

INFO1111: Computing 1A Professionalism

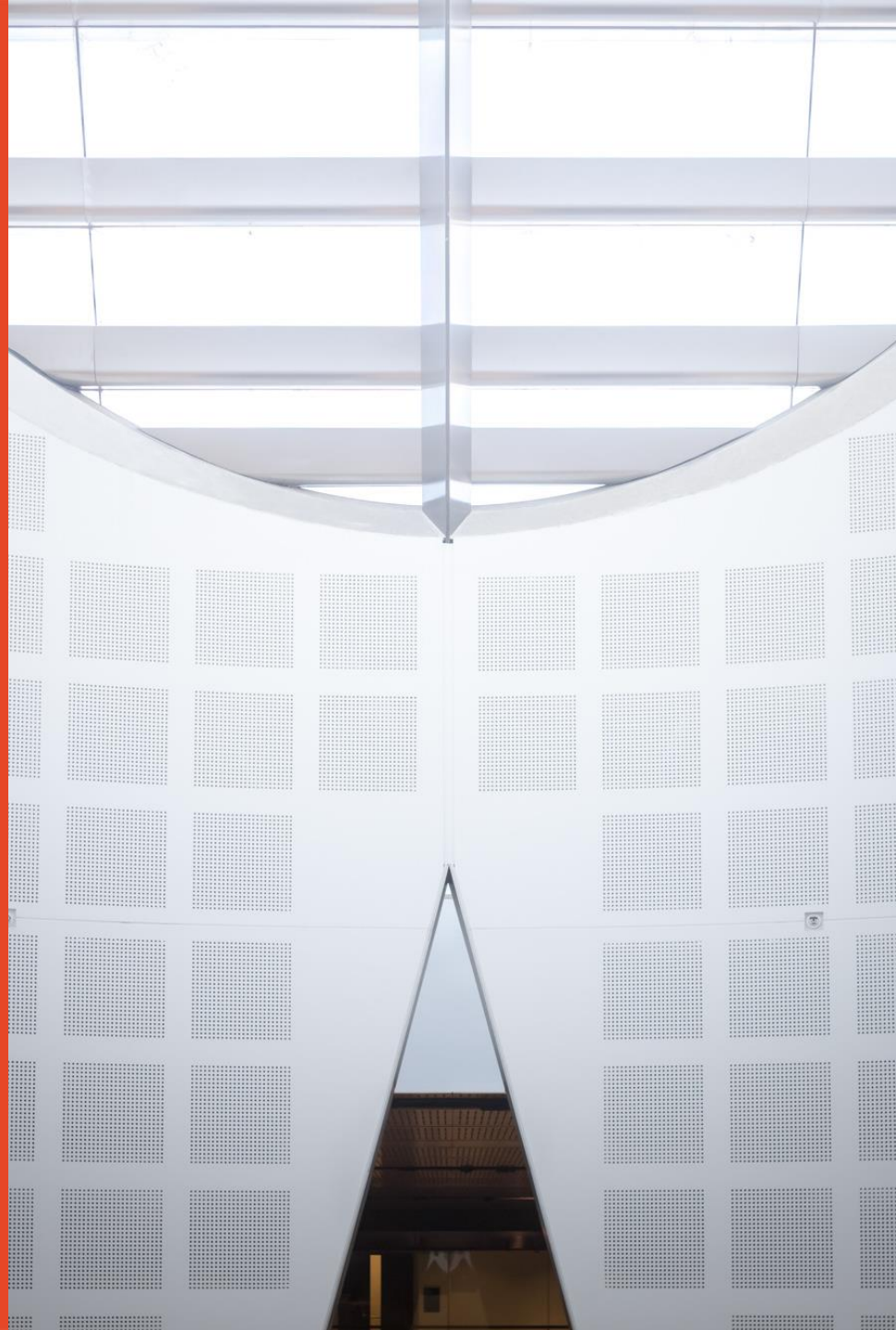
Week 4:
Tech Stacks / Make files

Week 3 recap

Week 4 overview



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Week 3 Recap

- Communication
 - The importance of thinking about how the “receiver” will interpret the message (and hence what is their context!)
- LaTeX
 - Have you been able to edit a .tex file and then compile it (from the command line)?

