INFO5990: Professional Practice in IT

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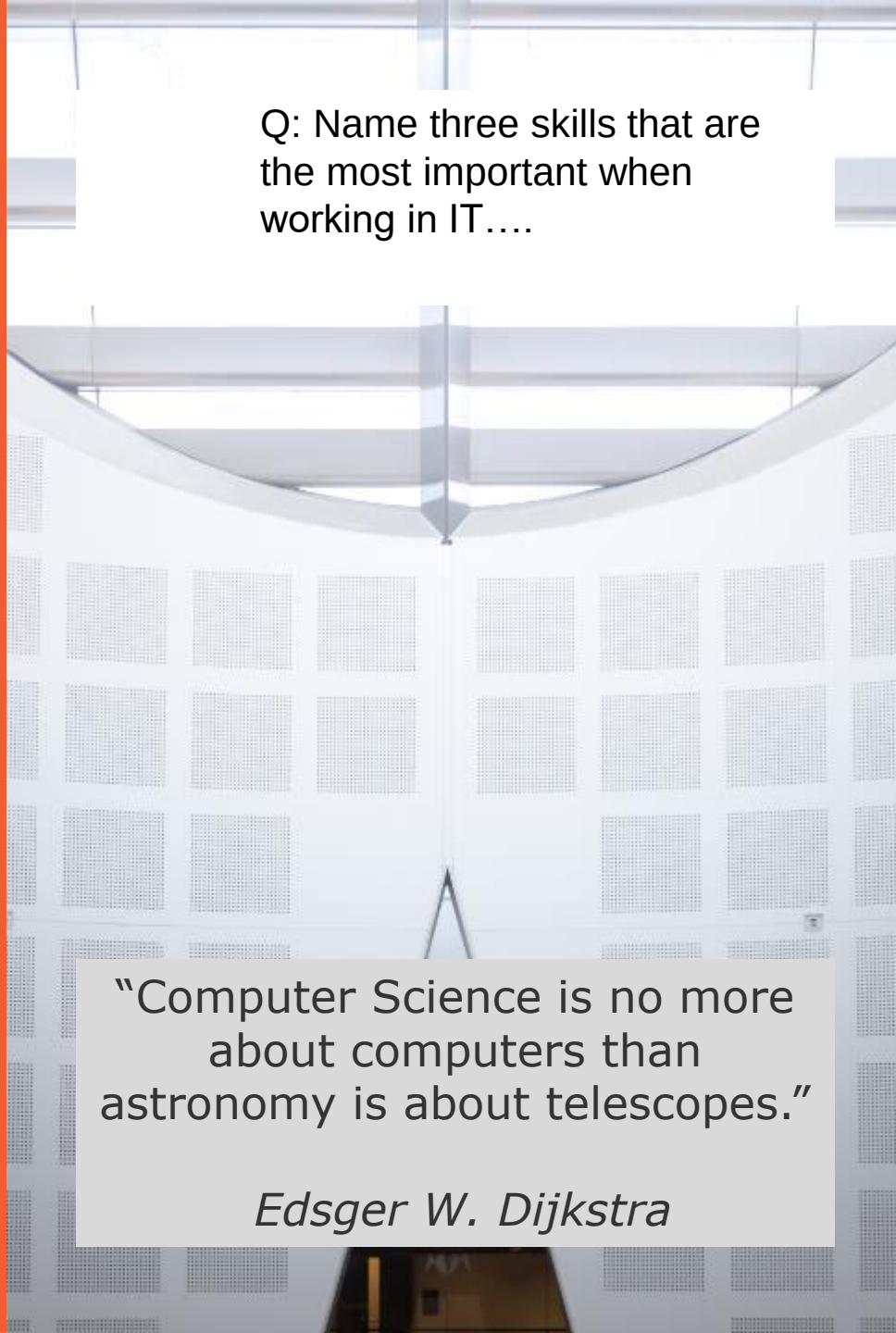
Week 1: Unit Overview & The IT Industry

School of Computer Science

THE UNIVERSITY OF SYDNEY



Acknowledgement of Country

I would like to acknowledge the Traditional Owners of Australia and recognise their continuing connection to land, water and culture. I am currently on the land of the Gadigal people of the Eora nation and pay my respects to their Elders, past, present and emerging.

I further acknowledge the Traditional Owners of the country on which you are on and pay respects to their Elders, past, present and future.

Quick Overview of Today

Part A

- Professions and practice
- Nature of the IT industry
- Professionalism

Part B

- Introductions
- Topics, Learning objectives, and concepts covered in the unit
- Overview of the unit and assessments

