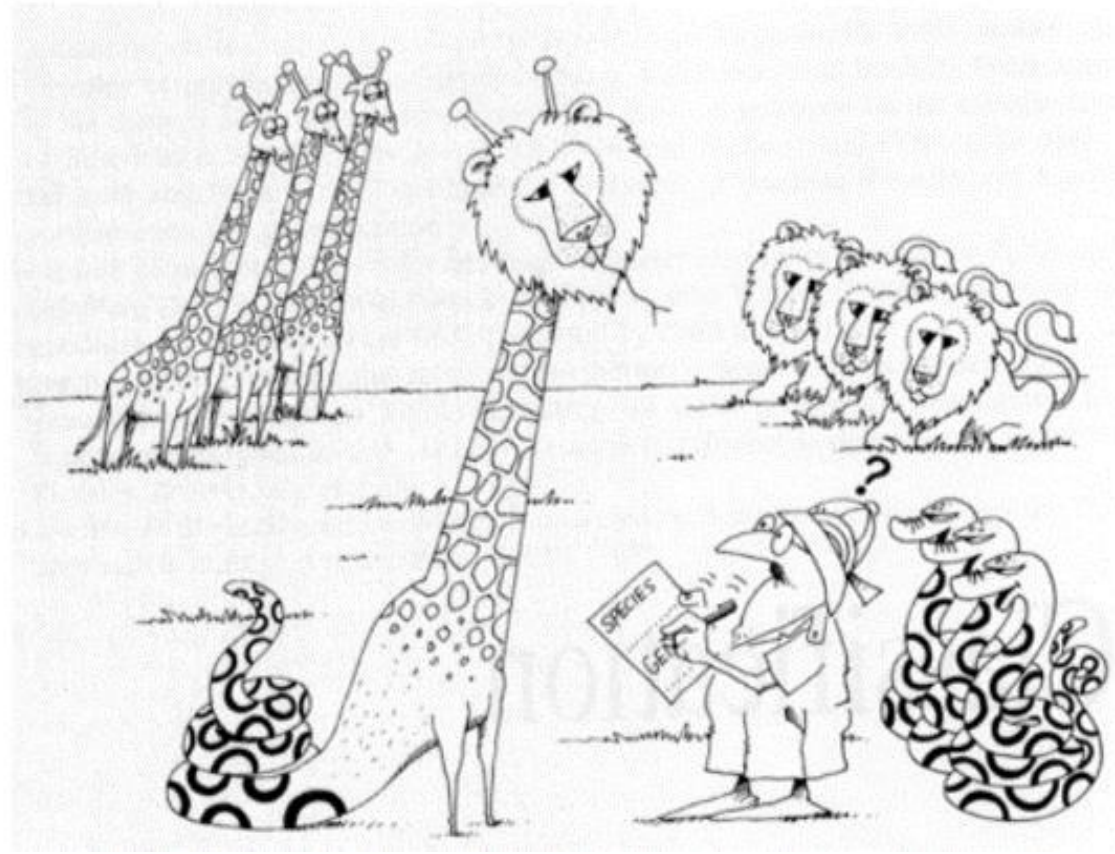
Systems Analysis and Design Overview

Systems analysis and design:

- is a very important part of the overall design.
- is related to the back end of the system design.
- its overall objective is to ensure that the system we design will support business requirements only.

Two “main” steps in systems analysis and design:

- 1) Requirements determination
- 2) Visualizing the results of system analysis via tools such as Visual Paradigm, LucidChart, and Visio.



Dr Pedro Antunes' lecture, Systems Analysis, Victoria University of Wellington, 2014

Analysts typically start with requirements determination step which is a type of classification task

Which of the statements below is **not** true about “systems analysis”?

- 1) It is a very important part of the overall design.
- 2) It is related to the back end of the system design.
- 3) It includes two main types of activities: requirements determination and visualizing the results.
- 4) Its overall objective is to ensure that the system we design improves productivity and is cost efficient.

