

# INFO1111: Computing 1A Professionalism

Week 2:

A: Professionalism / Teams

B: CLIs and Scripts

Professor David Lowe

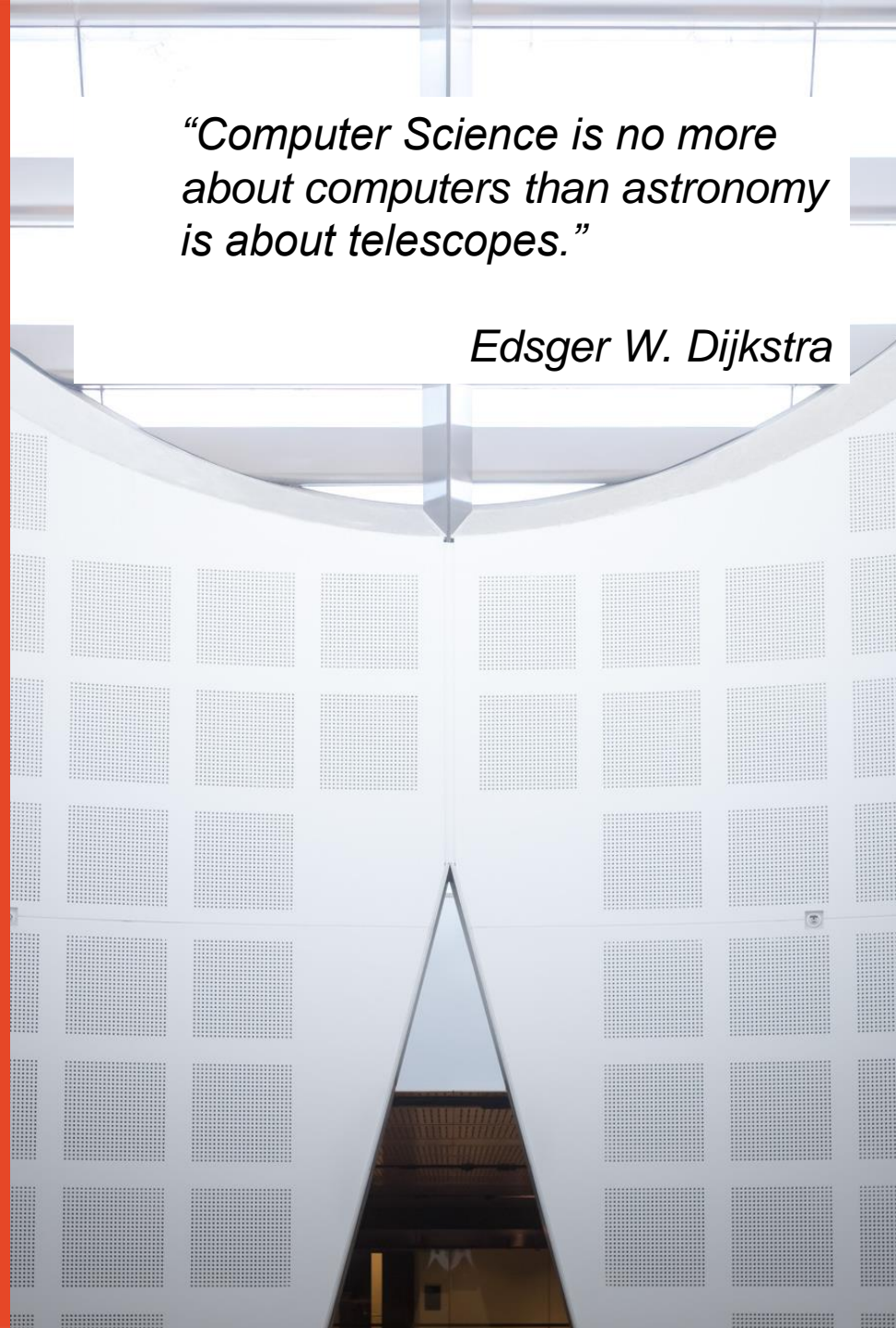
School of Computer Science



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*“Computer Science is no more  
about computers than astronomy  
is about telescopes.”*

*Edsger W. Dijkstra*



# Week 1 Recap

- UoS overview. Is everyone clear on the structure, expectations and resources available?
- Assessment
  - Self-Learning: Have you started thinking about your topic?
  - Skills: Are you in a team yet?
- Introductions – lecturer, tutors, fellow students, team members.
- IT Professions – varied, require wide range of skills to succeed.
- Future as an IT professional – rapidly changing environment requires continuous learning.

# Week 1 self-learning exercise...

## – Drunkard's walk

- Related to behaviours of stochastic processes  
And the assumptions we make...
  - Consider a “drunk” standing on the edge of a cliff...
  - If he randomly walks 1 meter towards or away from the cliff, then keeps repeating... then what is the chance he will fall off the edge?
  - What if he is not quite so drunk, and so there is a  $2/3$  likelihood he will walk away in each step?
- Concept is used in:
  - Machine learning
  - Twitter algorithms related to suggestions as to who to follow!
- Read
  - <https://medium.com/i-math/the-drunkards-walk-explained-48a0205d304>



## – Week 2 concept...

- What can you learn about: *Big O Notation*

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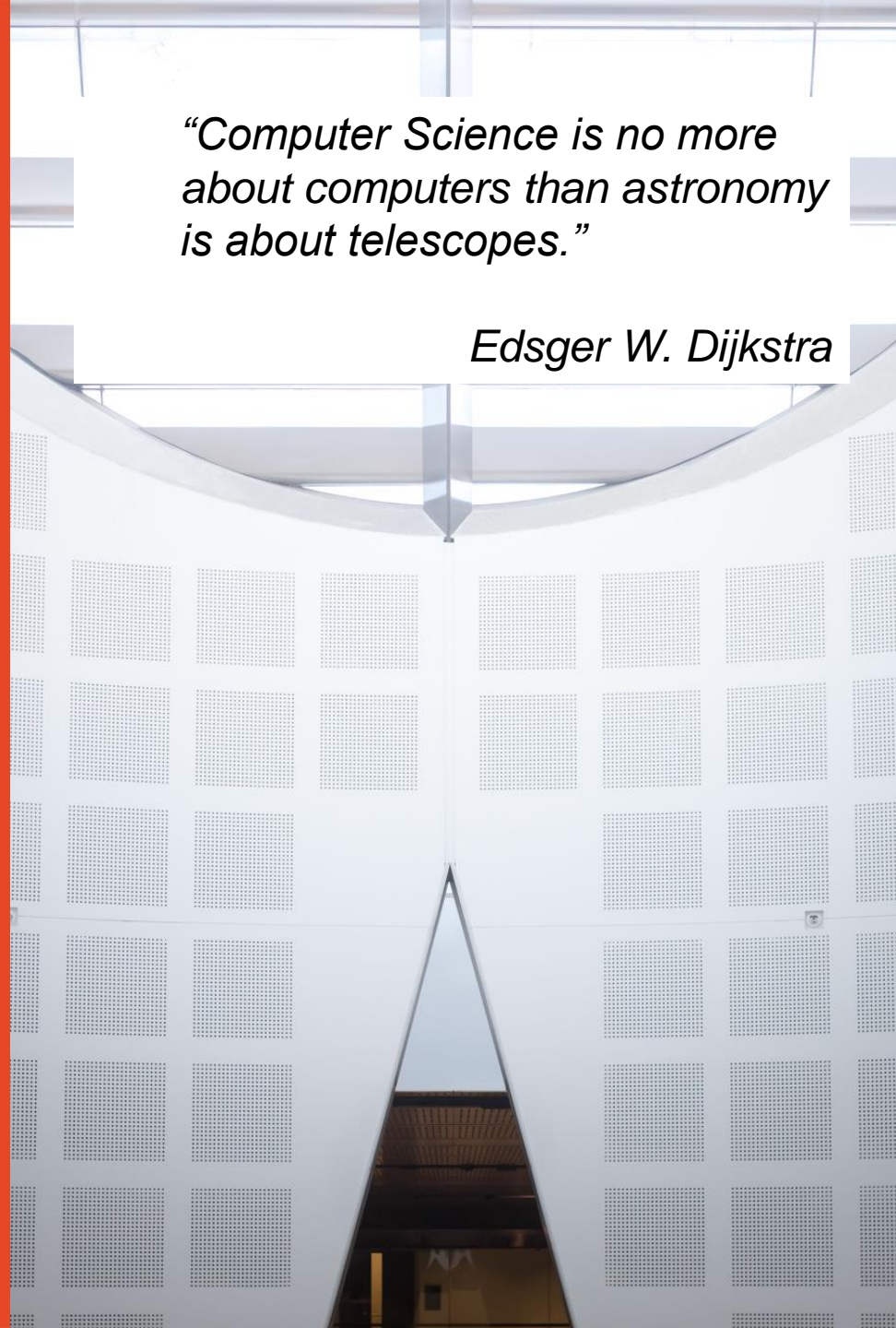
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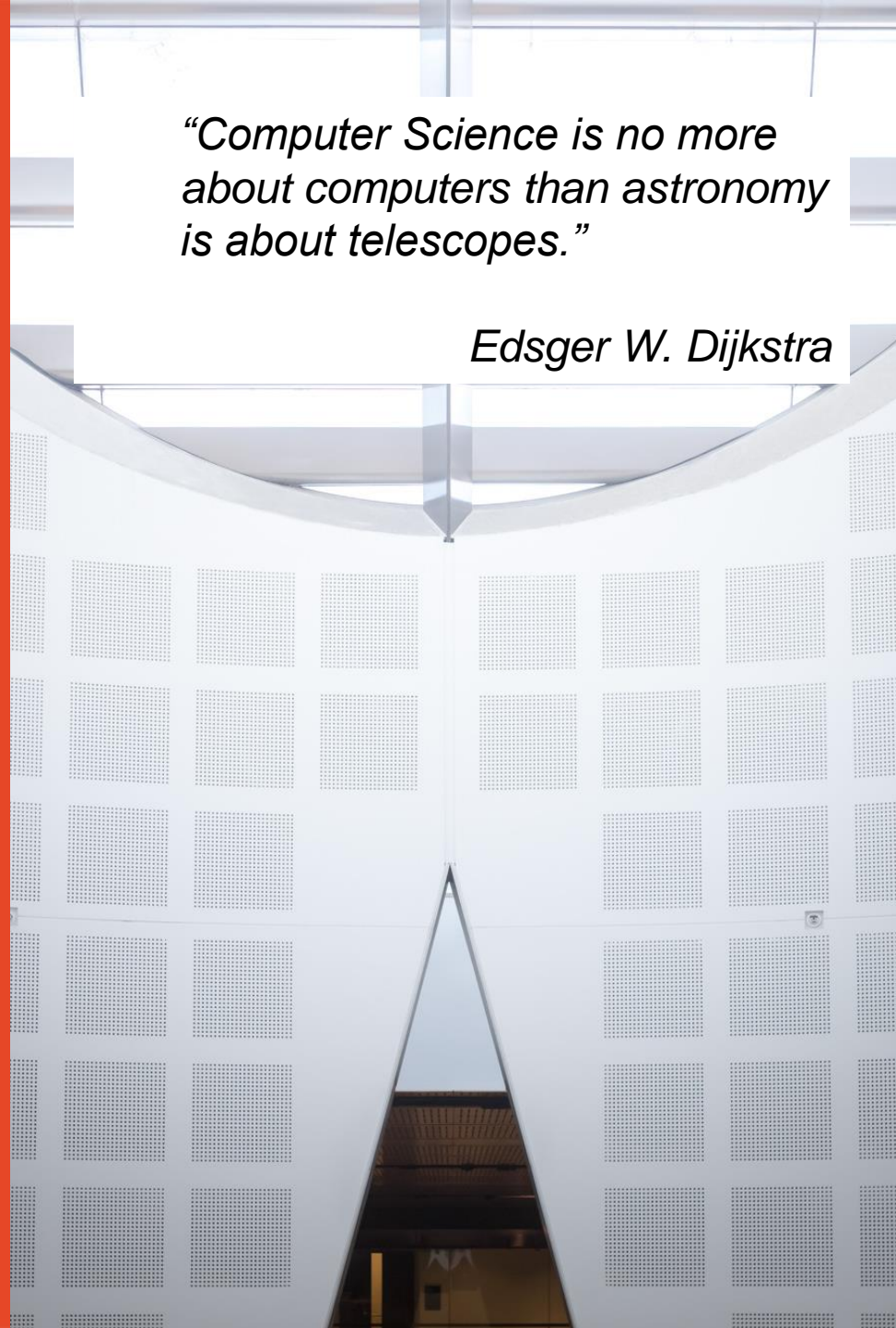
*Professionalism*