Week 3 self-learning exercise...

- Week 3 Concept: Regular Expressions (RegExp)

- Most people are familiar with using “wildcards”

```
$ ls -al my*  
-rw-r--r-- 1 david 197609    616 Mar 16  2021 my-bib.bib  
-rw-r--r-- 1 david 197609    523 Mar  8  20:18 my-paper.aux  
-rw-r--r-- 1 david 197609   1377 Mar  8  20:17 my-paper.bbl  
-rw-r--r-- 1 david 197609   1567 Mar  8  20:17 my-paper.bla
```

- Regular expressions is a text pattern matching language...
 - Like wildcards, but much more powerful...

- Can you work out what this does?

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

- Read

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

Week 4 self-learning exercise...

- Week 4 concept: *Greedy algorithms*
 - What are they?
 - Can you find an example where a greedy algorithm is sub-optimal?

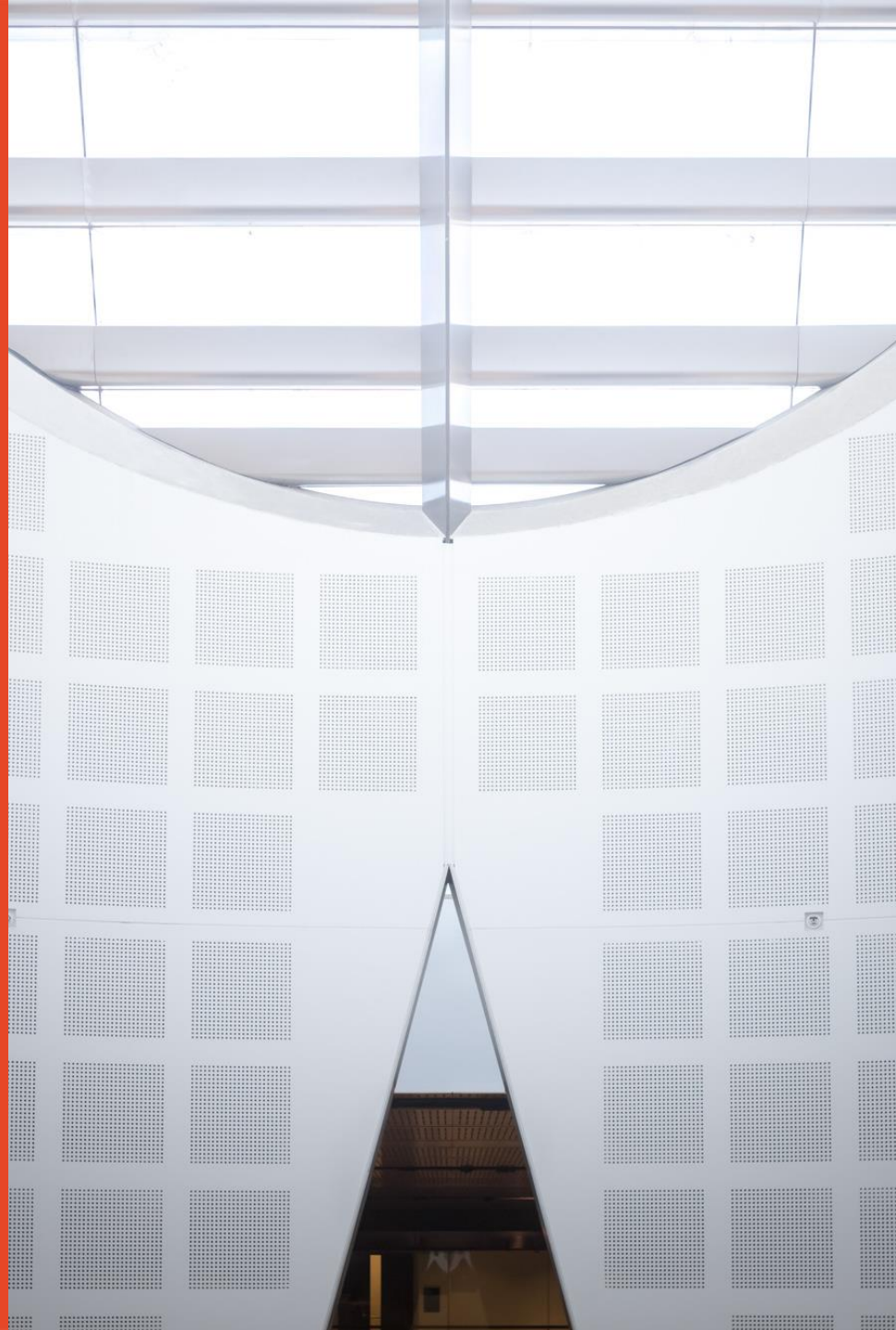
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Tech Stacks