INFO5990: Professional Practice in IT

Week 1: Part A
Professions and practice
Nature of IT industry

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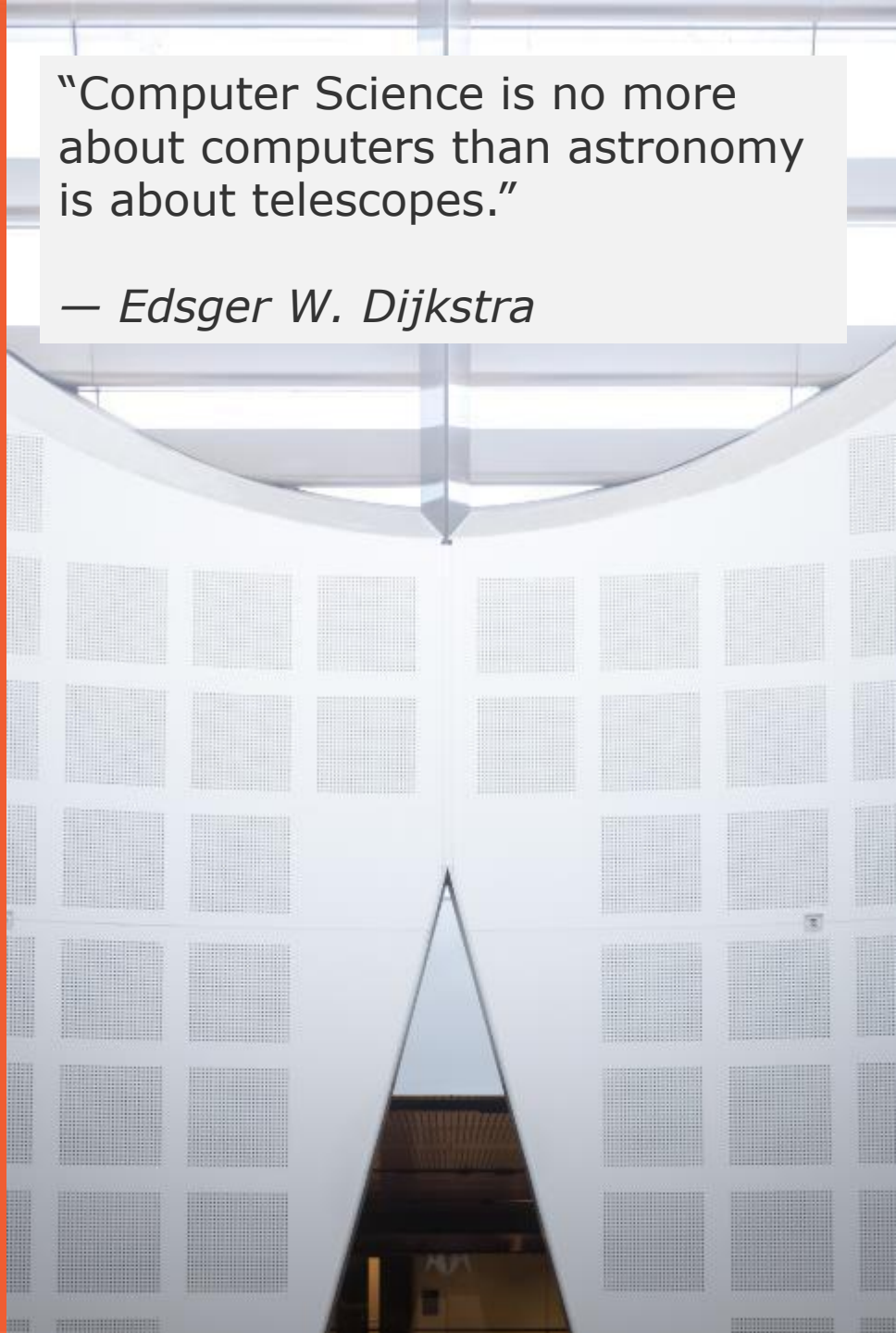


Week 1 Part A : Professions and the IT industry

Topics	Learning outcomes (able to)
1. Professions and practice	*Explain:* • *What professional practice is*
2. INFO5990: Professional Practice Why? and what is it?	*Explain:* • *Why professional practice skills and knowledge is important for IT specialists* • *Access the goals, learning objectives and concepts of the unit*
3. The IT industry	*Explain:* • *The kinds of changes that have taken place in IT and how it might change in the future* • *The effects that has on organisations* • *Typical IT-related activities* • *Examples of IT-related jobs and careers*

Professional Practice

- Professions?
  - a paid occupation, especially one that involves prolonged training and a formal qualification.
    - Expertise =
      - knowledge (knowing about something, how to do it) +
      - skills (being able to do it – competence, capability)
    - Qualifications and certification
    - Knowledge and skill standards
    - Common body of knowledge
    - Ethical standards
- https://www.professions.org.au/what-is-a-professional/
- Practice?
  - the actual application or use of an idea, belief, or method, as opposed to theories relating to it

  * Example of something you have knowledge about that you put into practice

  * Example of an application of IT – for business or for public benefit?

Professionalism

- Professionalism is the ability to do what you are supposed to do and not do what you are not supposed to be doing.
- It is about how the things you say, how you act, and how you dress. It is also about your character.

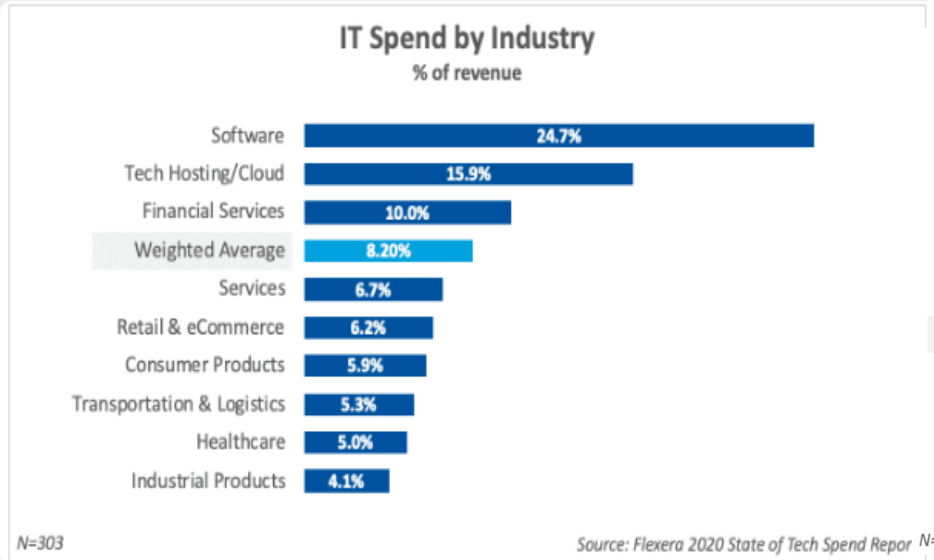
  - Why IT professionalism is needed and why is it important?