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# Professionalism

- What does it mean to be a professional?
  - *“Computer Science is no more about computers than astronomy is about telescopes.”*

Edsger W. Dijkstra
  - *“Computer Science is no more about coding than running a restaurant is about ingredients”*

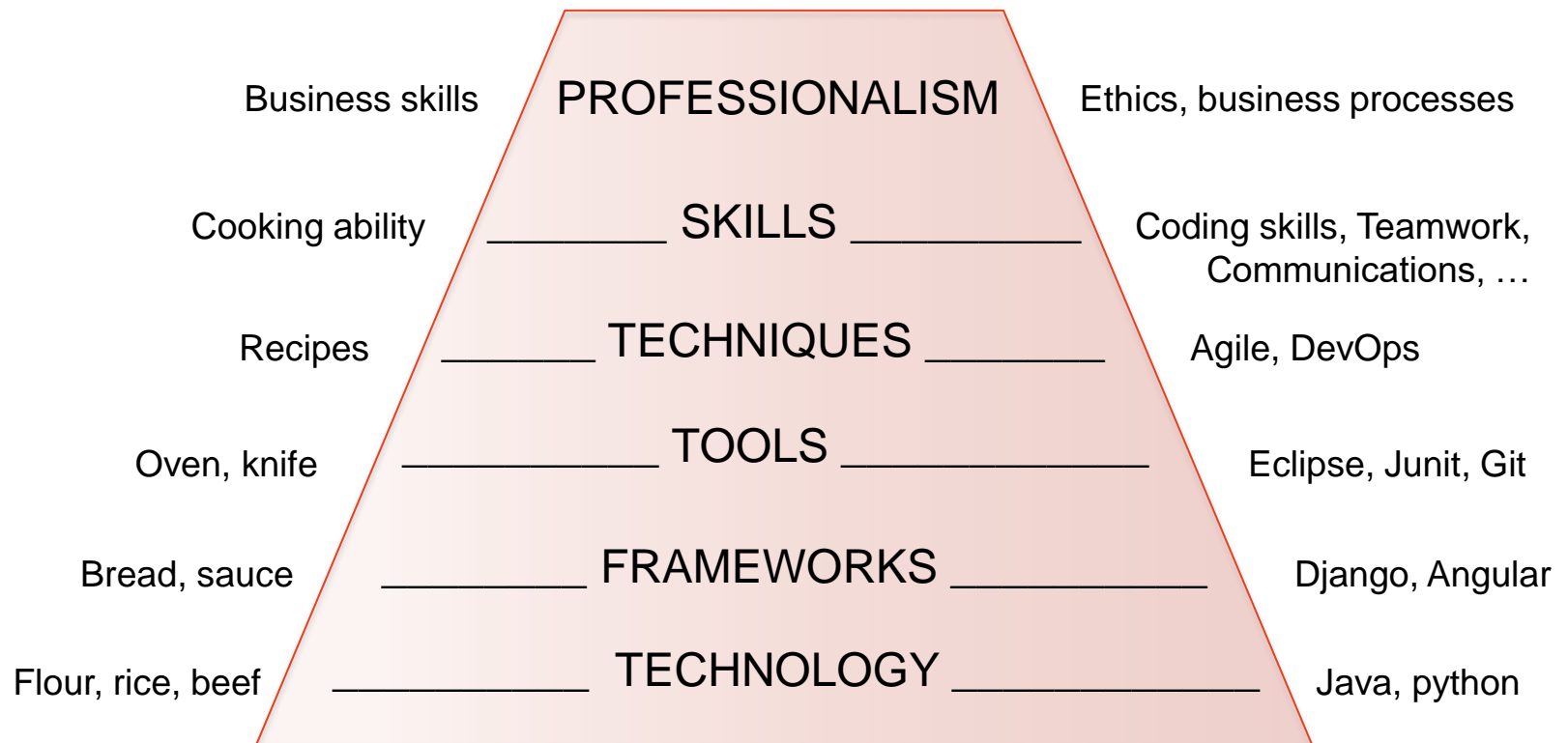
Felipe Jara
- So what is it about?

# Restaurant analogy

- What might you need to understand in order to setup and run a (great) restaurant?
- What are good quality ingredients (and where can I get them)?
  - *Poor quality ingredients can lead to terrible (or even dangerous) food.*
  - *Poor quality code can lead to a terrible user experience, or even dangerous outcomes.*
- What things can I prepurchase already partly made?
  - *A restaurant owner is unlikely to own his own cows, grow his own rice*
  - *A developer won't create every single bit of a system from scratch*
- What equipment might I need?
  - *A chef will want a good oven, sharp knives, etc.*
  - *A developer will want to use good development tools*
- What is a great meal?
  - *Delivering great meals is about more than just the ingredients. What recipes might guide me?*
  - *Delivering good systems is about more than a coding instructions. How do I manage the development?*
- Even with good recipes, you can still have a terrible meal?
  - *What about cooking skills? Customer service? Restaurant ambience?*
  - *What about teamwork? Communications?*
- How do I learn to run a restaurant?
  - *A restaurant is a business. What about finances? Marketing? Hiring good staff?*
  - *Computing systems get used by people. What about business processes? ethics?*

# Professionalism

- Technical capability is fundamental, but not sufficient...
  - Is flour enough to make bread? Is bread enough to make a meal? Is a meal enough to have a great dining experience?