Systems Analysis and Design:

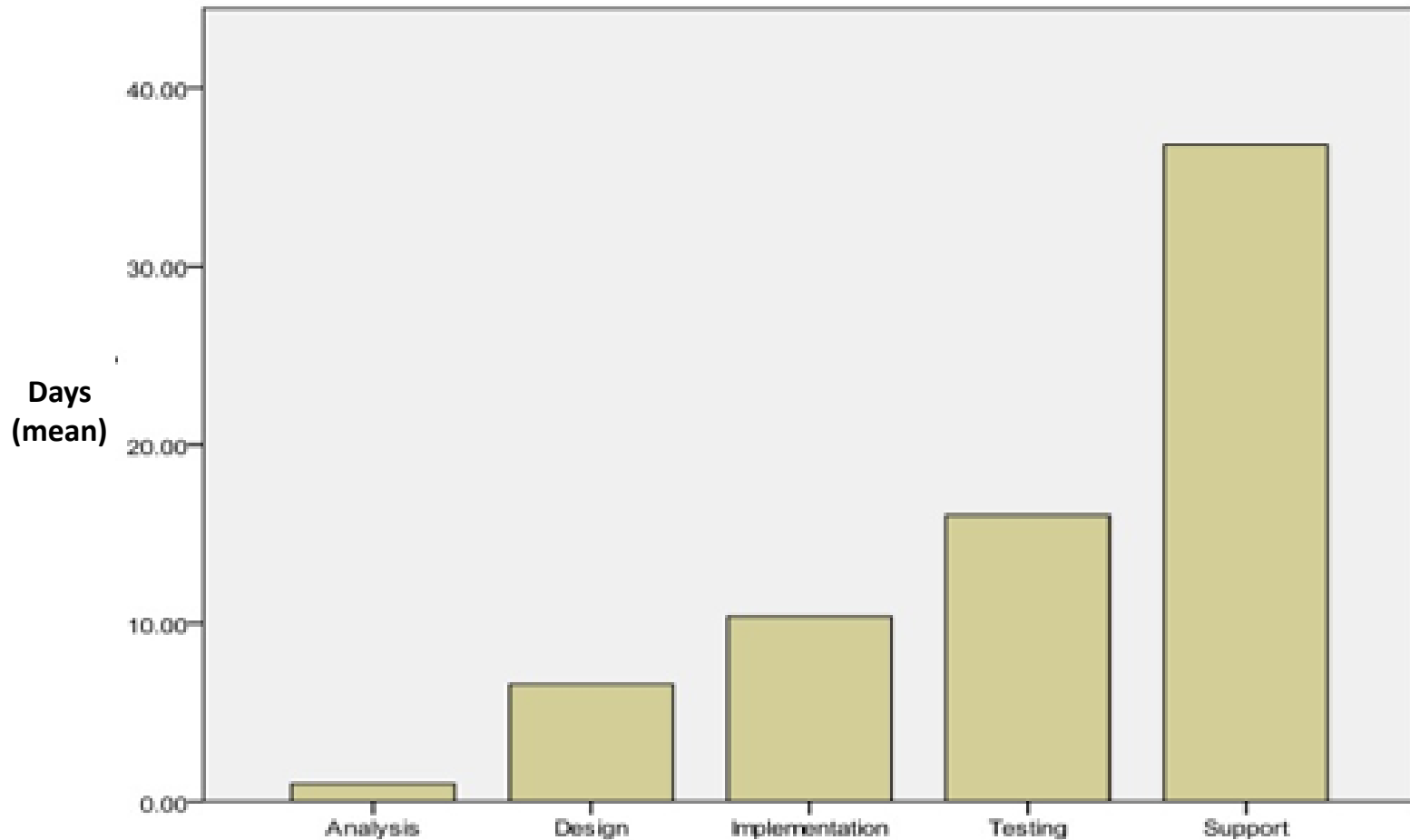
Step 1: Requirements Determination

Systems Analysis and Design:

- **Current State Analysis (as-is analysis):** identifying a problem (e.g. a business problem) and/or modelling how the system is currently working.
- **Design activities / to-be analysis:** the activities related to designing the system. We focus on back-end of the system.