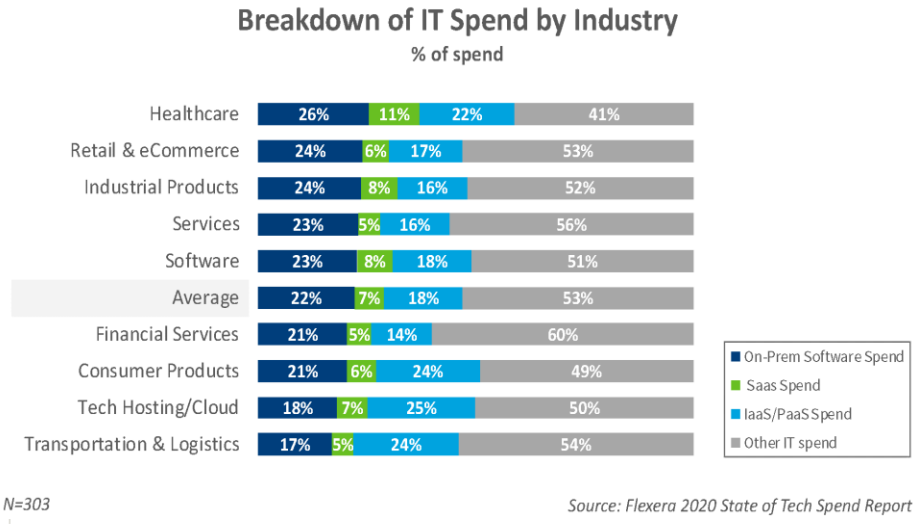
Some of the qualities which describe a professional-

- Trustworthiness
- Honesty
- Punctuality
- Responsibility
- Leadership
- Confidentiality
- Competency

Why INFO5990: Professional Practice?

- IT is a major investment for many organisations and is critical for creating value
- So doing IT well matters to organisations
- Professional Practice helps you do it well by providing you with skills and knowledge to enhance your technical skills in an organisational context





Why is this important?

- For technical specialists – you need to understand the organisation to be a digital driver from wherever you are in the organisation
- For other IT-related roles (e.g. CIO/CTO) CEO?

- https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/find-the-smartest-technologist-in-the-company-and-make-them-ceo?cid=other-eml-dre-mip-mck&hlkid=bdeb6a98a3d9412e98fd81fdd3ba4e19&hctky=2950560&hdpid=5fdae074-503e-4e6f-ad1a-503d2771ff1d

Marc Andreesson developer of Mosaic the first graphical web browser

How do we support that in INFO5990?

- Thought provoking readings
- Useful skills and techniques
- Practical examples discussion
- Case studies to help the learning process
- Learning objectives and concepts that cover a broad range of related topics
  - https://canvas.sydney.edu.au/courses/59195/pages/learning-objectives-what-you-should-be-able-to-do-by-completing-this-unit?module_item_id=2332220
  - https://canvas.sydney.edu.au/courses/59195/pages/concepts-covered-in-this-unit?module_item_id=2332219

IT Careers – What do they look like?

- Which key words describe professional IT careers? How do you know?

Activity (later)

Select a job website (for example http://www.seek.com.au/, https://jobsearch.gov.au/, https://www.careerone.com.au/ , https://au.indeed.com/, etc.)

Search for key words

Look for patterns in the types of skills being sought for those roles

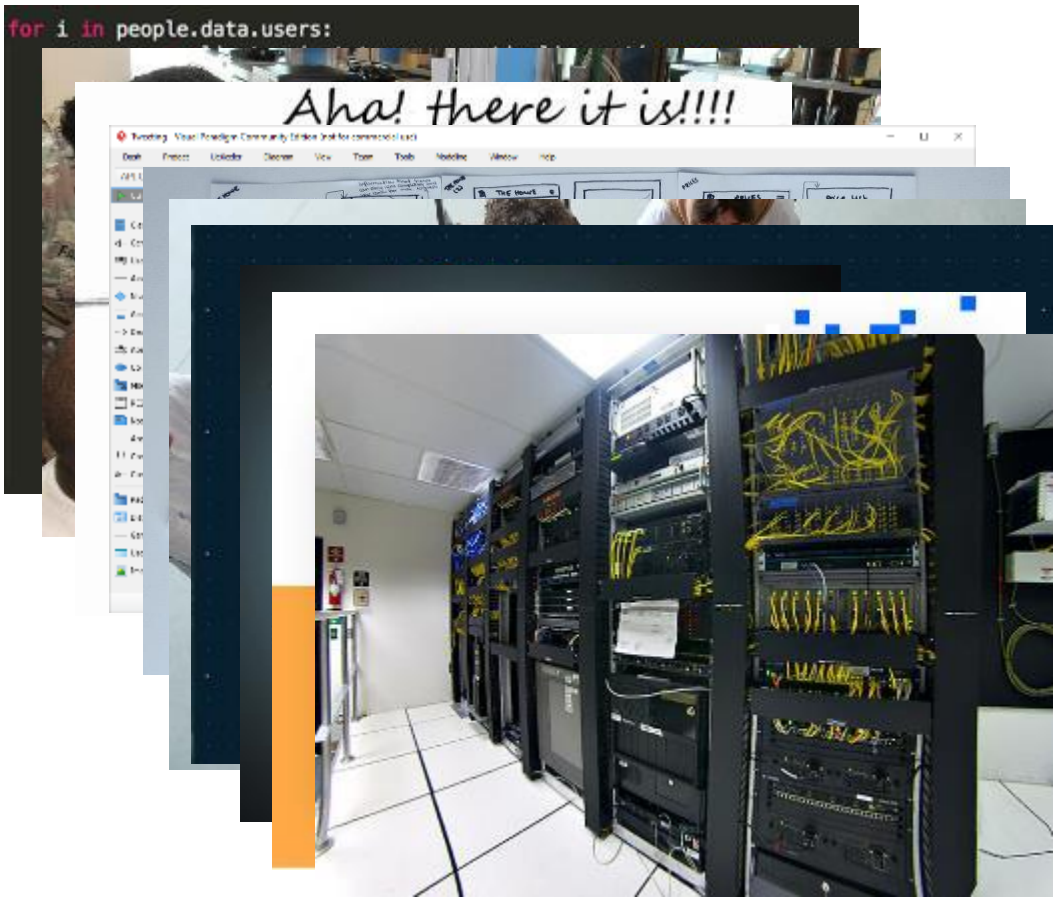
Key word(s)	Roles
IT Programming Java	Java Developer Full Stack Java Developer IT support officer IT Graduate Position
Specialist Database	Microsoft SQL/DBA Consultant Business Systems and Database Administrator B2B Client Services Database Technical specialist
IT Project Manager	Deliver data analytics projects to achieve business outcomes Manage project scope, schedule and risks Guide and support the team on how to use agile practices and values Navigate project blockers to ensure the team delivers the project outcome Report and maintain project-related documentation Coordinate backlogs and manage stakeholders with product owners and other business stakeholders