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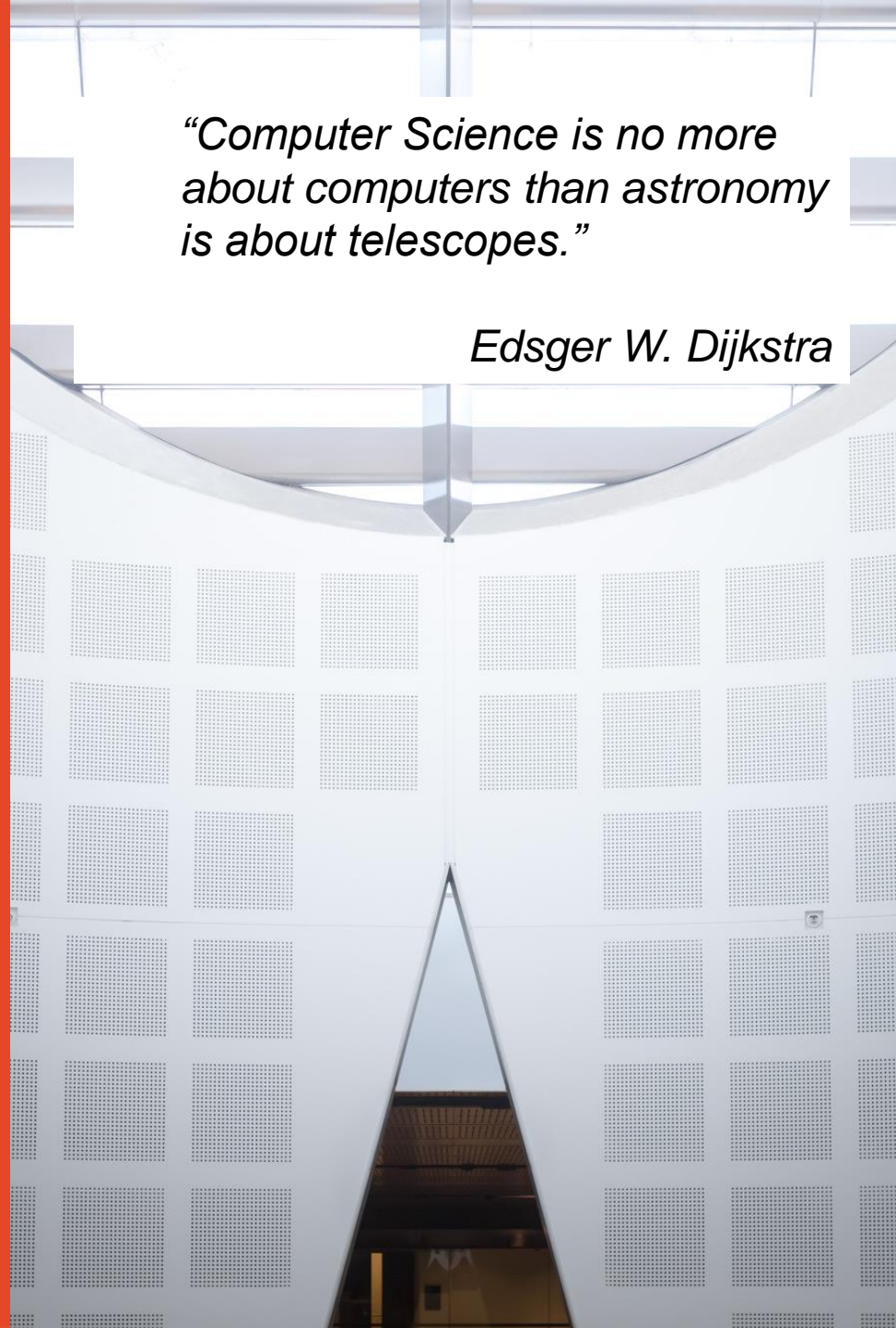
SFIA



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# Professionalism

- Skills Framework for the Information Age (SFIA)

## The skills context

IT professional capability comes from a combination of professional skills, behavioural skills and knowledge. Experience and qualifications validate that overall capability.

**Professional skills.** Business process improvement and Database design are just two examples of almost 100 fundamental professional IT skills defined by SFIA.

**Behavioural skills.** Most organisations recognise a set of behavioural skills. These vary considerably from one organisation to another.

**Knowledge.** Technologies, products, internal systems, services, processes, methods and even legislation are all examples of areas where IT professionals are required to have knowledge.

**Experience and qualifications.** These validate the individual's capability. Qualifications certify elements of skill or knowledge; experience gives practical demonstration of capability. The right sort of experience also acts as a powerful force for learning, thereby enhancing capability.



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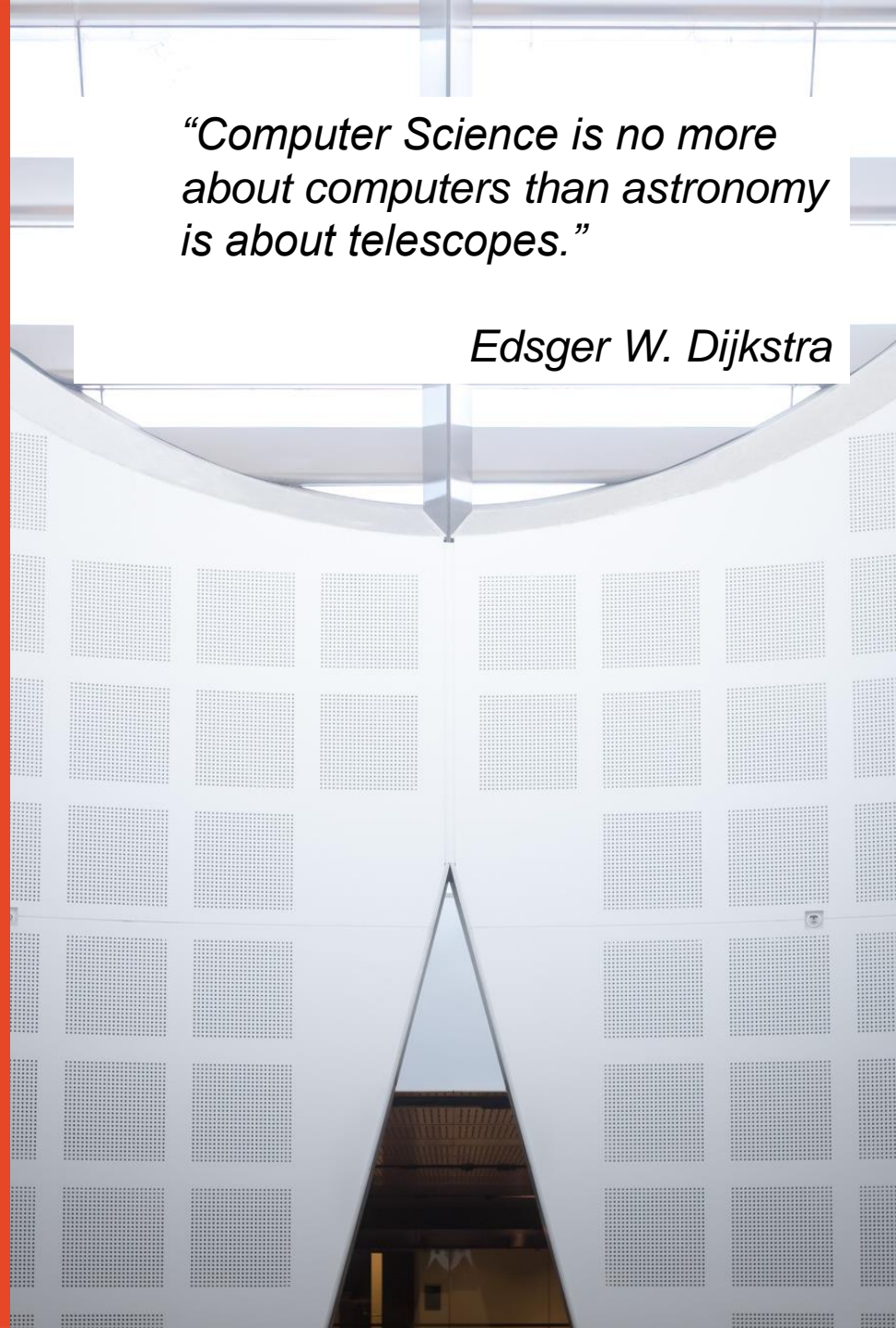
*Teamwork – part 1*



