INFO1111: Computing 1A Professionalism

Week 3: Communication / LaTeX

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School of Computer Science

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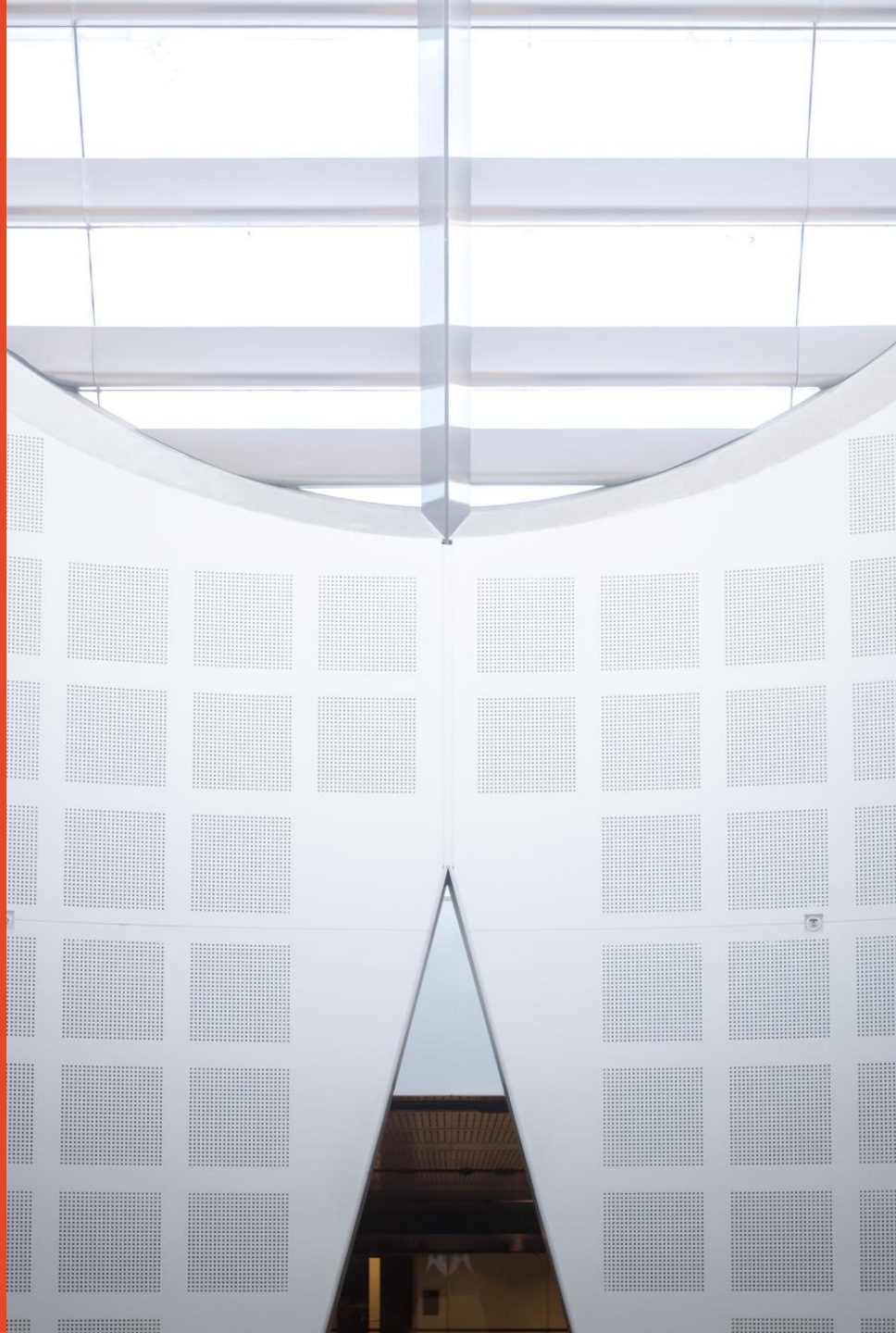

Week 2 Recap

- Professionalism
  - And the analogy with running a restaurant.
    - Do you aspire to be a kitchen helper?
    - A chef?
    - Wait staff?
    - The restaurant owner?
  - Teamwork?
    - How did your team make a decision about who should get the transplant?
    - And did you agree with the decision?

- Command-Line Interfaces
  - Do you know what the following would do?

```
cat names.txt | grep "David" | head -4 | sort
```

Admin

- Skills project
  - Everyone should now be in a team!

- Self-Learning
  - Have you identified a Topic?

Week 2 self-learning exercise…

- Week 2 Concept: Big O Notation
  - Consider an algorithm to find the average of N numbers…
    - Add up the numbers to find a sum (and count them as you go along)
    - Average = sum/count
  - If finding the average of 100 numbers took n operations, then:
    - How many operations will it take for 200 numbers? 1,000? 1,000,000?
  - It goes up linearly. O(n)

  - How about an algorithm to check if an item is in a sorted list, using a binary search
  - If checking for a list of 100 items takes n operations, then:
    - How many operations will it take to check if there are 200 items? 800?, 1,000,000?
  - It goes up logarithmically:
    - O(log n)

  - Important in terms of understanding computational efficiency
    - $O(n^2)$ vs O(n) vs O(log n) vs O(1)

  - Read
    - https://developerinsider.co/big-o-notation-explained-with-examples/

Week 3 self-learning exercise…

- Week 3 concept: *Regular Expressions ("RegExp")*
  - Test yourself:
    - "sed" is a useful command line tool that does various text manipulation, including simple search and replace
    - For example:

      sed "s|aaaa|bbbb|g" file1 > file2

    - Searches file 1 for every occurrence of aaaa and replaces it by bbbb, and then writes the result into file 2.
    - Can you work out what this does?

      sed "s|\(^T[io]m\)\W|\1my |g" names.txt > newnames.txt

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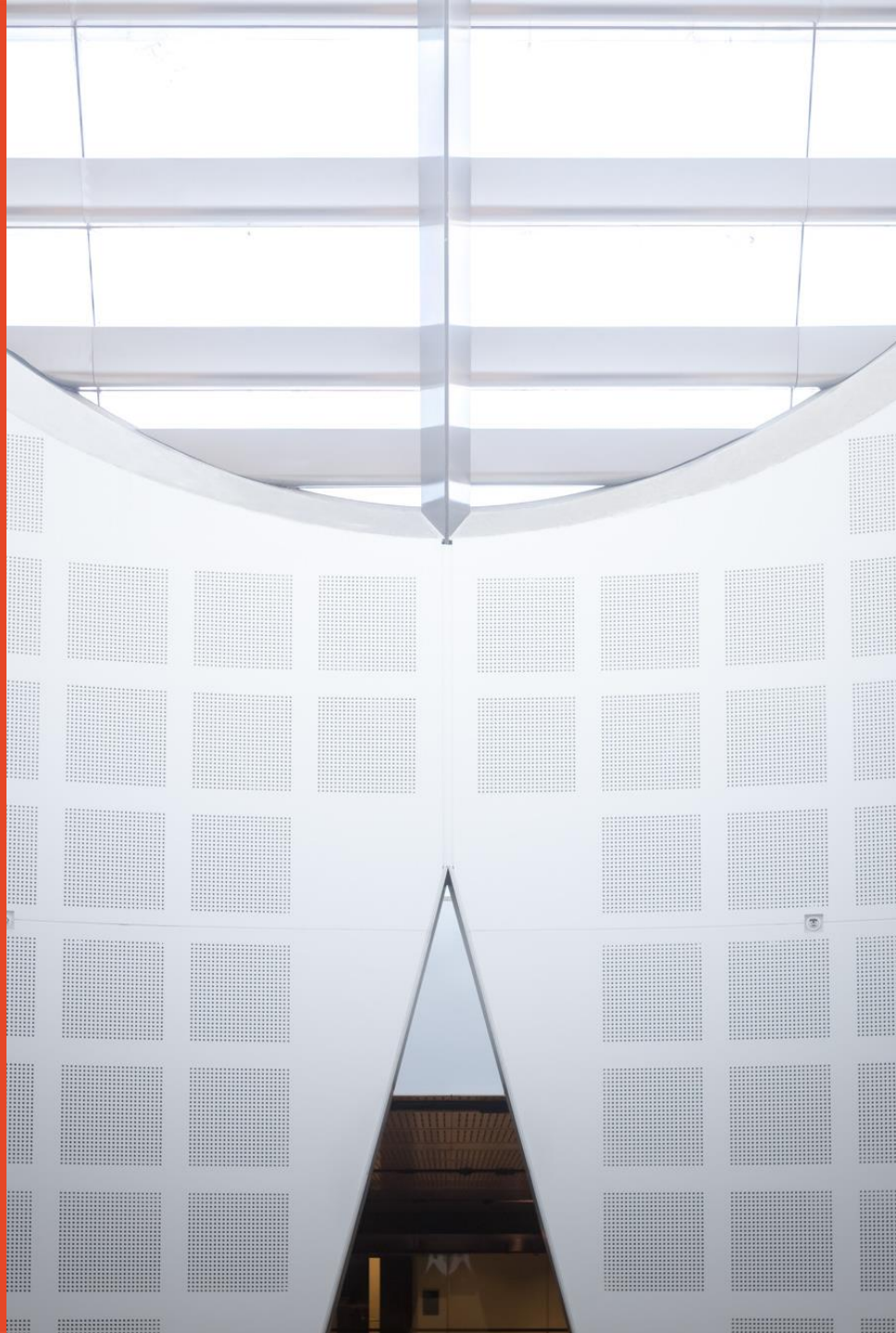
Communication – Part 1