Word cloud for “Information Technology Software Programming Computing” search on Seek.

Notice how many non-technical words are in there.

Typical activities

- Coding
- Testing
- Debugging
- Design
- Prototyping
- Requirements
- Data analysis
- Business analysis
- Support
- Hardware
- Project management
- Service management
- UX



- See https://gradaustralia.com.au/career-planning/13-types-of-graduate-jobs-in-the-tech-industry

How have careers changed?
Then and now…

- In 2000… (that are disappearing in 2021)
  - User Interface Designer
  - Flash Developer
  - Fortran programmer
  - Software Support
  - SEO Specialist
  - Quality Assurance Manager
  - Windows XP Admin
  - Voice Telephony
  - C/C++, VB, Perl, …

(* see http://readwrite.com/2013/05/01/10-technology-skills-no-longer-in-demand)

- In 2021 (that didn't exist in 2000*)
  - User Experience Designer
  - App Developer
  - Cloud Developer
  - Social Media Manager
  - Data Miner
  - Chief Listening Officer
  - Millennial Expert
  - Internet of Things
  - Java, Python, PHP, Ruby
  - Machine Learning Engineer
  - Data Engineer
  - Data Scientist

(* Or at least were nowhere near as common)

Technology changes *quickly*.

From:
https://www.gadgetguard.com/alara-technology

From: 2007 - 2024

https://www.iphonelife.com/content/evolution-iphone-every-model-2007-2016

https://news.samsung.com/global/a-brief-history-of-the-galaxy-s-series-camera-technologies

Technology changes quickly

- But we rarely can predict how…

- *"This 'telephone' has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us."*
  - Western Union internal memo, 1876.
- *"I think there is a world market for maybe five computers."*
  - Thomas Watson, 1943 (chairman of IBM)
- *"Computers in the future may weigh only 1.5 tons."*
  - Popular Mechanics, 1949
- *"There is no reason anyone would want a computer in their home."*
  - Ken Olsen, 1977
- *"We will never make a 32-bit operating system."*
  - Bill Gates, 1989
- *"I believe OS/2 is destined to be the most important operating system, and possibly program, of all time."*
  - Bill Gates, 1987
- *"Spam will be a thing of the past in two years' time."*
  - Bill Gates, 2004
- *"Next Christmas the iPod will be dead, finished, gone, kaput."*
  - Sir Alan Sugar, 2005 (founder of Amstrad)

- See http://www.rinkworks.com/said/predictions.shtml for many more...

Future Technology

New Ideas that will change our world

Source: https://www.sciencefocus.com/future-technology/future-technology-22-ideas-about-to-change-our-world

Q: What future technology will be common in the world that does not exist now?

- Necrobotics
- Sand batteries
- E-skin
- Smelly VR
- Catapulting satellites into space
- AI image generation
- Brain-reading robots
- 3D printed bones
- Digital "twins"

Technology in 15 years time

- What did you predict?
  - Typically, we over-estimate short-term impacts and under-estimate mid-long term impacts…

- Others predictions…
  - Quantum computing; metaOS; Zero-size computing; neurohacking; mass data; nanotech (nanomed, genetech, …); cyber-security and dark networks; babel fish; surrogates; augmentation; … ; *the singularity* (read Ray Kurzweil)

    - https://www.weforum.org/agenda/2020/06/17-predictions-for-our-world-in-2025/
    - https://www.pewresearch.org/internet/2020/06/30/innovations-these-experts-predict-by-2030/
    - https://rossdawson.com/blog/
    - https://www.arup.com/perspectives/publications/research/section/emerging-technology-timeline
    - https://www.futuretimeline.net/

- **And critically – WHY will that technology become common?**
- **What value does it provide?**

Gartner Predicts 2024

https://www.gartner.com/en/articles/gartner-s-top-strategic-predictions-for-2024-and-beyond

- **Strategic Predictions for 2024 and Beyond**

- **By 2024**, Generative AI will be widely adopted including but not limited to content creation, product design, and scientific discovery, enabled by advancements in cloud computing, open-source tools, and pre-trained models

- **By 2027**, Generative AI tools will be utilized to understand and replace legacy business applications, cutting modernization costs by 70%

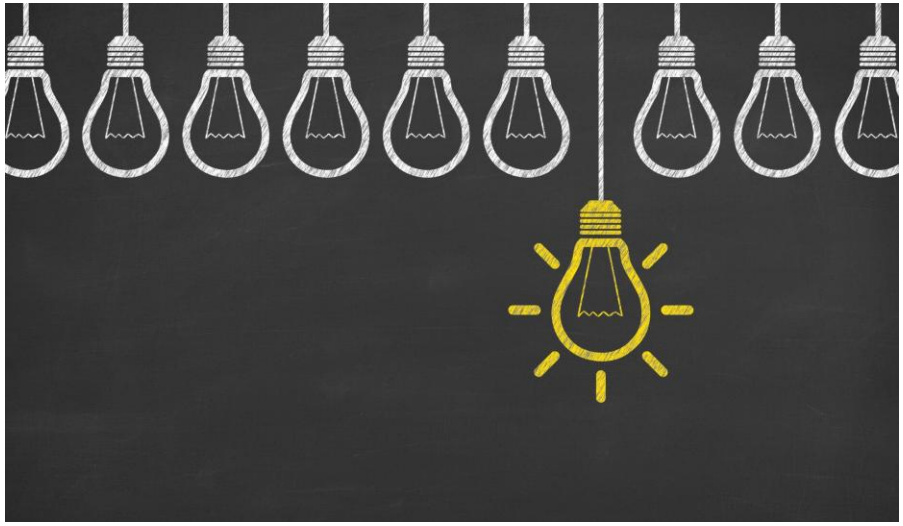
- **By 2024**, there will be increased collaboration between governments, businesses, and individuals to address new threats like cyberattacks, climate change, and pandemics.