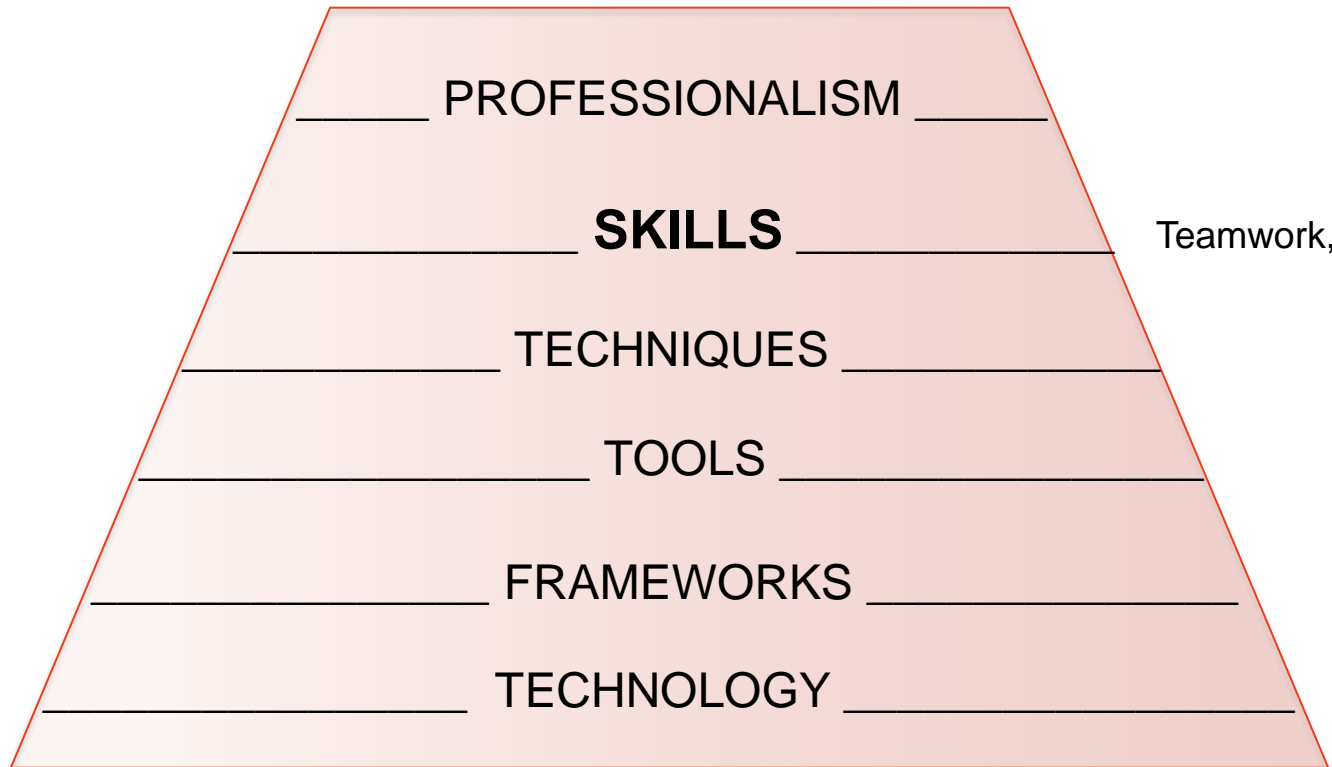
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# Skills – Team work



- As one tutor phrased it: we do lots of human-computer interfacing, but human-human interfacing is just as important.

# Computing teams

- Team types
  - Development; operations; QA; support; security; ...
- Team topologies
  - Stream aligned; enabling; platform; ...
- Team roles:
  - Analyst; programmer; architect; tester; ...
- Team functioning
  - Pair programming?
- Have a read of:
  - <https://relevant.software/blog/what-agile-software-development-team-structure-looks-like/>

# Team Work

- What is a team?
  - “A group of people with a full set of complementary skills required to complete a task, job, or project.”  
<http://www.businessdictionary.com/definition/team.html>
  - “A group is an intact social system, complete with boundaries, interdependence for some shared purpose, and differentiated member roles” [Hackman et al]
  - “A **team** is a group of individuals working together to achieve a goal. A group does not necessarily constitute a team. Teams normally have members with complementary skills and generate synergy through a coordinated effort which allows each member to maximize their strengths and minimize their weaknesses.”  
<https://en.wikipedia.org/wiki/Team>



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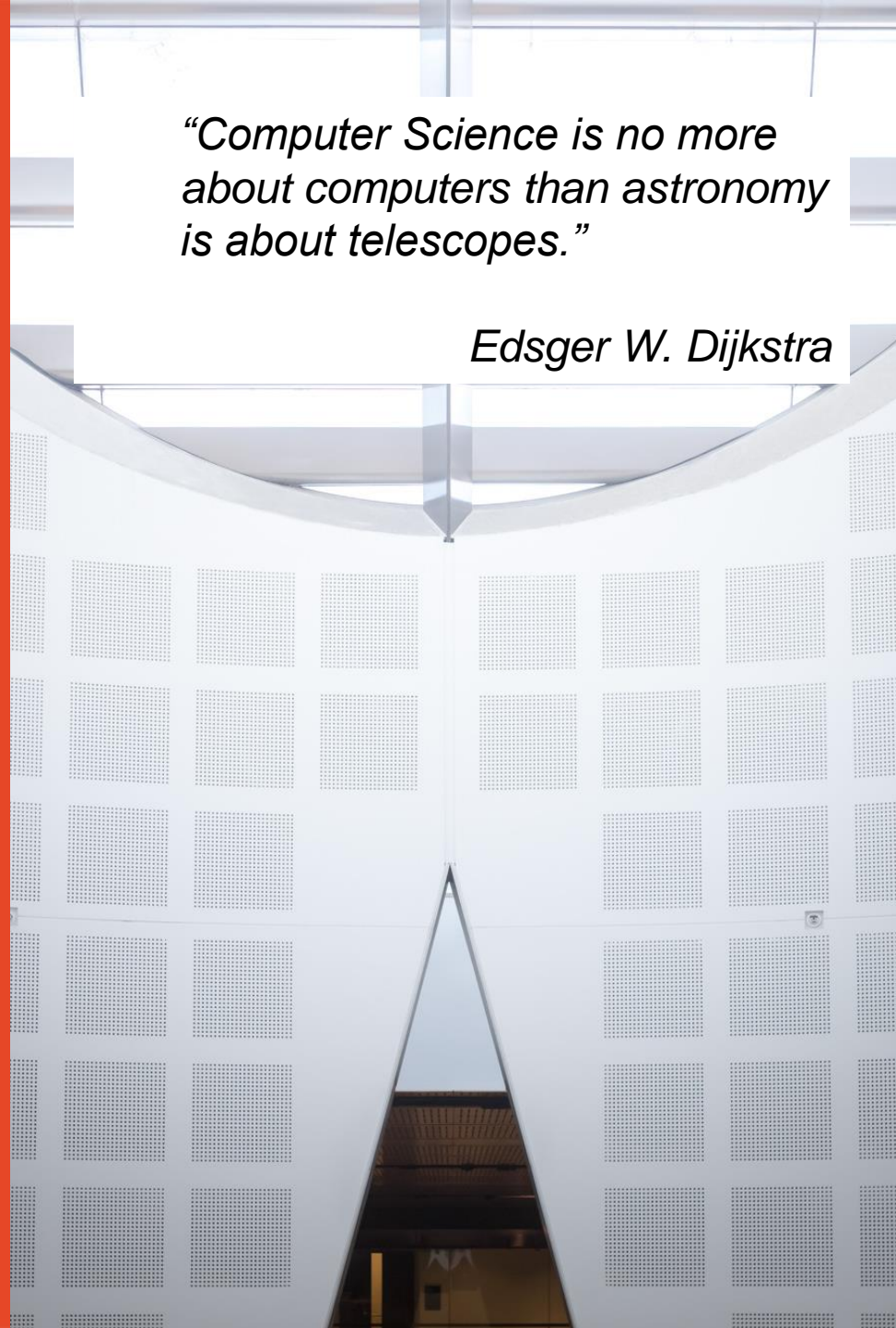
*Teamwork – part 2*



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# Team Work - Mistaken Beliefs

- Teams that work together harmoniously perform better than those with lots of conflict.
  - “... grumpy orchestras played together slightly better than orchestras in which all the musicians were really quite happy”
  - <https://hbr.org/video/5566537368001/the-explainer-how-management-teams-can-have-a-good-fight>
  - <https://hbr.org/video/5542728022001/whiteboard-session-clashing-with-a-coworker-heres-what-to-do>
- Team dynamics are largely caused by the leader's style (authoritarian versus democratic).
- Larger teams perform better than small ones.
- Teams whose membership stays intact gradually deteriorate
  - “73% of the [airline] incidents ... occurred on a crew's first day of flying together”  
see <https://hbr.org/2009/05/why-teams-dont-work>
- We will come back to teamwork as we do our group project through the semester.

# Team Work - Successful Teams

- Why are some groups successful?
- Hackman identified three attributes of such groups
  - They satisfy internal and external clients
  - They develop capabilities to perform in the future
  - Members find meaning and satisfaction
- And then five factors that increase the chances for success:
  - A real team (shared task; clear membership; stability; ...)
  - Compelling direction (SMART goals?)
  - Enabling Structure (size; internal structure; skills balance; ...)
  - Supportive Context (reward; development; information; ...)
  - Expert Coaching (support; mentoring; evaluation; ...)

[from Hackman] – see <https://hbr.org/2009/05/why-teams-dont-work>

# Team Work for IT Professionals

- Multi-disciplinary
  - e.g. business; IT; creative design; ...
- Multi-faceted
  - e.g. analyst; architect; coder, tester; ...
- Collaborative
  - e.g. coder; coder; coder; ...
- Traditional plan-and-document structures
- Agile such as SCRUM or XP
  - e.g. pair programming (why???)