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Which of these is most appropriate? Why?

Hiya,
I wanna get help bc my team wont work
IDK. ¯_(ツ)_/¯"
thx bigD

Hi David,
I'm having problems with my group members who just aren't responding to any emails over the last few days. Can you suggest how I should handle this?
Thanks, Dan

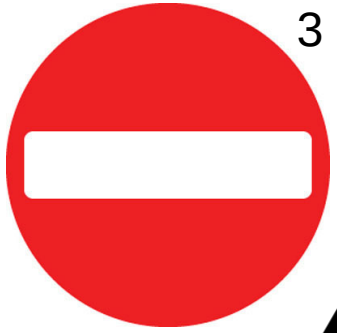
Dear Professor Lowe,
Over the last week I have sent emails to my INFO1111 CC34-2 group members about the assignment on Fri, Sat twice, and then this Sunday morning. I haven't had a single response. This is very unfair to me. Would you please email them and bcc me, indicating that this is unacceptable?
Kind regards, Daniel Smith (SID: 123456789)

What do these "signs" communicate

- And how do you know?


1


2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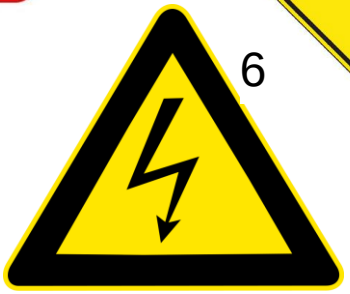
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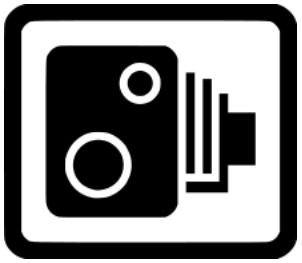
9


10


11


12


13

Skills - Communication

- Communication is "*a process by which information is exchanged between individuals through a common system of symbols, signs, or behavior*"

  [from Merriam-Webster dictionary https://www.merriam-webster.com/dictionary/communication]

  - … *information is exchanged* …
  - … *common set of symbols, signs or behavior* …
  - *(have a read about "semiotics")*

- Is that all that is needed for *effective* communication?
  - Take a look at https://youtu.be/swxUzmMBQ38

- Post a message on Ed if you can work out what this means
  - Dpohsbuvmujpot. Bsf zpv uif gjstu up xpsl ju pvu?

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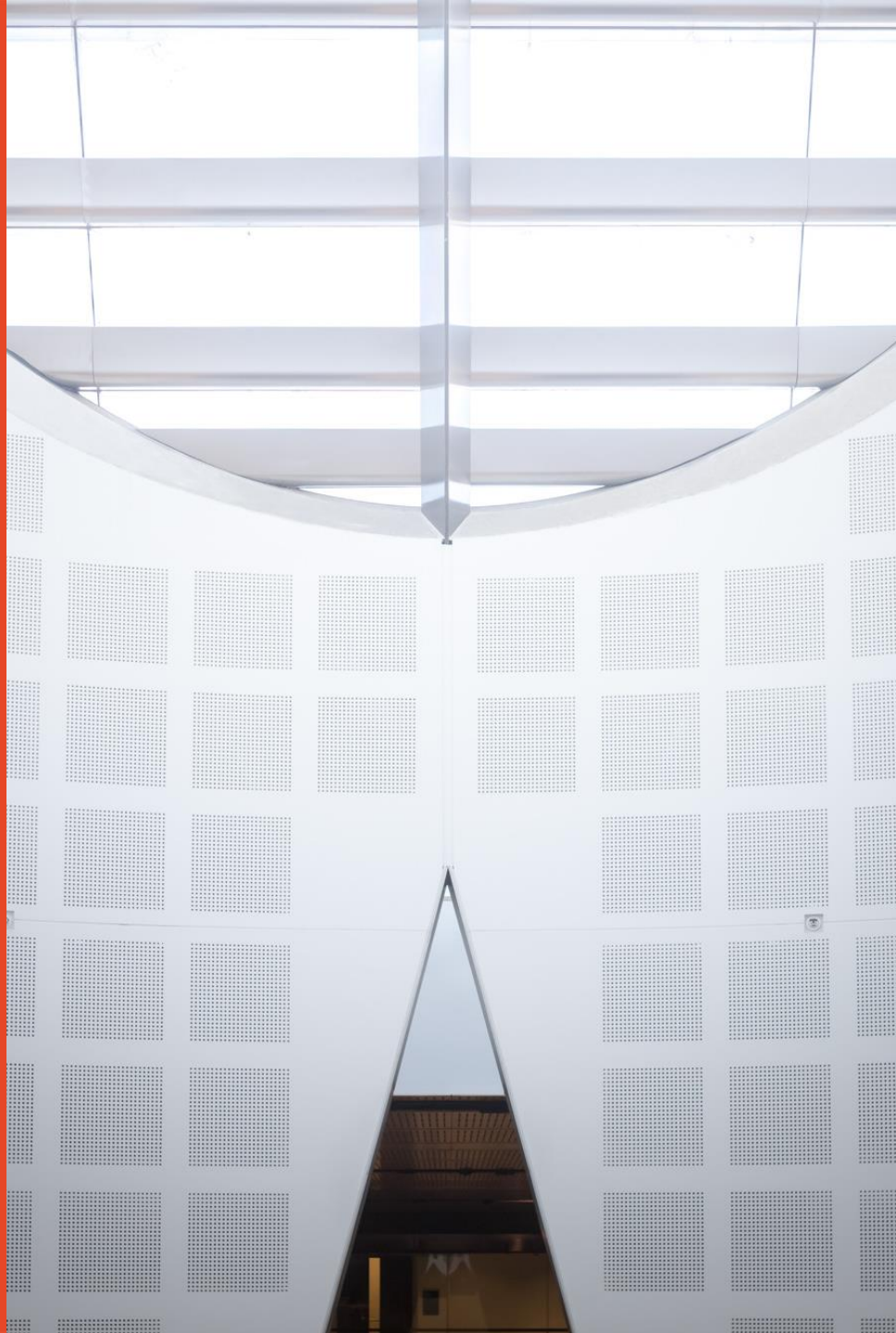
Communication – Part 2