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Tech Stacks

- Lists of inter-related technologies that can be integrated together to create a solution.
 - Sometimes specific to one solution
 - Sometimes a collection used by an organisation across all their activities
- See:
 - <https://heap.io/topics/what-is-a-tech-stack>
 - <https://fullscale.io/blog/top-5-tech-stacks/>
 - <https://stackshare.io/>
 - <https://mixpanel.com/blog/tech-stack-examples/>



Tech Stack

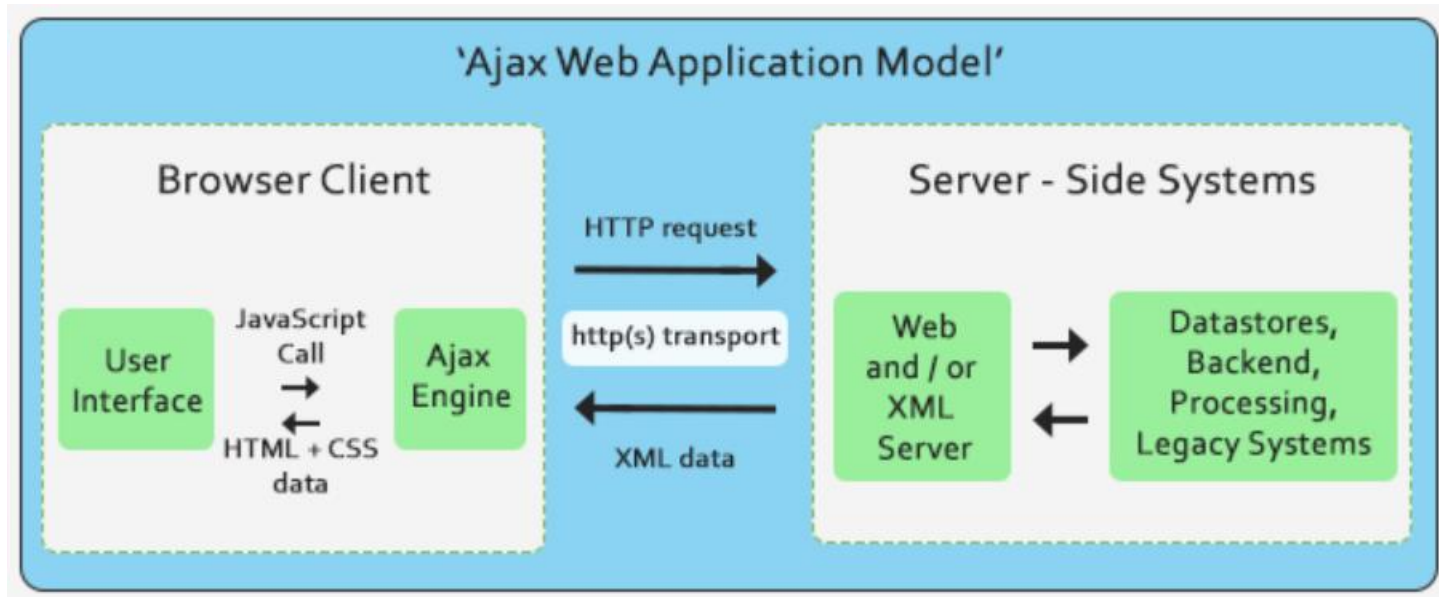
- “A tech stack is the combination of technologies a company uses to build and run an application or project. Sometimes called a “solutions stack,” a tech stack typically consists of programming languages, frameworks, a database, front-end tools, back-end tools, and applications connected via APIs.”
 - <https://www.heap.io/topics/what-is-a-tech-stack>