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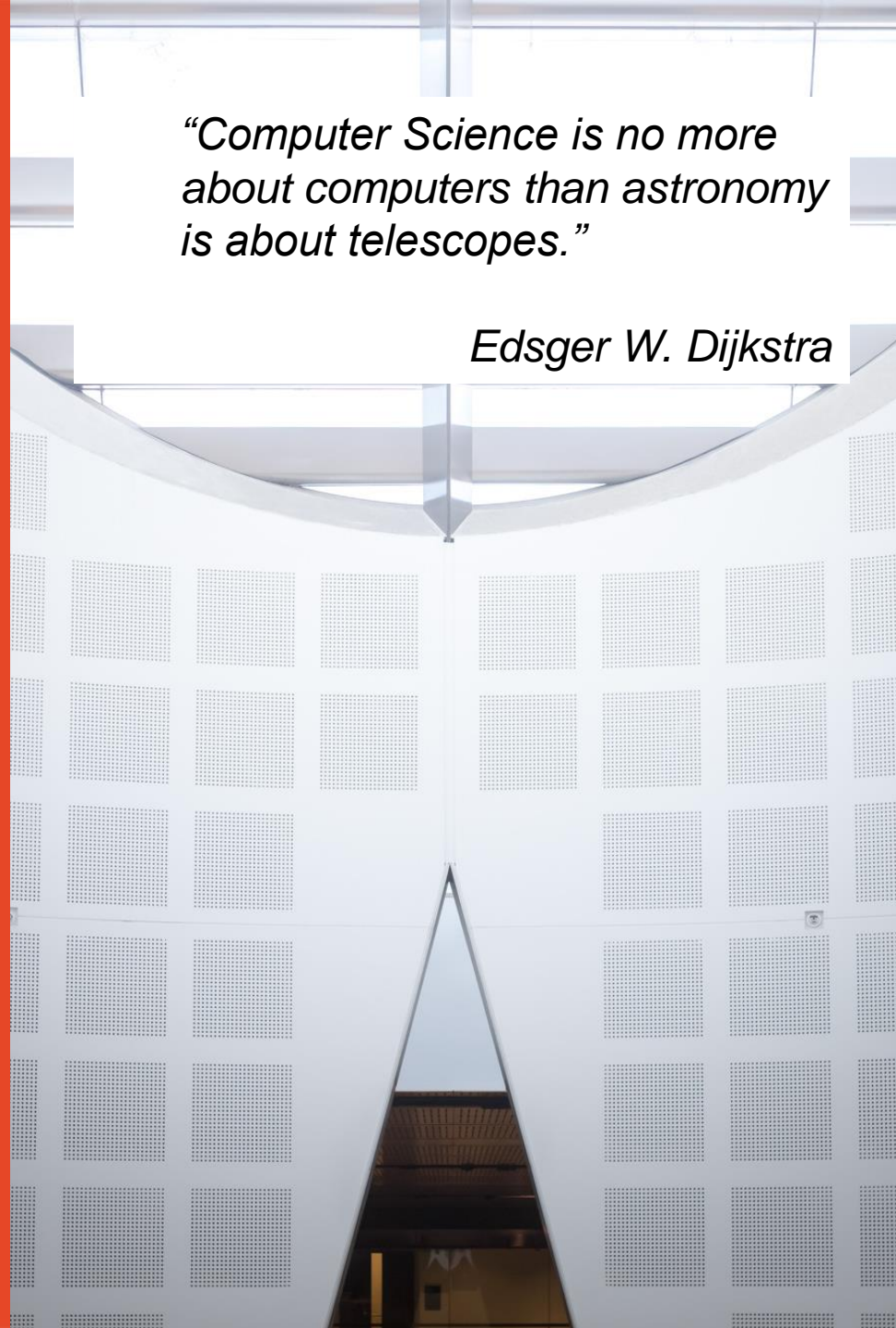
*Teamwork – part 3*



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# Team Work for Students

- Why are student projects different from commercial development?
  - Lack of fully shared fate
  - Limited consequences
  - Different goals
  - Not the whole work => Different schedules
- How do you deal with these issues?



# Team Work - Successful Student Teams

- Characteristics of groups that worked effectively:
  - equal contributions
  - full discussion of issues
  - member support

⇒ High quality result & high level of member satisfaction
- Common problems that prevent groups working effectively:
  - problems with logistics
  - problems with allocation of tasks
  - coordination of member contributions
  - lack of commitment from some group members

⇒ Quality of group product lower than individual product, & high level of stress and dissatisfaction

# Team Work - Successful Student Teams

- Strategies for improving group dynamics
  - Setting up the group. Positive organisational systems such as drawing up a team constitution and open discussion in the first meeting of your group can help the development of a good dynamic.
  - Dealing with differences. In universities today, most groups are going to include people from different cultural backgrounds. Again, open discussion and tolerance are key factors for success here.
  - Dealing with negative behaviour such as aggression, blocking, controlling, freeloading and discounting.

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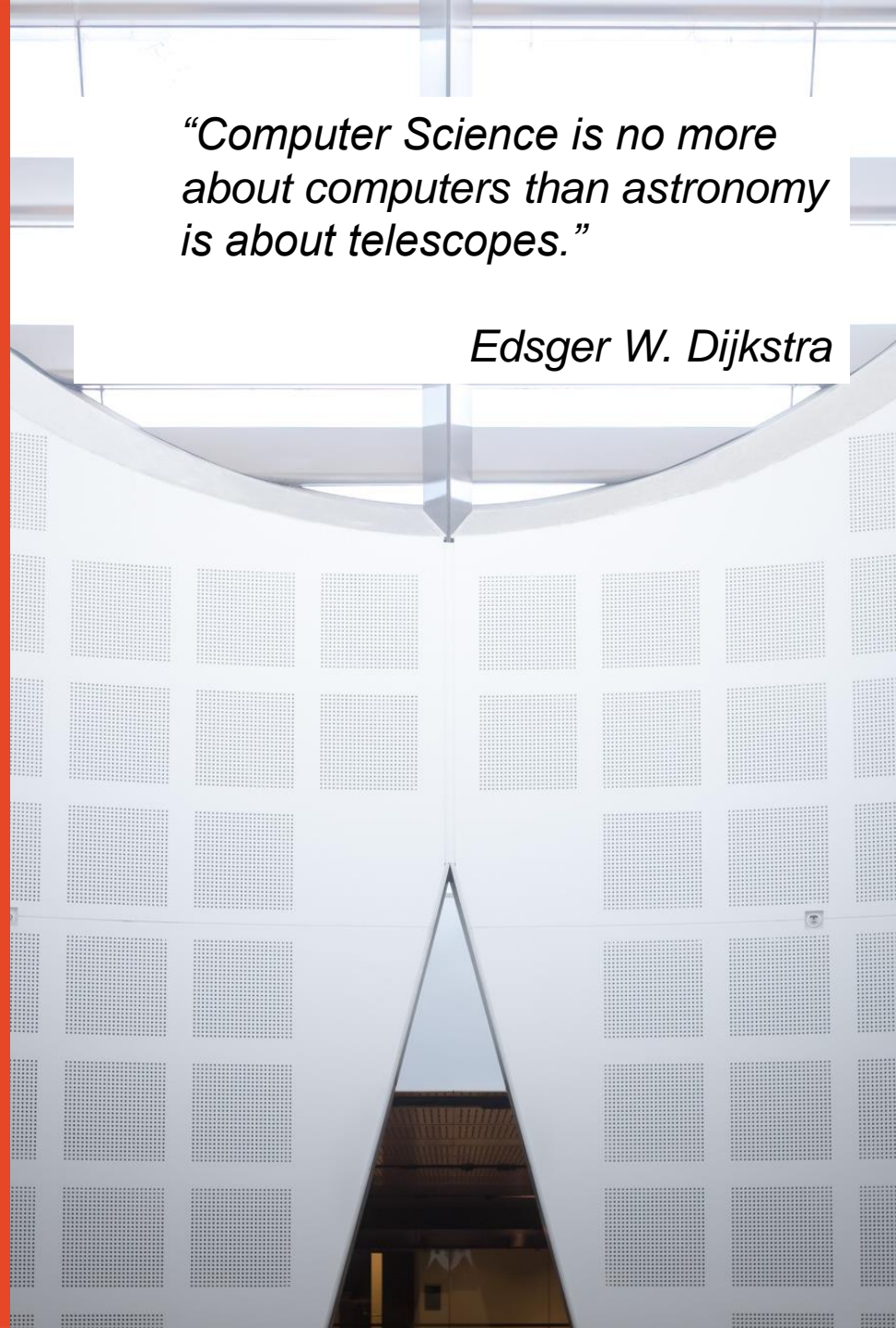
*What is hard about software?*