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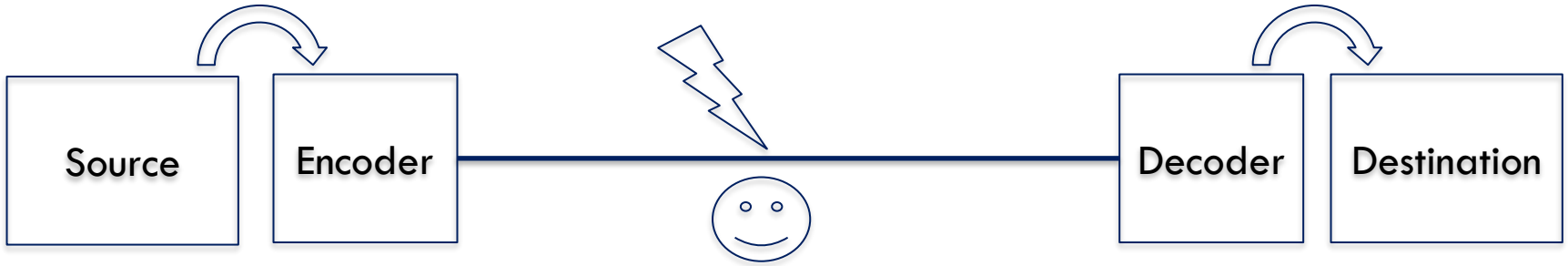
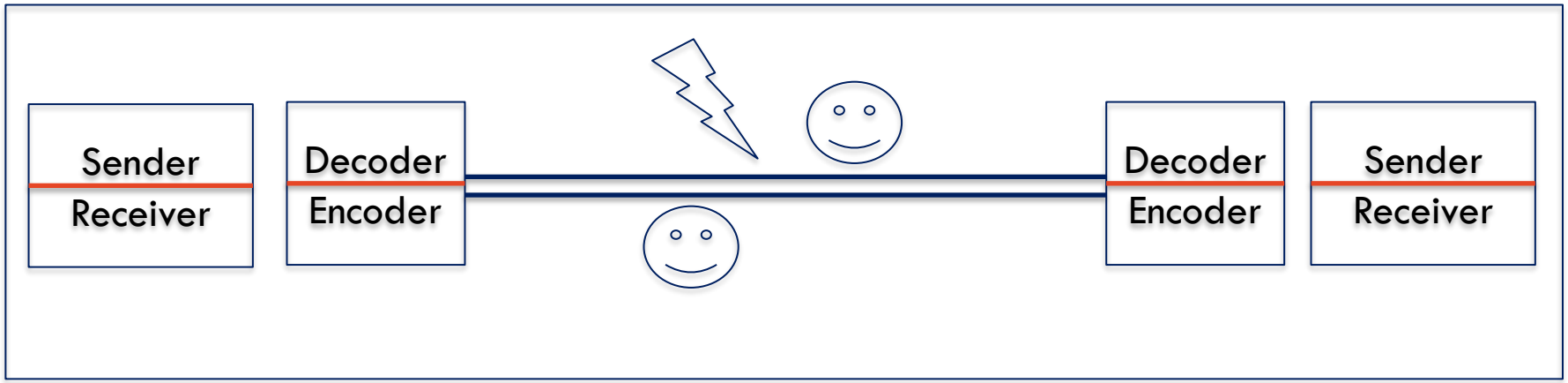
Communication

- Transmission Models
  - Claude Shannon
  - *Can you think of an example of this?*



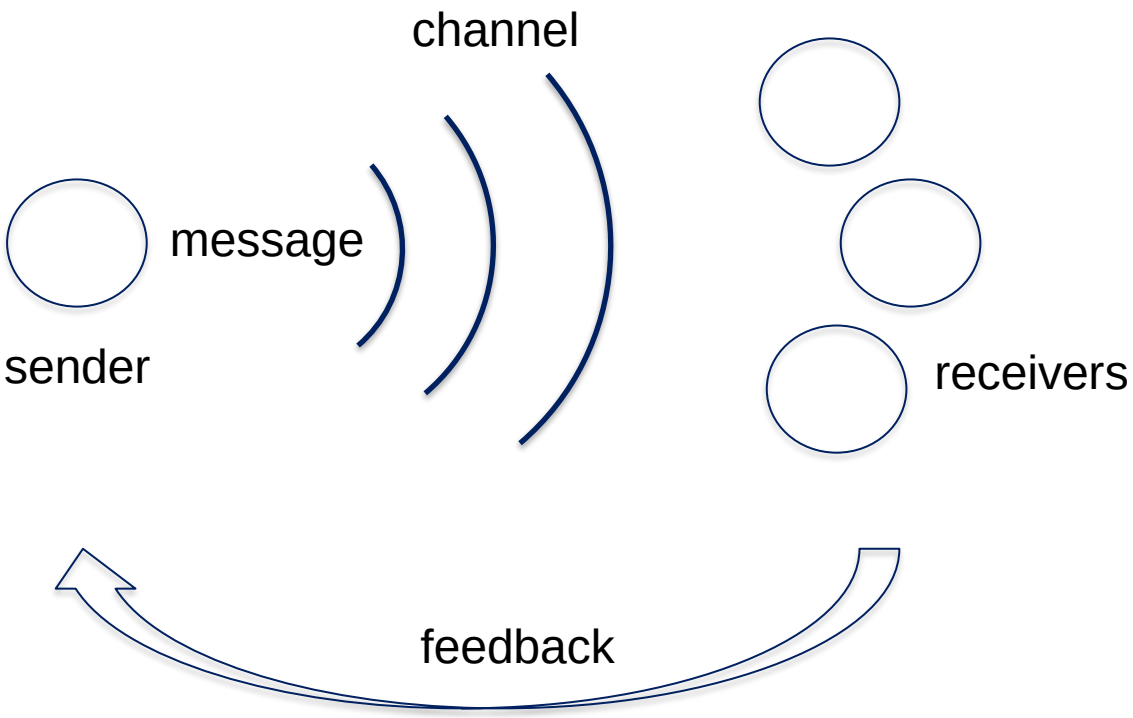
Communication

- Interaction Model
  - *And what about an example of this?*



Communication

- Transaction Model



Communication

- Effective communication – has the information been received as intended?

- Is the sender or the receiver of the information responsible for effective communication?

Communication – Forms

- Is it easier to tell using this?

1. *Start at the New Law Building*
2. *Walk west towards Eastern Ave for 61 m*
3. *Turn left onto Eastern Ave and walk for 120 m*
4. *Continue straight to stay on Eastern Ave for a further 22 m*
5. *Turn right to stay on Eastern Ave. Walk 100 m*
6. *Turn right onto City Rd and walk 16 m*
7. *Turn left onto Butlin Ave. Walk 190 m*
8. *Turn left onto Maze Crescent S and the destination is 94 m ahead on your right.*

Communication – Forms

- Or this?