Requirements Determination

Requirements determination is “a statement of what the system must do or what characteristic it must have”. It is the most critical step of systems analysis.



Changes at early design stages are much less expensive than at later stages

Types of Requirements

During analysis, requirements are written from the user's perspective. There are three types of requirements:

- **Functional Requirements:** relate directly to what the system should be able to do (not 'how' it should do it).
- **Non-functional Requirement:** are about qualities and 'how' such as reliability, adaptability, security, efficiency, etc.
- **Usability Requirement:** are specifically about user interaction perspective: user experience, ease of use and learnability.

Which sentence is **not** a functional requirement?

- 1) The system **should calculate** average scores.
- 2) The system **should accept** new clients.
- 3) The system **should list** students by name and number.
- 4) Having used the system once, users should be able to learn the system and complete a task **in 2 minutes**.

Too easy?

We are going to have more exciting activities in the tutorials.

Systems Analysis and Design:

Step 2: Modeling Tools and Techniques

Modeling Tools and Techniques

- Involves graphical methods and nontechnical language that represent the system at various stages of development
- Unified Modeling Language (UML), Data Flow Diagrams (DFD), and Fundamental Modelling Concepts (FMC).
- Can use various drawing and visualization tools

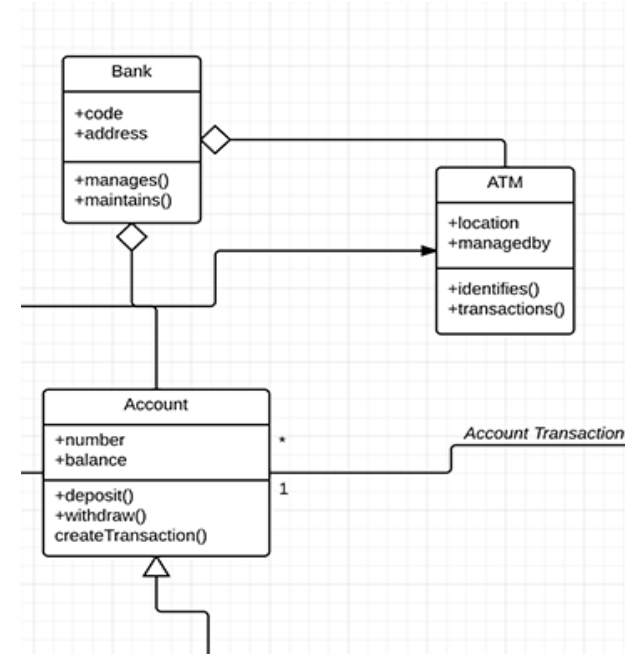
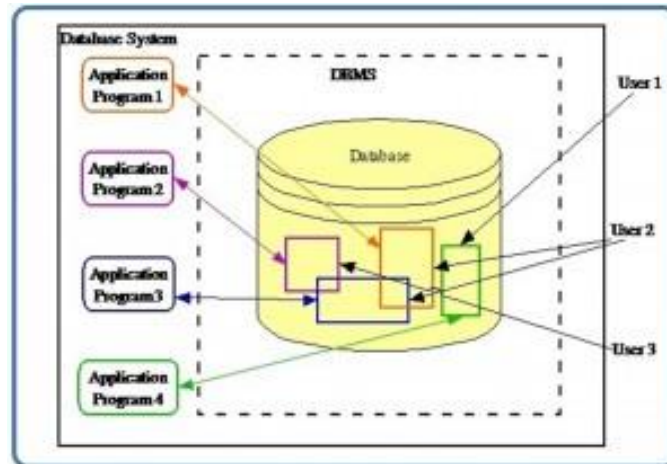
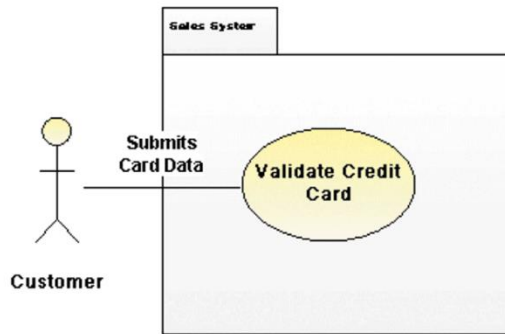
In this unit, we teach UML and FMC diagrams.