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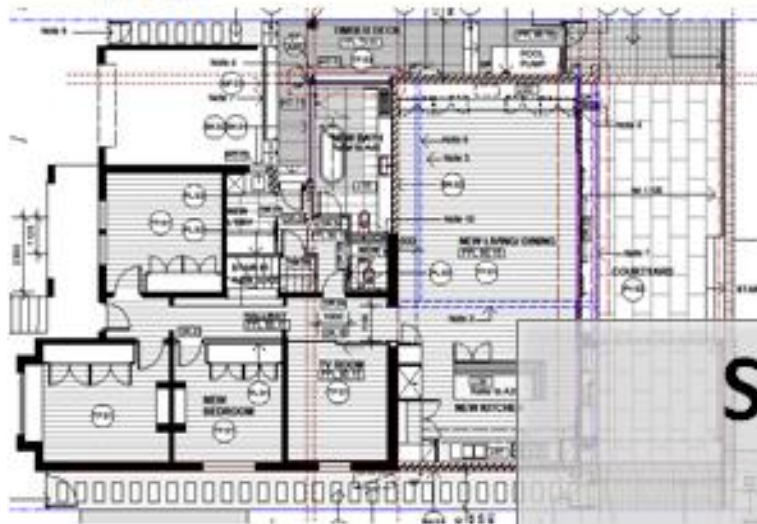
*Edsger W. Dijkstra*



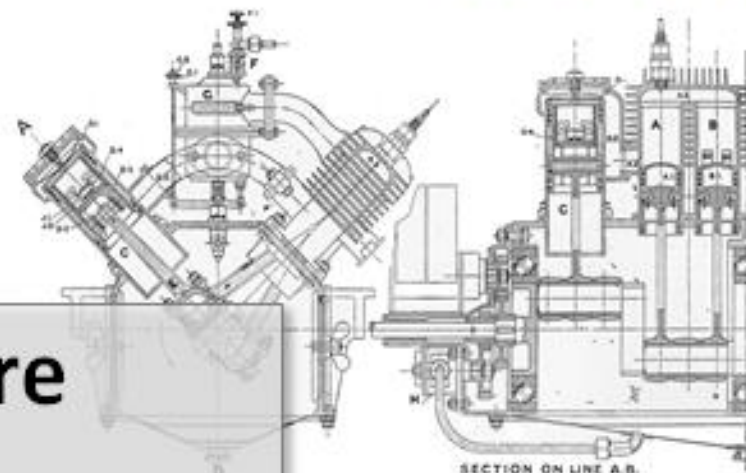
## Sidetrack.... Software projects

- Software project “failure”
  - ~30% success rate (correct, on time, on budget)
  - 50% poor outcomes (limited functionality, late, over budget)
  - 20% scrapped
- 2020 global cost of the IT failure rate
  - \$300B of projects scrapped
  - \$750B late and over budget
- Can you imagine if buildings, tunnels, vehicles, or devices had the same failure rate?
- SO what is “wrong” or “hard” about software?

# Civil



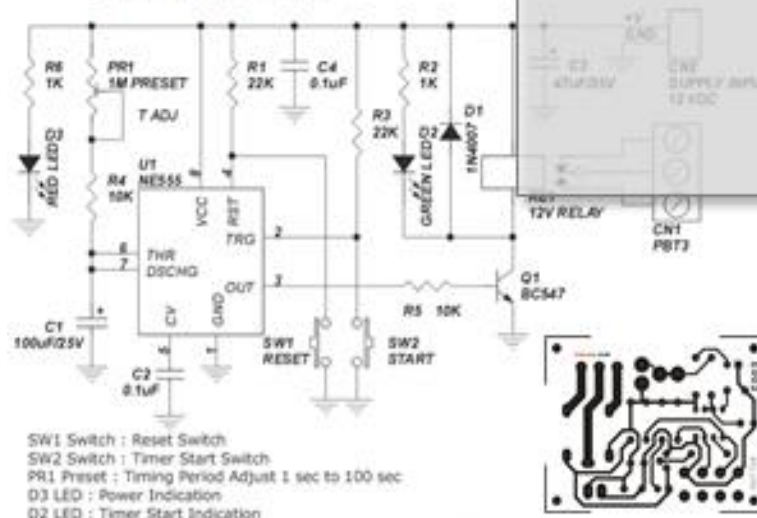
# Mechanical



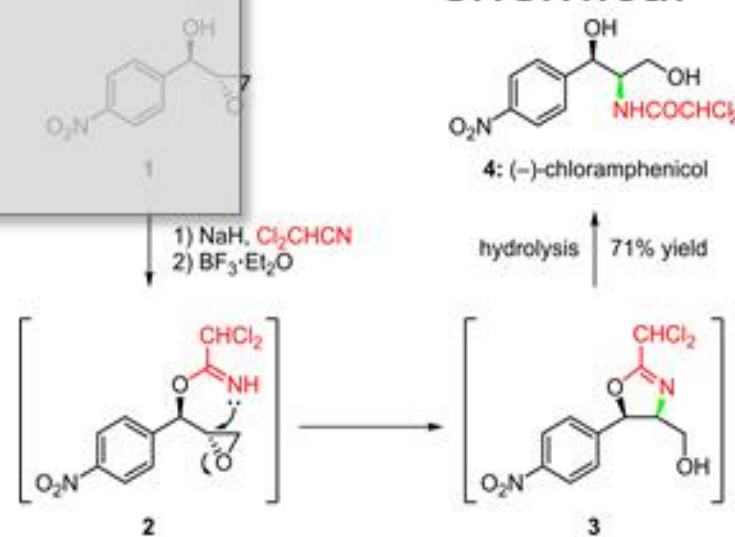
# Software



# Electrical



# Chemical





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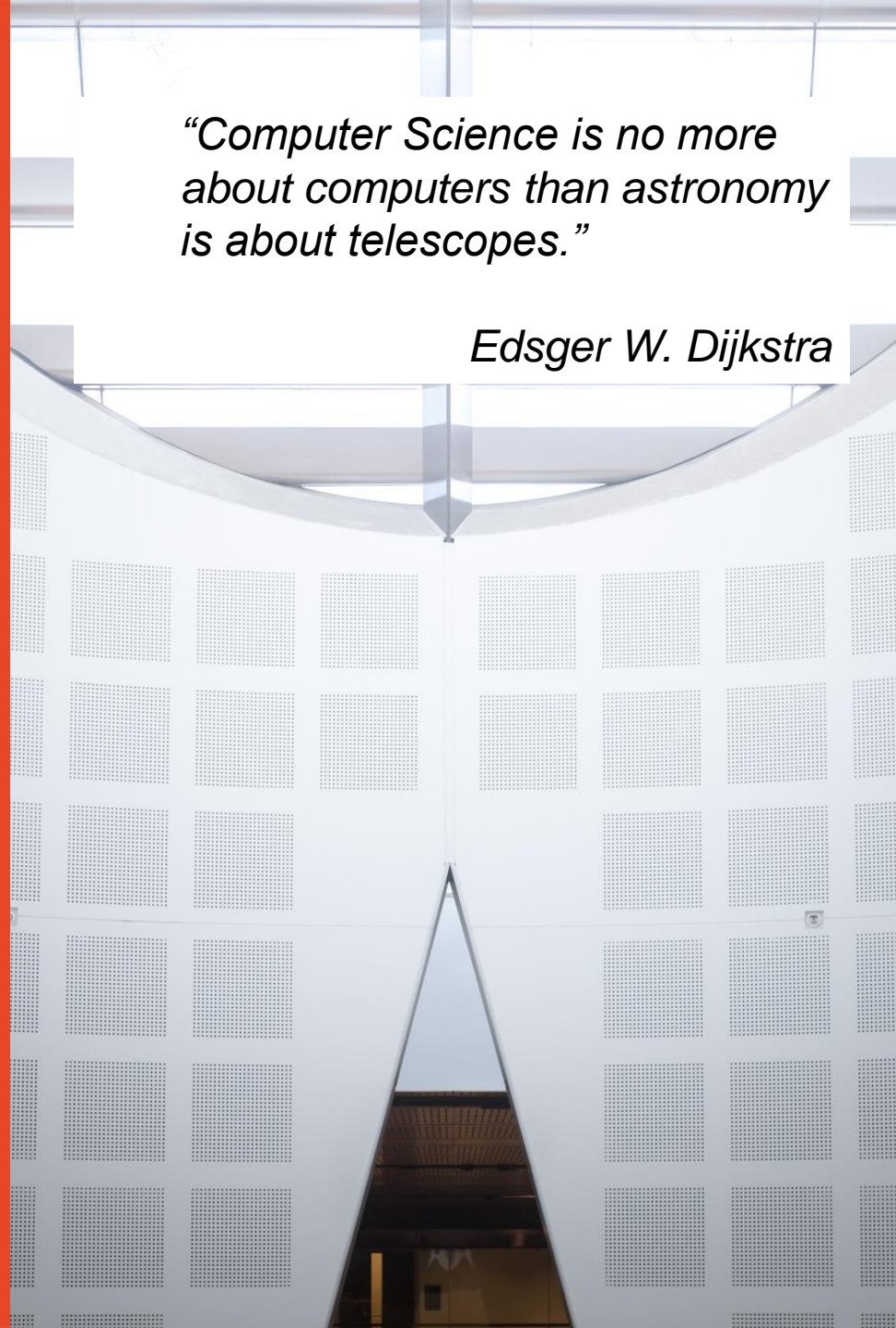
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# Team Work – Diversity