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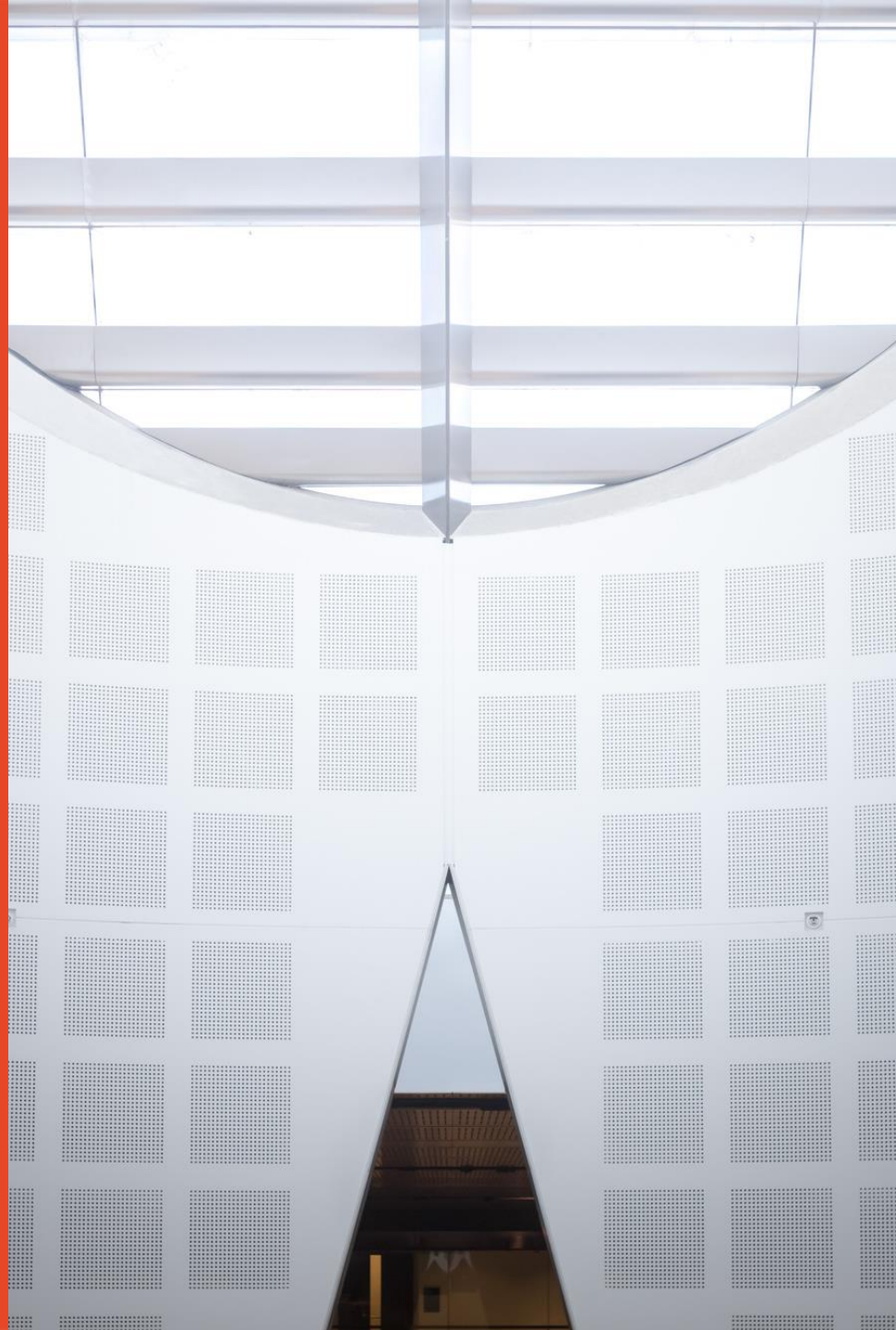
Communication – Part 3



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Communication Examples

- Can you think of some examples of communication which IT professionals have to do?
  - Designer specifies the inputs and outputs for a new code module
  - Consultant produces report for senior managers on the impact of a new technology
  - Team leader presents plan for the work to client representatives
  - Developer requests funds for purchase of a tool and training in that tool, from their manager
  - Senior architect documents the overall system design, for current and future team leaders
  - Local expert teaches proper use of a tool to other developers

Communication – Forms

- What differentiates various forms of communication?
  - Different media (written, oral & slides, talking while looking at code in IDE, etc)
  - Different scales (1 page summary, 50 page report, 10 minutes talk, 3 hour conversation)
  - Different type of target (boss, subordinate, colleague, client, partner)
  - Different number of targets (one-to-one, broadcast to many)
  - Different patterns of interaction (frequent alteration of direction, always one-way, mostly one-way with questions)
  - Different purpose (convey facts, guide action, adjust attitudes)

Communication - Your goal

- Know what you want to achieve!
- After the communication, what change do you want in your targets (audience, readers, maybe even indirect influence)?
  - they know something
    - e.g. they know what some tool can do
    - e.g. they know *how to* use some feature
  - they will do something
    - e.g. they will hire you
    - e.g. they will approve a decision
    - e.g. they follow a particular style when they write tests
    - e.g. they will give you some information you need
  - they will have certain feelings/beliefs (affect)
    - e.g. they will respect you

Communication - Context

- Know where your targets start from
  - What do they know?
  - What they expect?
  - What they value?
- To produce a desired outcome, your actions will be different depending on the starting point!
- Explain things they don't know in relationship to what they do know
- Don't use unexplained terms they don't recognize
- Follow the style they expect (tone of language, dress, layout, etc.) unless you deliberately want them to notice the difference
  - e.g. to get attention to some point

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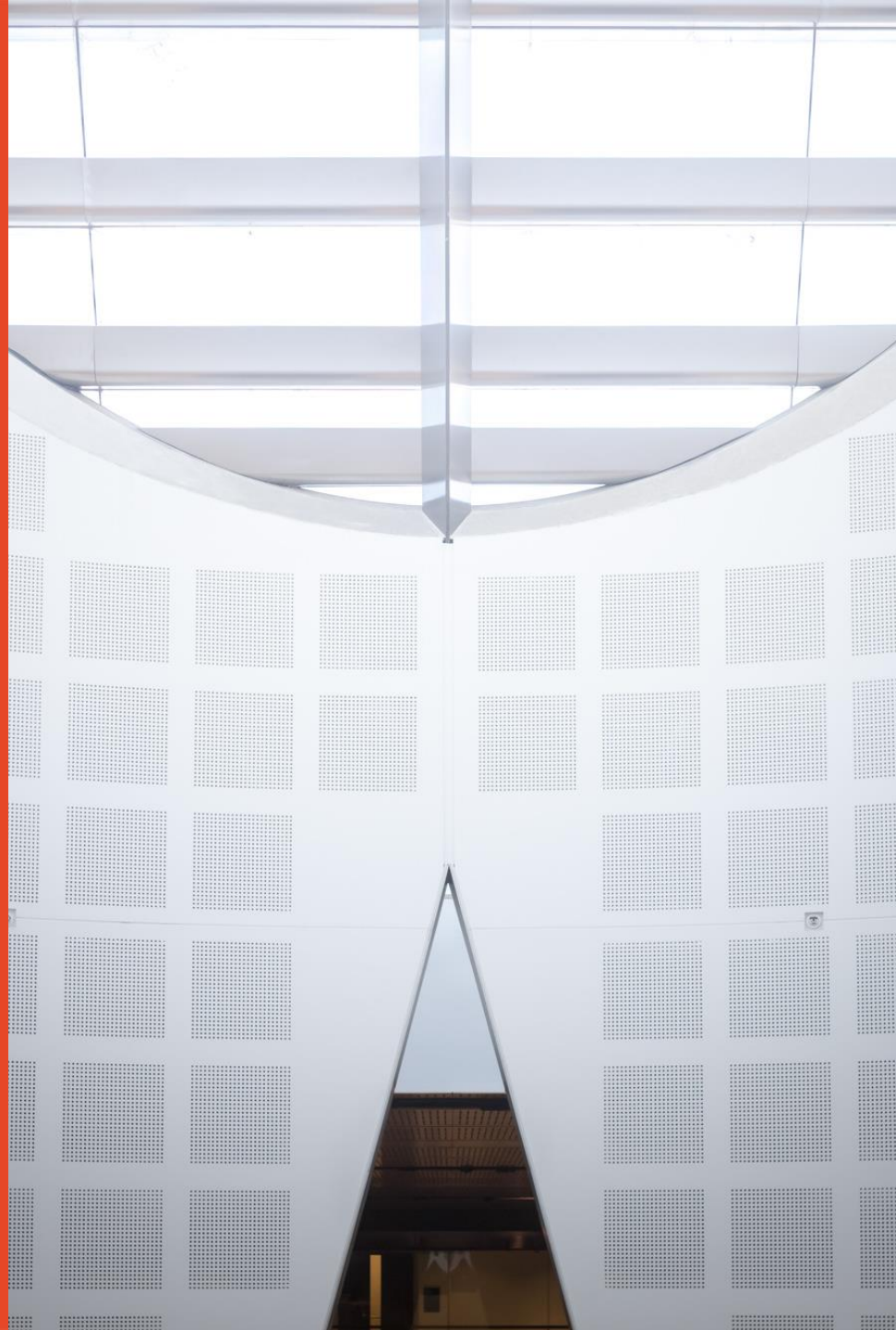
LaTeX - Introduction



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Written Communication Tools - Latex

- What is LaTeX (or TeX)?
  - TeX – Typesetting program; LaTeX – formatting and "higher level" macros based on TeX
  - Uses "plain" text rather than formatted text
  - "Markup" tags are used to apply structure, style and formatting
  - Compiled to produce an output file

- Why?
  - Donald Knuth wrote the TeX language
  - "to allow anybody to produce high-quality books using minimal effort, and to provide a system that would give exactly the same results on all computers, at any point in time"
  - Case study of software development including:
    - Well documented changes
    - Version control
    - Collaboration - Rewards for finding bugs (starting at a hexadecimal dollar, US$2.56)

```
\frac{n!}{k!(n-k)!} = \binom{n}{k}
```

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

(https://en.wikibooks.org/wiki/LaTeX/Mathematics)

Why are we using it in INFO1111

- Used extensively in Academic writing, but not much in industry.