- **By 2028**, enterprise spending on combating cyber threats will exceed $30 billion, consuming 10% of marketing and cybersecurity budgets

- **By 2027**, 45% of Chief Information Security Officers (CISOs) will have responsibilities beyond cybersecurity due to growing regulatory demands and an expanding attack surface

Gartner Predicts 2024

- Quantum computing will transition from theoretical concept to practical application, revolutionizing fields like materials science, drug discovery, and financial modeling
- By 2024, sustainability will become a core business strategy, with companies prioritizing environmentally and socially responsible practices gaining a competitive edge by attracting talent and fostering brand loyalty
- Augmented reality (AR) will be integrated into everyday applications, enhancing user experiences in industries like training, education, and product design
- By 2028, labor shortages will result in more smart robots than frontline workers in sectors like manufacturing, retail, and logistics
- By 2028, unionization among workers will increase by 1000%



- Strategic Predictions for 2024 and Beyond pt 2

About INFO5990

"Computer Science is no more about computers than astronomy is about telescopes." [*Edsger W. Dijkstra*]

INFO5990 *is no more about coding than astronomy is about telescopes*

So what is it about ??

Role of IT

What is the role of IT in organisations?

- Installing and configuring an organisation's computer system.

IT in an organisational environment can be used for:

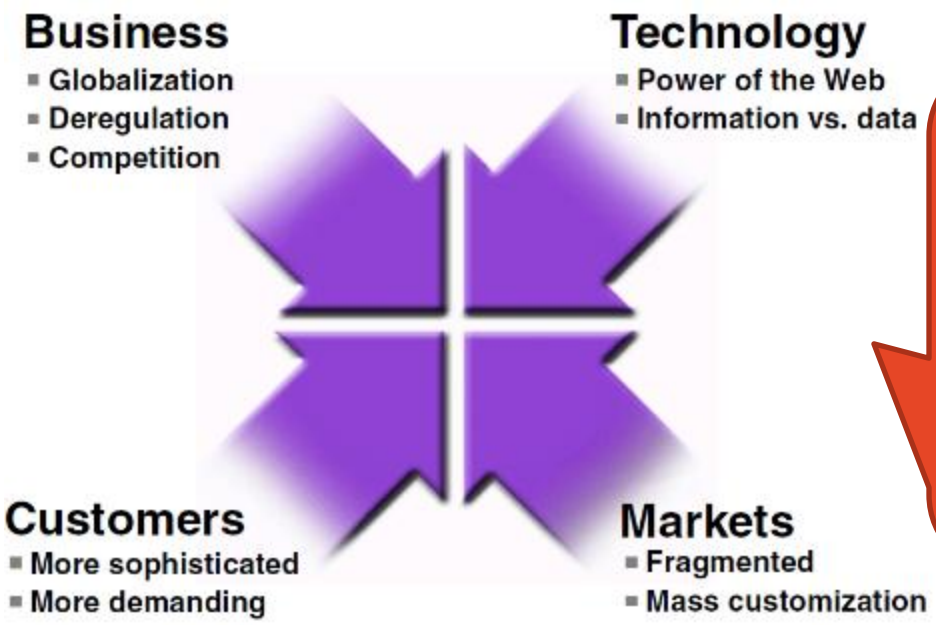
- Administration- Invoices, Communication, Emails → **Value = economies of scale**
- Business, Finance and Accounting- Business Plans, Financial forecasting, Auditing, Market Analysis, Research, Recording Transactions
- Communications- email, instant messages, mobile phones
- Engineering and Creative Art- 2D and 3D Drawing, Modelling, Simulation
- Wildlife and Tourism and Hospitality- Animal Tracking, Hotel booking, GIS
- Book your flights to Sydney → **Value = lowers cost of transactions to arrange travel for both provider and customer**

Role of IT in organisations

- IT provides *value* to an organisation through changing the way in which business functions and processes are carried out and providing new functions and enabling new business models
  - This unit focuses on the issues associated with the effective use of IT
- **Example…** A nation-wide real estate chain is considering implementing a CRM enterprise system.
  - **What value can this provide?**
  - **How does fit into the overall technology strategy of the organisation?**
  - **How might they need to change the way they operate?**
  - **What is the expected life cycle of the system?**
  - **How might it interoperate with other systems?**
  - **What will be the security issues?**
  - **How will QA issues be managed?**

Changing Business Landscape

The term "global" includes: global markets, global customers, global suppliers, global shareholders, and global opportunities.
Highly competitive with companies competing across national boundaries