## Activity – BINGO (will follow up on Ed)

<b>Is an aunt or uncle</b>	<b>Has lived on a farm</b>	<b>Has eaten at a Thai restaurant recently</b>	<b>Is an only child</b>	<b>Is left handed</b>
<b>On a diet</b>	<b>Thinks cold pizza is great for breakfast</b>	<b>Buys most of their own clothes</b>	<b>Knows what Yom Kippur is</b>	<b>Does not have a driving license</b>
<b>Likes jazz music</b>	<b>Has three or more siblings</b>	<b>FREE</b>	<b>Has lived in more than 2 countries</b>	<b>Has had COVID</b>
<b>Member of a university club</b>	<b>Catholic</b>	<b>Speaks more than two languages</b>	<b>Born outside NSW</b>	<b>Knows sign language</b>
<b>Has worked at a place that requires uniforms</b>	<b>Is a vegetarian</b>	<b>Has all their close relatives living in Australia</b>	<b>Is married</b>	<b>Has red hair</b>

## Team Work – Diversity

- What perceptions and assumptions were made?
- How did you perceive others?
- What assumptions did you make about other people?
- How were you perceived by others?
- What assumptions were made about you?
- Which blocks were the easiest to fill?
- Were there characteristics about which you hesitated asking?  
Why?
- What other categories could have been included?

# Team Work - Diversity

- What do we mean by diversity?  
“the inclusion of different types of people ... in a group or organization”.  
<https://www.merriam-webster.com/dictionary/diversity>
- We all have bias (explicit and implicit / conscious and unconscious), assumptions, generalisations.
  - (Quick test)
- Awareness of implicit bias.
  - <https://www.youtube.com/watch?v=dVp9Z5k0dEE>
  - <https://www.projectimplicit.net/>
- All teams are diverse and diversity matters.
  - <https://twitter.com/nkeise/status/897756900753891328>

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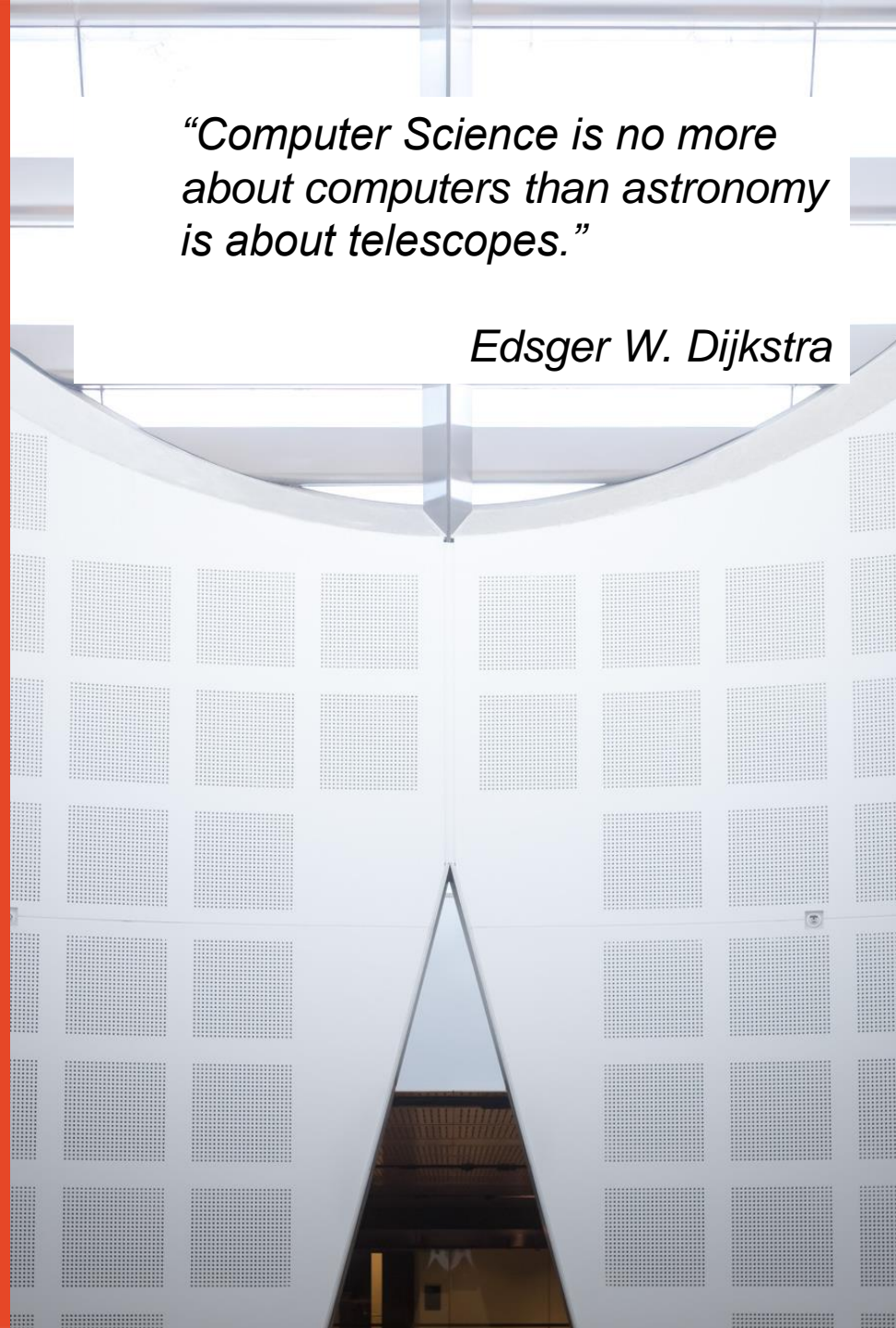
*Command line interfaces*



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# Command Line Interfaces



Hardware

# Command Line Interfaces



A diagram consisting of two stacked, rounded rectangular boxes. The top box is blue with a gradient and contains the text 'Operating System'. The bottom box is red with a gradient and contains the text 'Hardware'. The boxes are centered horizontally and have a slight shadow effect.

Operating System

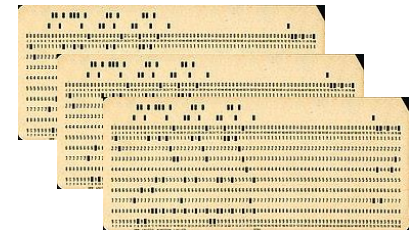
Hardware



# Command Line Interfaces

Operating System

Hardware



# Command Line Interfaces

Operating System

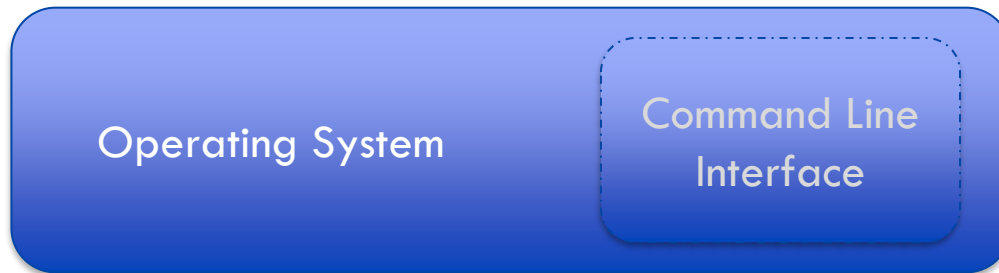
Command Line  
Interface



Hardware



# Command Line Interfaces



Hardware



# Command Line Interface

- Lots of different terminals / shells
  - powershell, bash, zsh
- Learn the commands!
  - Navigation: pwd, cd, ...
  - Directories: mkdir, rmdir
  - Files: del/rm, echo/cat
  - ...
- Scripts
  - Used to automate a sequence of commands