- However…
  - Focuses writer on content + structure, and not presentation
  - Better at equations, layout, bibliographies, …
  - Encapsulates a number of key computing concepts
    - Compilation
    - Separation of concerns

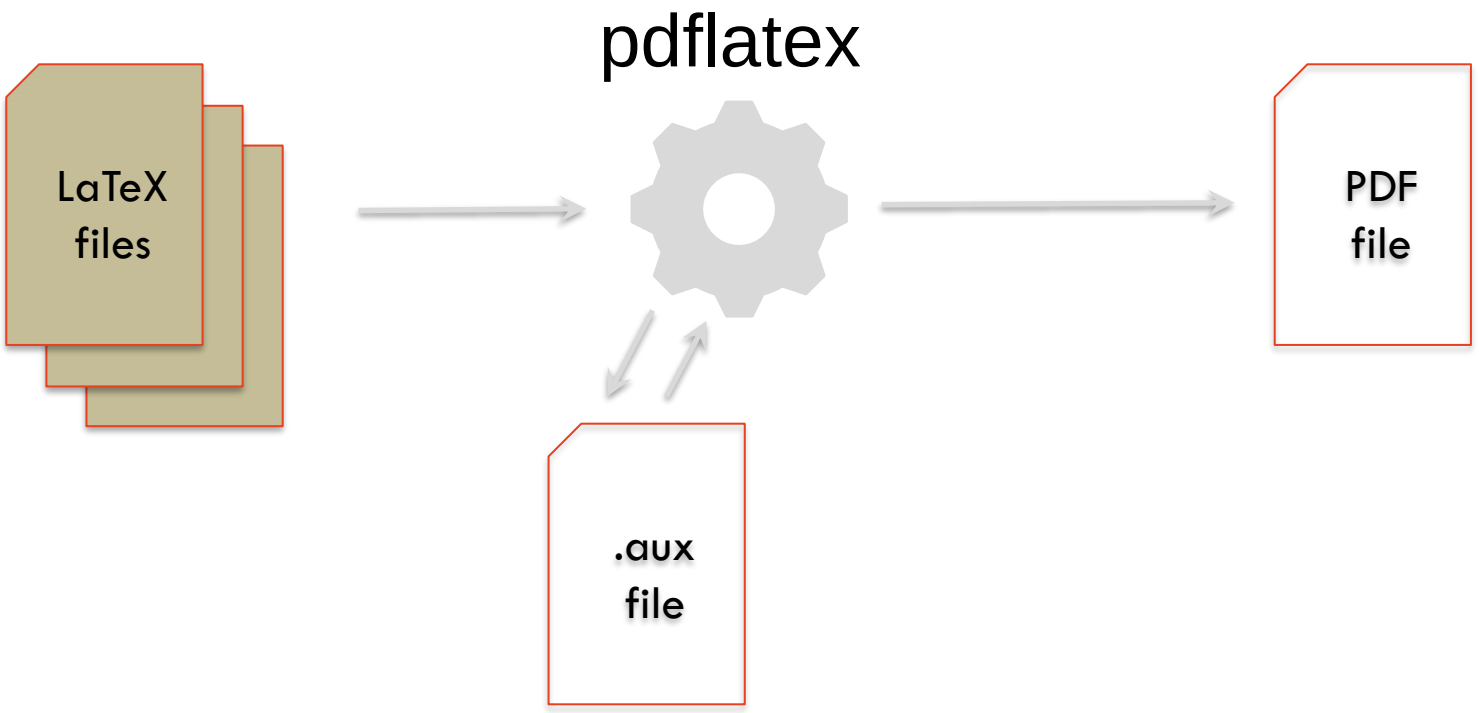
  - It is free
  - We can use it to demonstrate tool use

- See
  - https://towardsdatascience.com/why-should-you-learn-latex-or-at-least-give-it-a-try-8d0f3218b8e

Example

```
\documentclass[12pt]{article}
\usepackage{amsmath}

% preamble
\title{First example}
\author{David}
\date{\today}

% main document
\begin{document}
   \maketitle    % creates title using info in preamble

   \section{First section}
   This is the \textbf{first section} in my \LaTeX document.

   I can include some maths directly in the text like $a^2+b^2=c^2$. Or I
   can create it separately (see equation~\ref{aaa}).
   \begin{equation}
      \label{aaa}
      \gamma^2+\theta^2=\omega^2
   \end{equation}
   That was so easy.
\end{document}
```

Process



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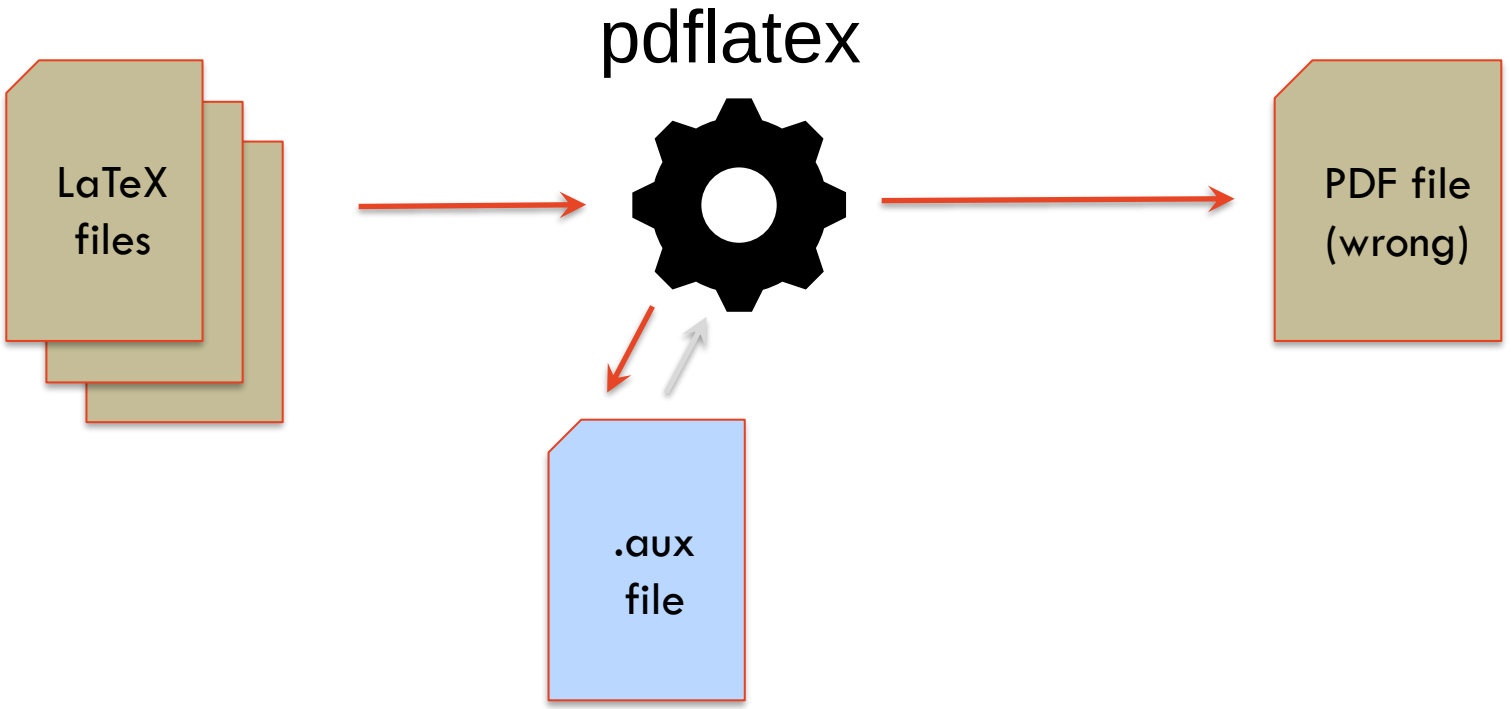