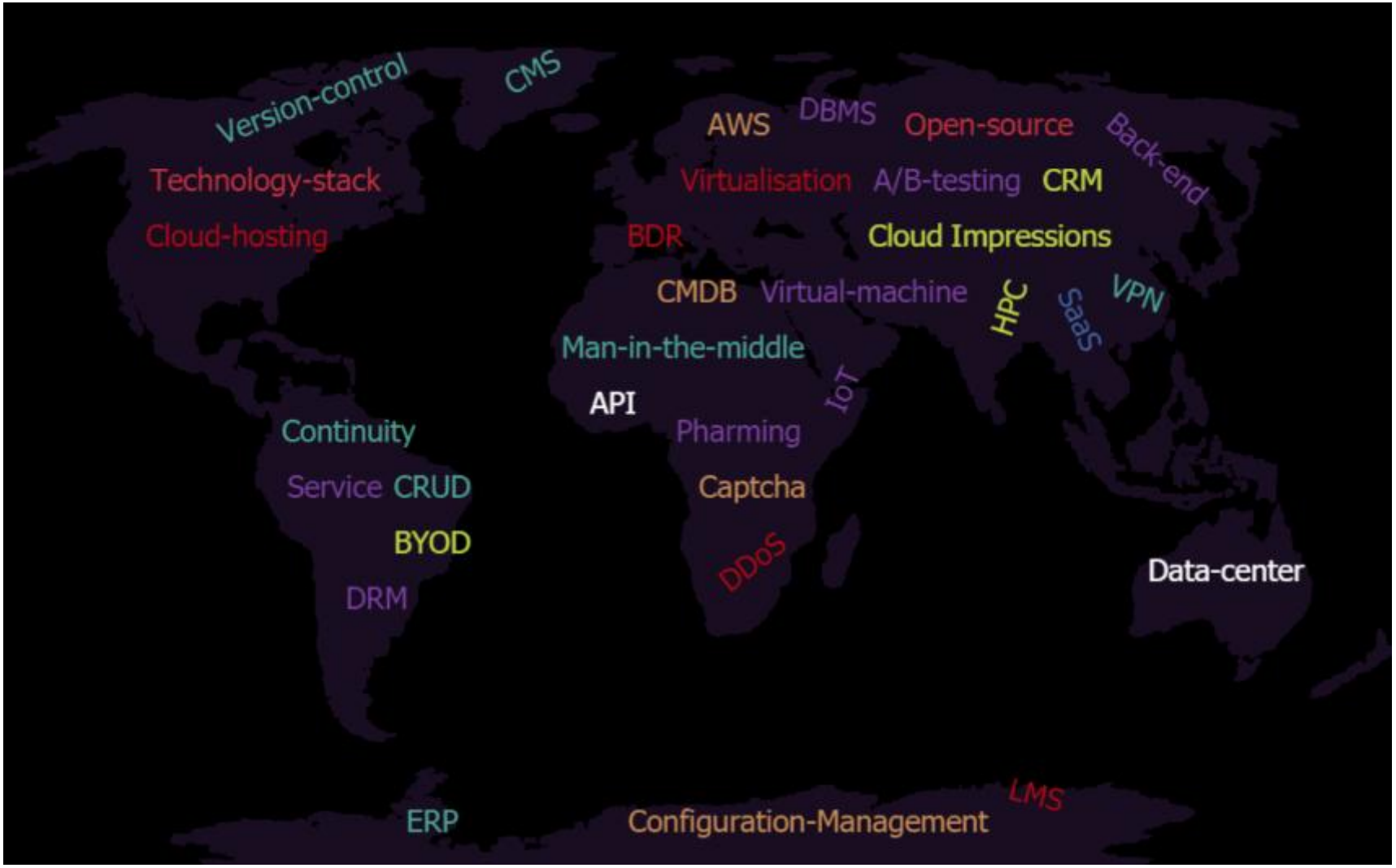
Global reach of Internet Technology: mobile phones can handle Internet communications
Pervasive Computing- idea of putting powerful computer chips and functions into everyday things such as cars or household appliances. Fridges can now scan itself and inform you to procure goods online using GPS and location technologies

IT Jobs….

https://themigration.com.au/blog/best-it-jobs-in-australia-in-2024/

- Organisations increasingly want IT people who understand how organisations work and the changing role of IT in them:
  - Business processes and transformation
  - Agile environments
  - Customer and client expectations
  - Business value

A key pathway is understanding the language



Many of these terms have meanings that vary in different contexts. We will be talking about that later.

Diversity in High Tech

Various backgrounds, including race, ethnicity, gender, age, religion, and sexual orientation

https://www.g2.com/articles/diversity-in-the-workplace

Why need diversity?

It helps create a stronger and broader narrative about the case for diversity (everyone feels relevant and part of the shared goal)

Accurately reflects an individual's intersectional complexity instated of focusing on only one.

Demographic equality – rather than being its own end

lack of diversity in employment has led to under-utilization of available talent and under-recruitment of potentially valuable employees.

Diversity in High Tech

High Tech: Evaluation of the industry

- lack of diversity in employment has led to under-utilization of available talent and under-recruitment of potentially valuable employees
- employment of women and non-white workers in these occupations, accompanied by a steady exodus of these same workers, particularly women, from tech jobs.

High Tech Geography: Dispersing

- moved from a niche economic product dependent on highly specialized expertise to become a major source of economic vitality.

– Source: https://www.eeoc.gov/special-report/diversity-high-tech

Diversity in High Tech

Source: https://www.eeoc.gov/special-report/diversity-high-tech

- **Labor Diversity: Supply vs. Demand**
- lack of employment diversity in high-tech industries to lack of applicant diversity and self-selection of minorities.
- women away from STEM fields focuses on only part of the industries' hiring and retention situation.

Exiting Tech & Related Field

- Research by The Center for Work-Life Policy shows that 41 percent of qualified scientists, engineers, and technologists are women at the lower rungs of corporate ladders but more than half quit their jobs.