Consider different technology “roles”

- Operating system
 - Server
 - Data management
 - Back-end (Underlying functionality)
 - » Front-end (User interfaces)
 - Communications
 - Load balancing
 - Monitoring
 -
- See <https://www.heap.io/topics/what-is-a-tech-stack>

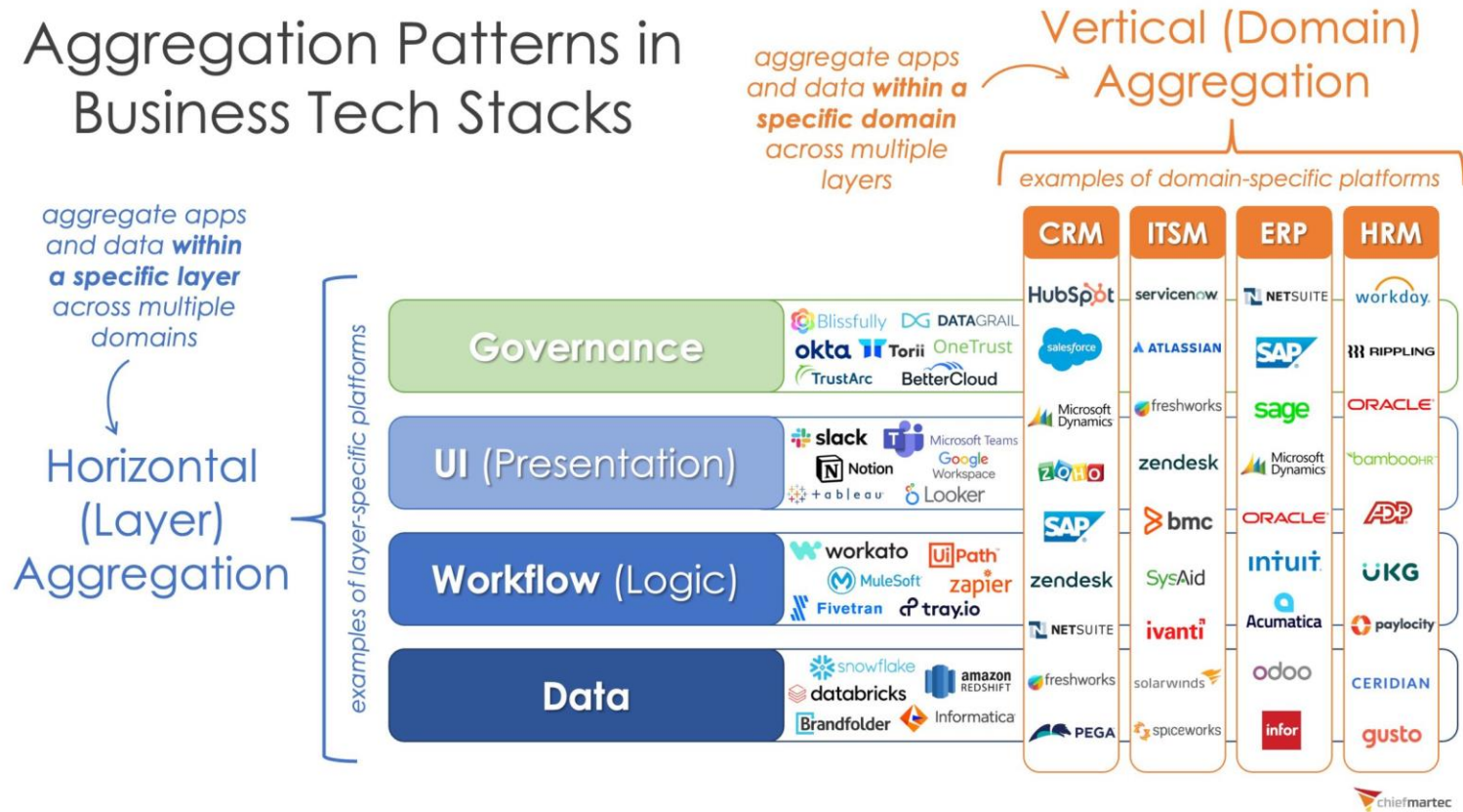
Interactions...