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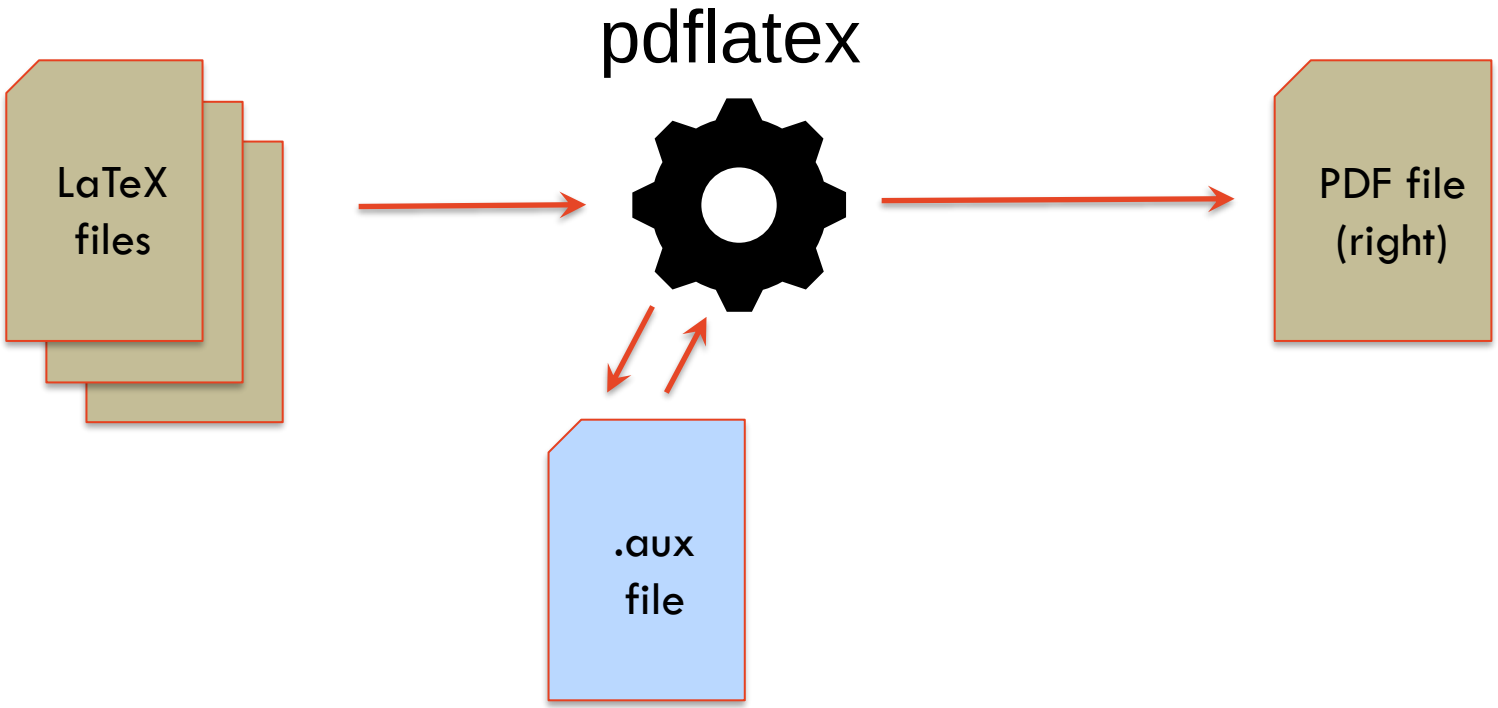