Diversity in High Tech

- Best available talent to create value for clients, people and communities.
- To solve important problems, need diverse talent.
- Bringing together the perspectives of individuals of all backgrounds.
- Collective and individual ability can thrive in a talent-diverse environment

BREAK

see you in 5 mins

INFO5990: Professional Practice in IT

Week 1: Part B

Introductions
Overview of the unit
Overview of assessments

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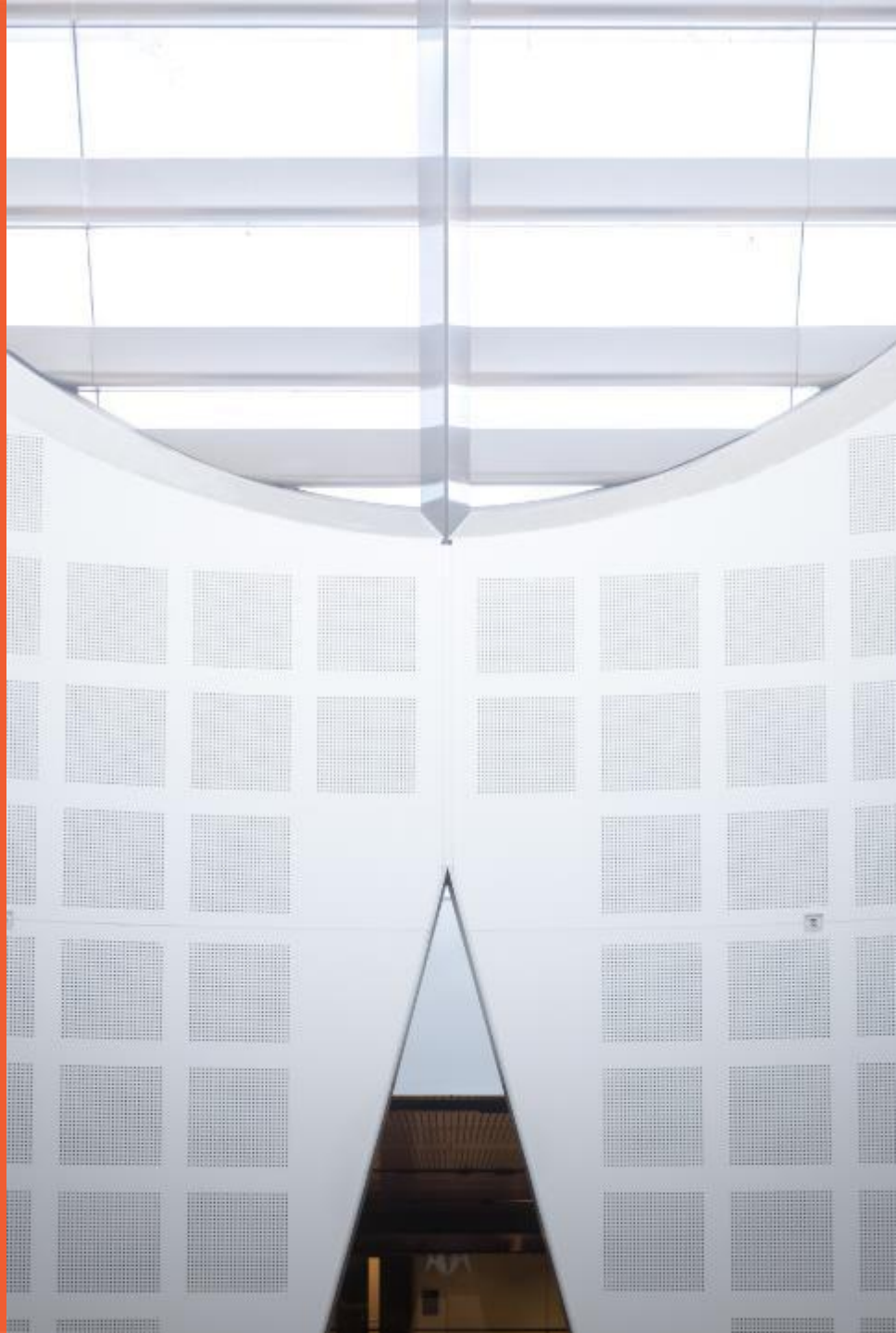
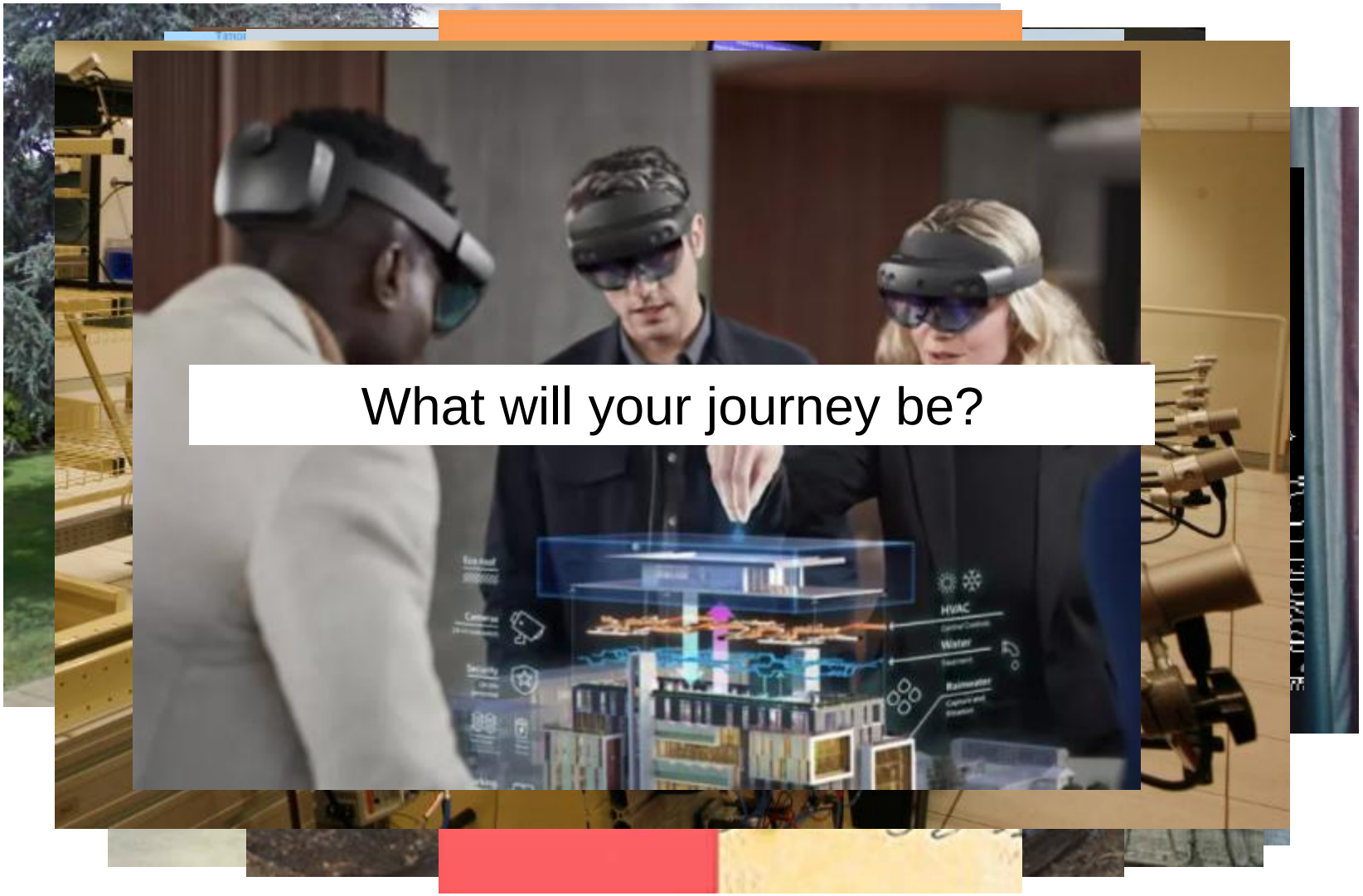