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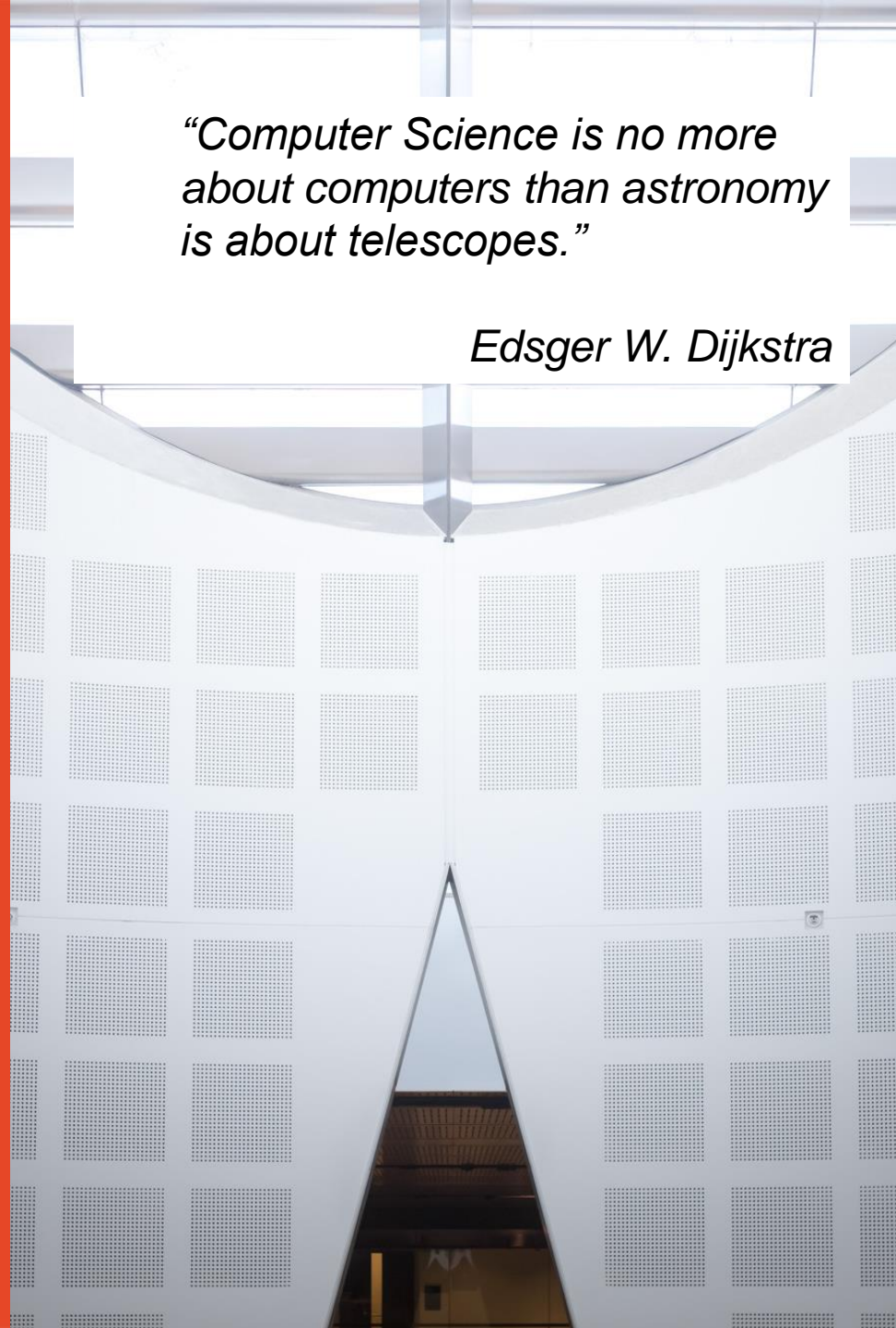
*CLI + Scripting Example*



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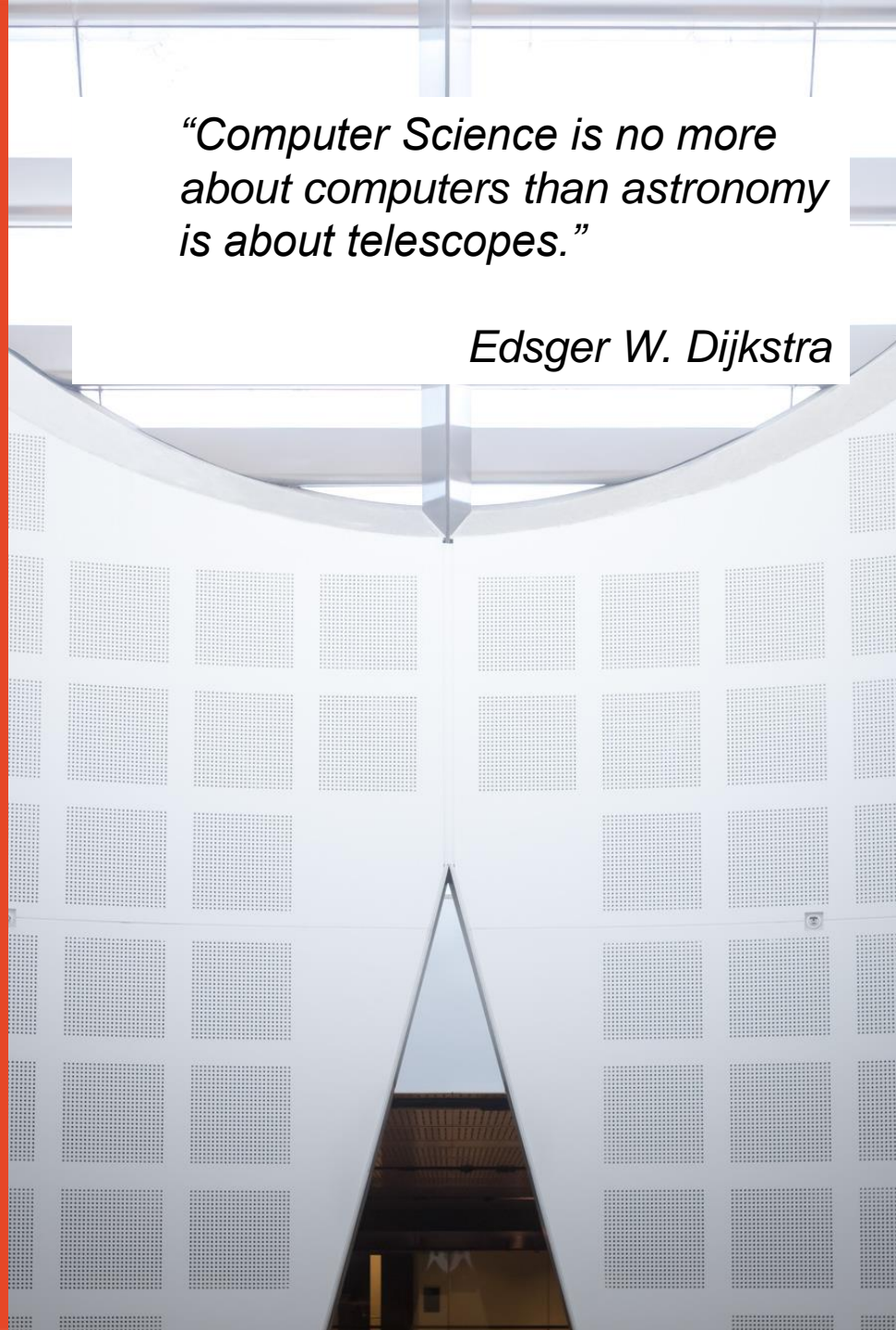
*Wrap-up*



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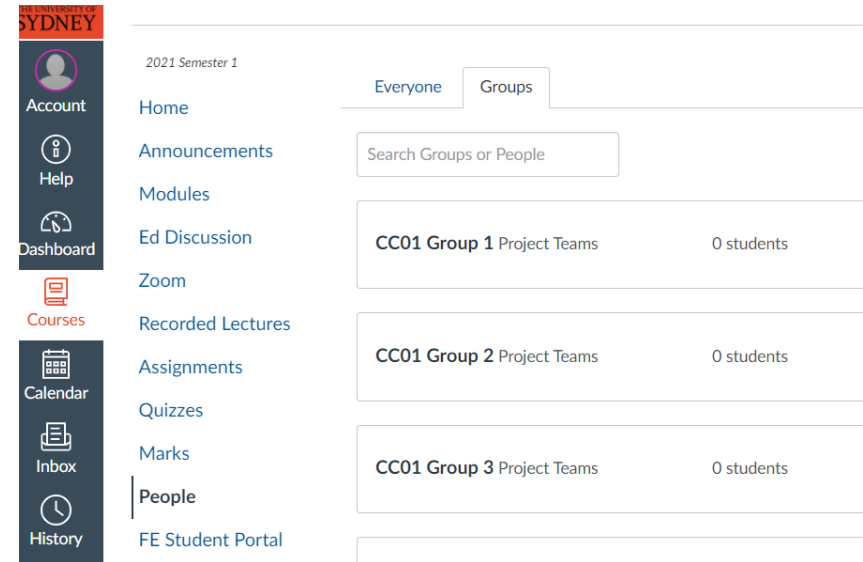
## Tutorial – Week 2

- Assignment overview
- How do teams make decisions?
- Self-learning



# Group Formation

- Project Teams
  - Groups for the project teams have been created on Canvas
  - These allow up to 4 students to join
- Each person should add themselves to a project team
  - If you know your team, then coordinate with each other to add yourselves to the same Project Team on Canvas.
  - **Be careful to only add yourself to a Project Team for your tutorial**
  - Anyone who isn't in a group can add themselves to a group that is not full
  - Ensure this is finalised by the end of week.
- Then, after the deadline...
  - We will lock down any further changes
  - Anyone who is not in a group will be added to one with space left
  - Any small groups might be merged.



## Teams of 5 ?

- *Ask you tutor, and if approved, then they can increase your Project Team on canvas to allow 5 members. BUT this will only be allowed if you agree to the following...*
- *If you do have a team of 5 and there is a small team left in your tutorial then you may be required to identify a member to move to the small team.*