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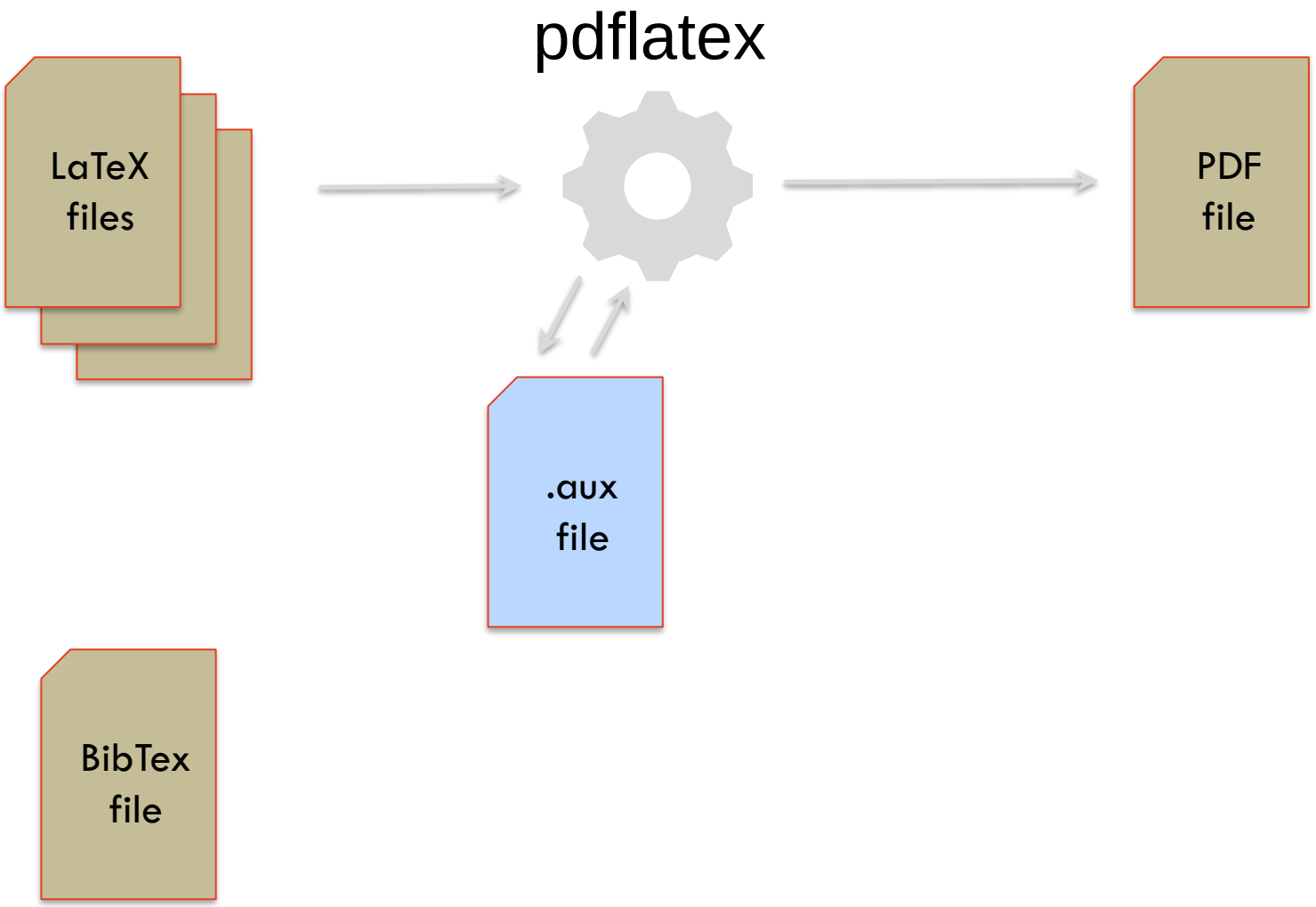
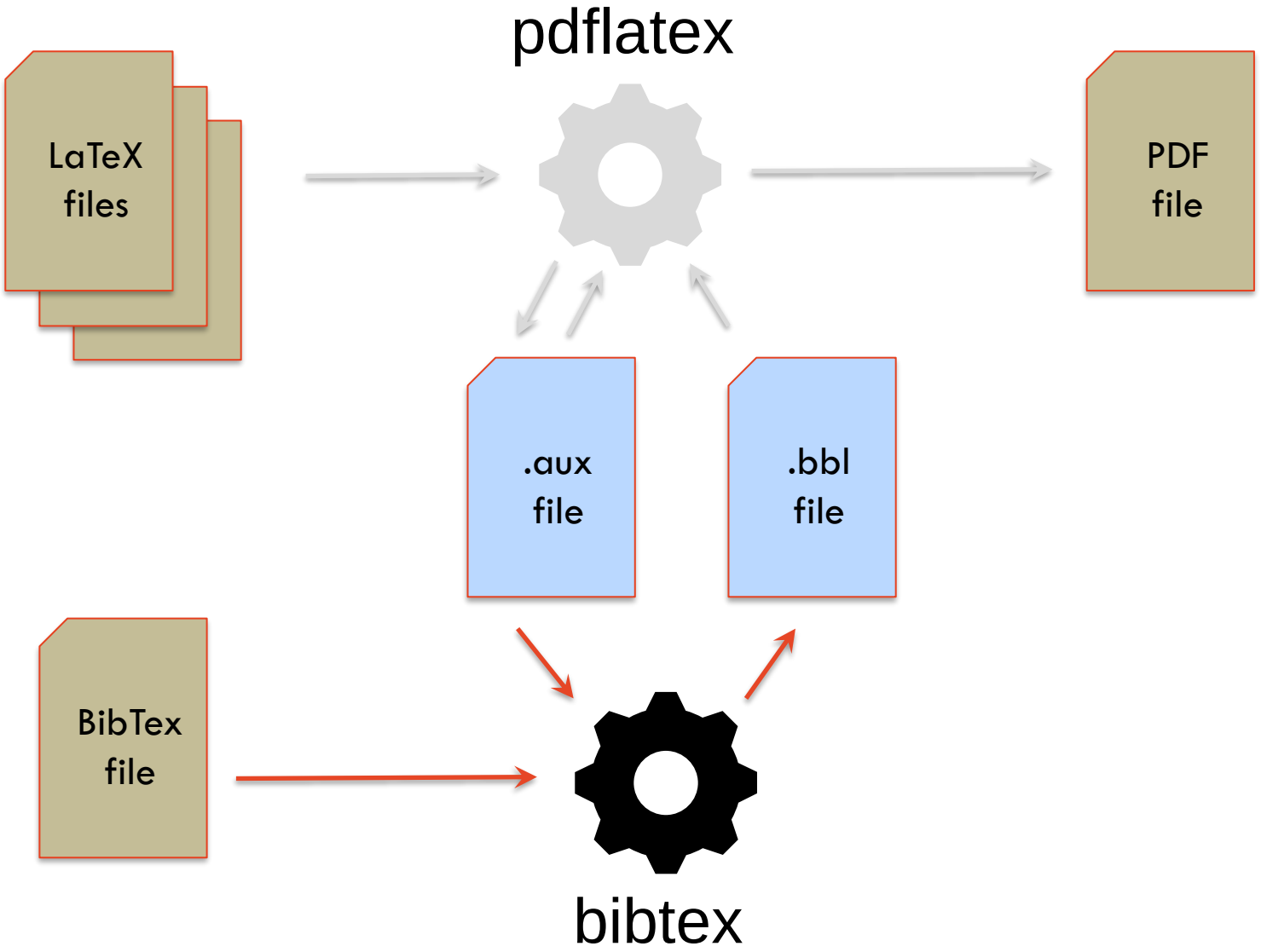
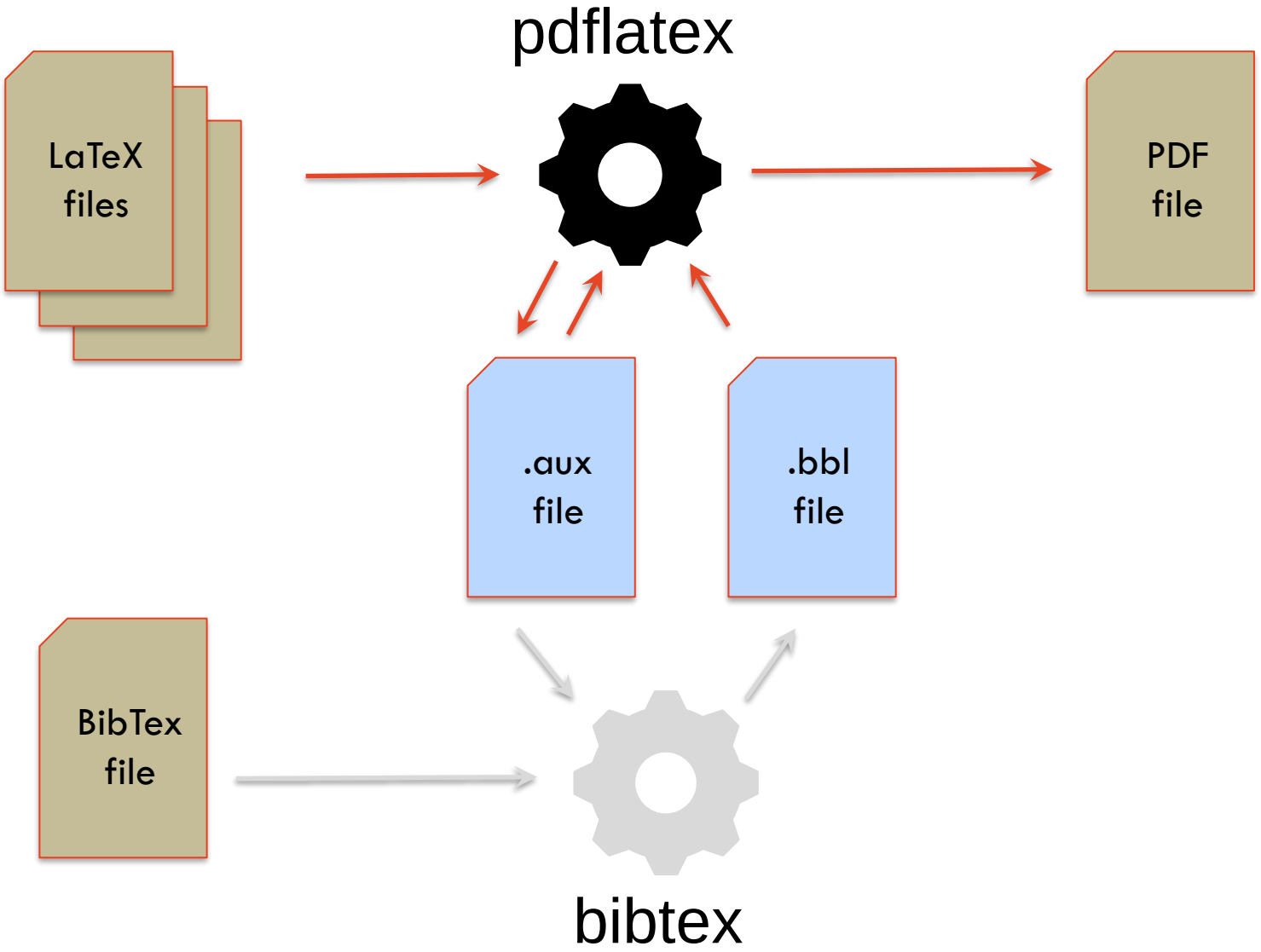