My educational journey?



Getting to know each other

- I really enjoy playing tennis
- I have a keen interest in photography
- Basketball
- I am a cat lover
- I am very good at playing games
- I am very interested in the relationship and history of various countries
- I can make web applications with Java frameworks, and I love it
- I know a little about Chinese philosophy Yi Ching
- I really enjoy teamwork rather than individual work
- I really like Disney land!!!
- I travel to lots of places.
- I have a cat, named Gululu
- I watch anime and my favorite character is Kirito from SAO.
- In January 2022, I was 88kg. In January 2023, I was 76kg.
- Maybe warm heart
- My birthday is on February 29, which is once every four years.
- My laugh is loud and I laugh alot
- My only interest now is theoretical economics
- I have some social phobia
- Shy but gregarious.
- When walking, I saw an unknown bird with a curved mouth
- X4 games

Getting to know each other

A network of people you know is vital for information, support and well being.

Activity (?)

Turn to a person near you and ask each other the following questions….

What one skill do you think is most important in being successful in the IT industry?

The Admin Bits…. UoS Overview

Topics covered

- IT lifecycles
- People and Teams
- Finding/trusting information
- Project scoping and estimation
- Quality assurance and risk
- Testing management
- Security management
- Communication
- Ethics and regulations
- Decision making
- (See https://www.pluralsight.com/blog/career/cs-and-is-students-need-to-know-by-graduation)

Learning outcomes

- https://www.sydney.edu.au/units/INFO5990/2024-S2C-NE-CC

Resources

- Canvas - login using Unikey and password
  - Lecture slides
  - Lecture videos
    - We intend to record the lectures
    - (but the technology is not reliable – and we still want you to listen live)
  - Reading links
  - Assignment instructions
  - see your grades; etc
- Canvas/Unit Outline for official schedule, list of learning outcomes, etc.
- Ed: Discussion forum

Schedule and expectations

Lecture: Tuesdays 7pm-9pm both F2F and on zoom

Tutorial session: depends on your timetable:

- You must enroll in a tutorial
- Monday or Tuesday; F2F
- It is important you attend these, as there is groupwork…
- And make sure you attend the tutorial that is listed in your timetable!

Expectations: You are responsible learners!

- Attend scheduled classes, and devote an *extra* 6-9 hrs per week
- Participate in classes, constructively
  - Respect for one another (criticize ideas, not people)
  - Humility: none of us knows it all; each of us knows valuable things
- Check Canvas site regularly - at least once a week!
- Notify academics whenever there are difficulties
- Notify group partners honestly and promptly about difficulties
- **Read the "Key Information" on Canvas**

Assessment Overview

- For this section we will take you to canvas as all the information you need is there

INFO5990 Professional Practice in IT (sydney.edu.au)

Advice

Metacognition

- Pay attention to the learning objectives for the unit
- https://canvas.sydney.edu.au/courses/59195/pages/learning-objectives-what-you-should-be-able-to-do-by-completing-this-unit?module_item_id=2332220
- and for each learning activity (lectures, tutorials, and assignments etc.)
- Self-check that you are achieving each one

Time management

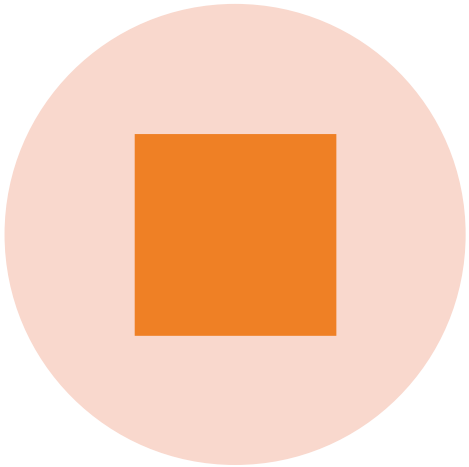
- Watch the due dates
- Start work early, submit early

Networking and community-formation

- Make friends and discuss ideas with them
- Know your tutor, lecturer, coordinator
- Keep them informed, especially if you fall behind
  - Don't wait to get help

Enjoy the learning!

ANY QUESTION



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