One or two lectures for FMC and four lectures for UML.

UML and FMC

Widely used methods of visualizing and documenting software systems design

Examples of UML and FMC diagrams:



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Drawing and modelling it **all** together

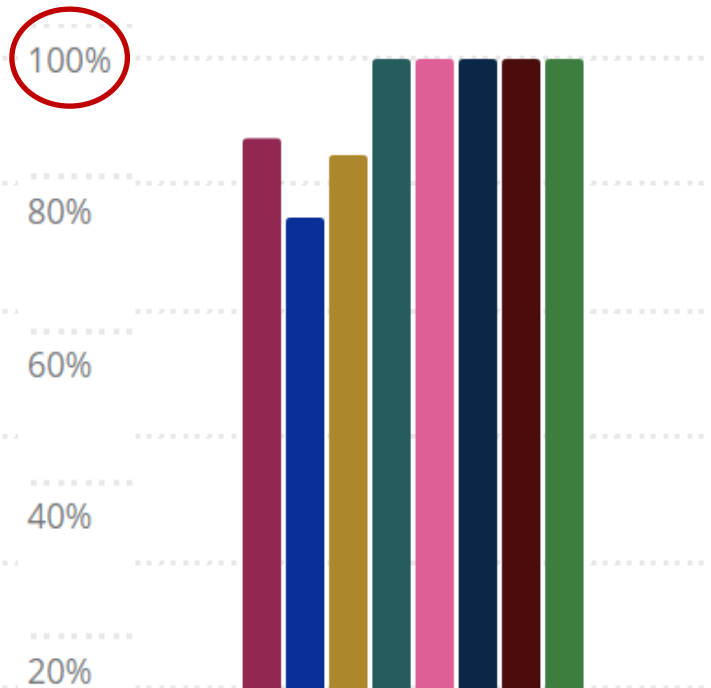
Tutorials run weekly starting week **2**.

This is a unit which is structured to allow you to explore your talents.

Next week we will introduce you to Interaction Design and how we can tackle complex IT design challenges.

The IFB103 Canvas site is now up and running for you to use.

**Almost all students have been very happy with the IFB103 teaching team.
IFB103 is known as a high quality unit.**



Percentage of students who mentioned 'strongly agree' or 'agree' to the overall evaluation item / T2 (i.e. high quality teaching).

Reference: student survey, Semester 2 of 2023, IFB103 unit, QUT

At QUT, we strive to create an environment of respect – where everyone is welcome, comfortable participating, and free from harassment.

This unit is governed by [our code of conduct](#), and we want to thank you for doing your part towards building an inclusive community.

If you feel uncomfortable, or if there are any other issues that need addressing, please come and see us – we're happy to assist.

Arrive with an open mind: let us show you what we know and how it can aid you

Learning is “Co-creation”:

- **Teaching members’ responsibilities:** we are putting a high amount of effort for this very big unit. The list of our activities is very long.
- **Your responsibilities:** pay attention to details, take notes, actively participate in the tutorials, and be punctual about your tasks (assessment tasks, ...).

Lectures and tutorials: don’t forget to view the lecture recordings. Tutorials are essential for your learning. Important messages are through tutorials and lectures (note: not via the Canvas system).

Industry speakers: We invite industry experts and/or researchers in the field. “We are open to suggestions from you.”

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