Process


pdflatex
LaTeX files
PDF file
.aux file
.bbl file
BibTex file
bibtex

Process


pdflatex
LaTeX files
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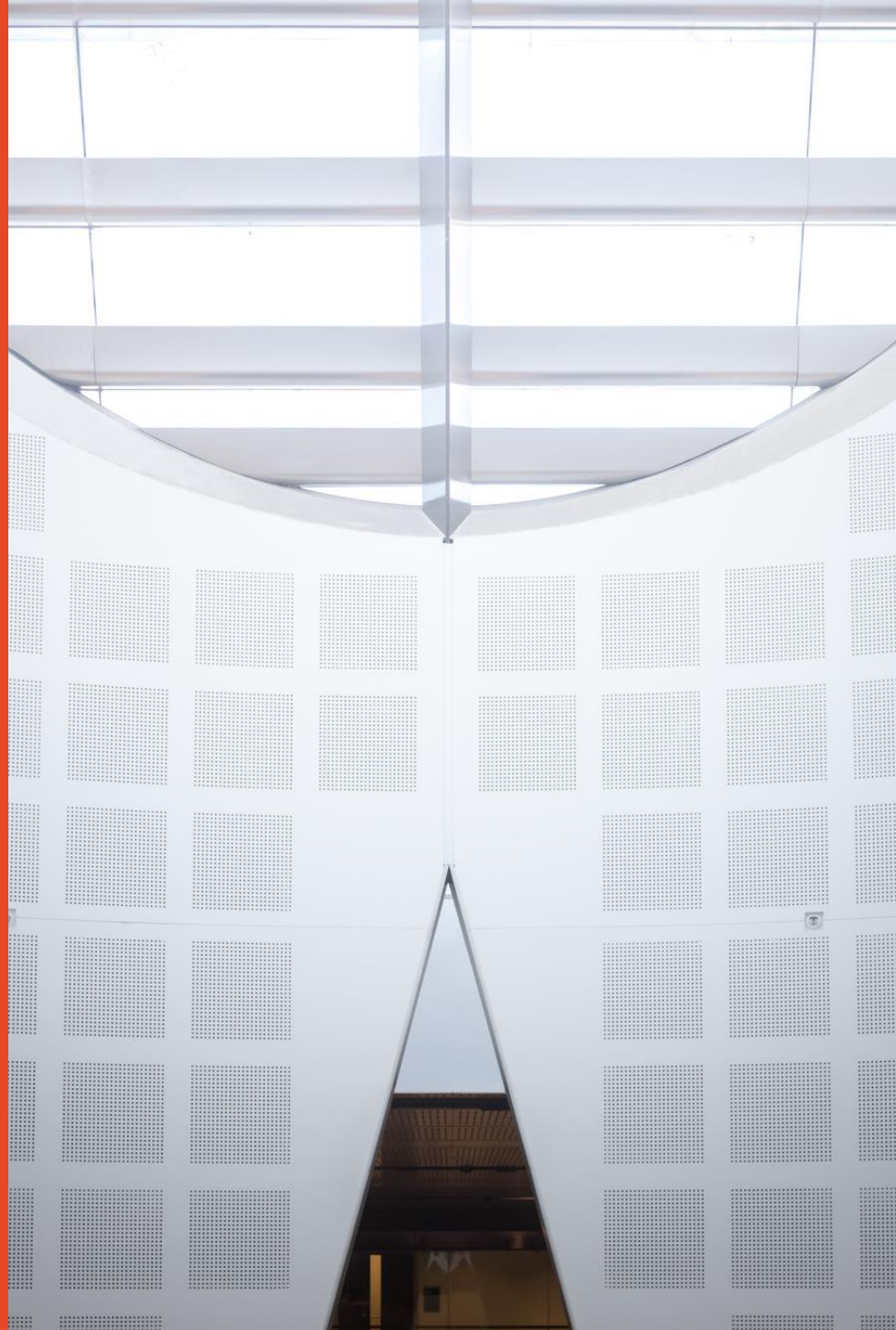
LaTeX - Demonstration



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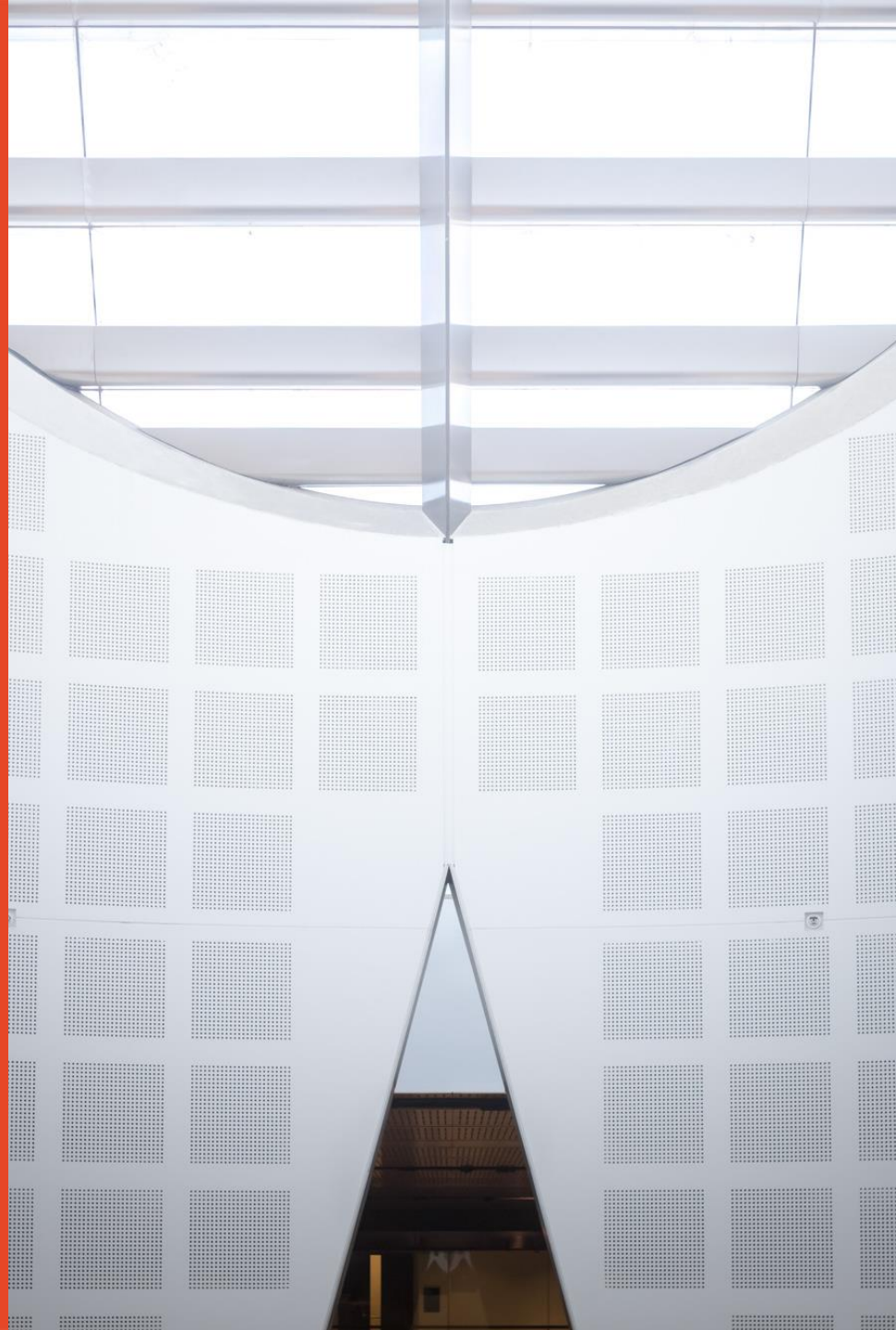
Wrap-up



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Conclusions

- LaTeX allows:
  - Focusing on content rather than presentation
  - Usage of pre-supplied style sheets
  - Effective indexing and cross-referencing

Wrap-up

- Tutorial – Week 3
  - Communication
  - LaTeX

- Self-learning
  - Topics should all be approved soon (though there is nothing stopping you from already starting)
  - Submission 1 is due in 3½ weeks (Week 6)

- Practice
  - Teams have all now been confirmed
  - Submission 1 is due in 3½ weeks (Week 6)