- How do you combine these ‘layers’?
 - Configuration
 - Code...
 - Network sockets...



“Business” Tech Stacks

Aggregation Patterns in Business Tech Stacks



From <https://chiefmartec.com/2022/01/matrixed-tech-stacks-with-both-horizontal-and-vertical-aggregation-platforms/>

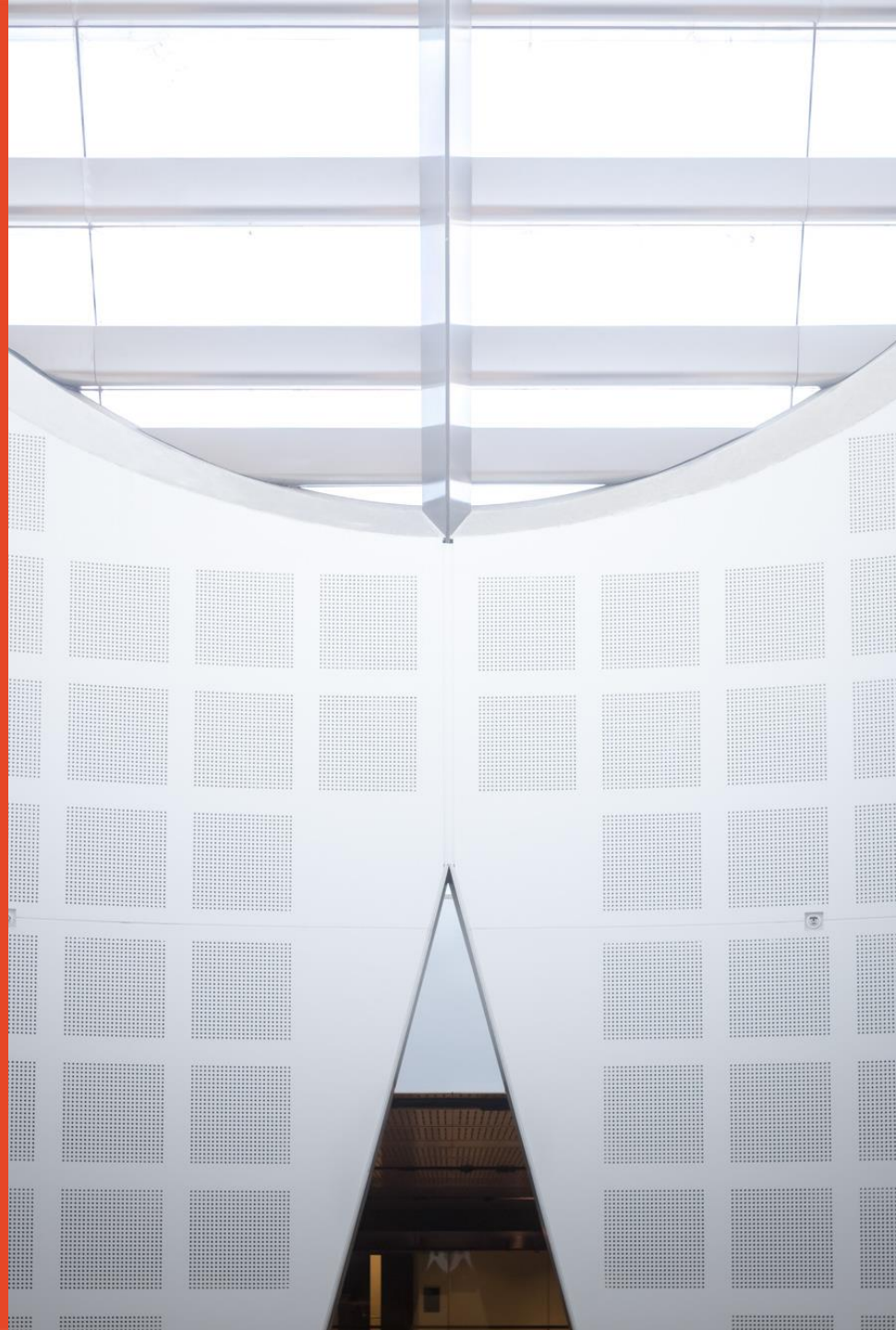
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APIs



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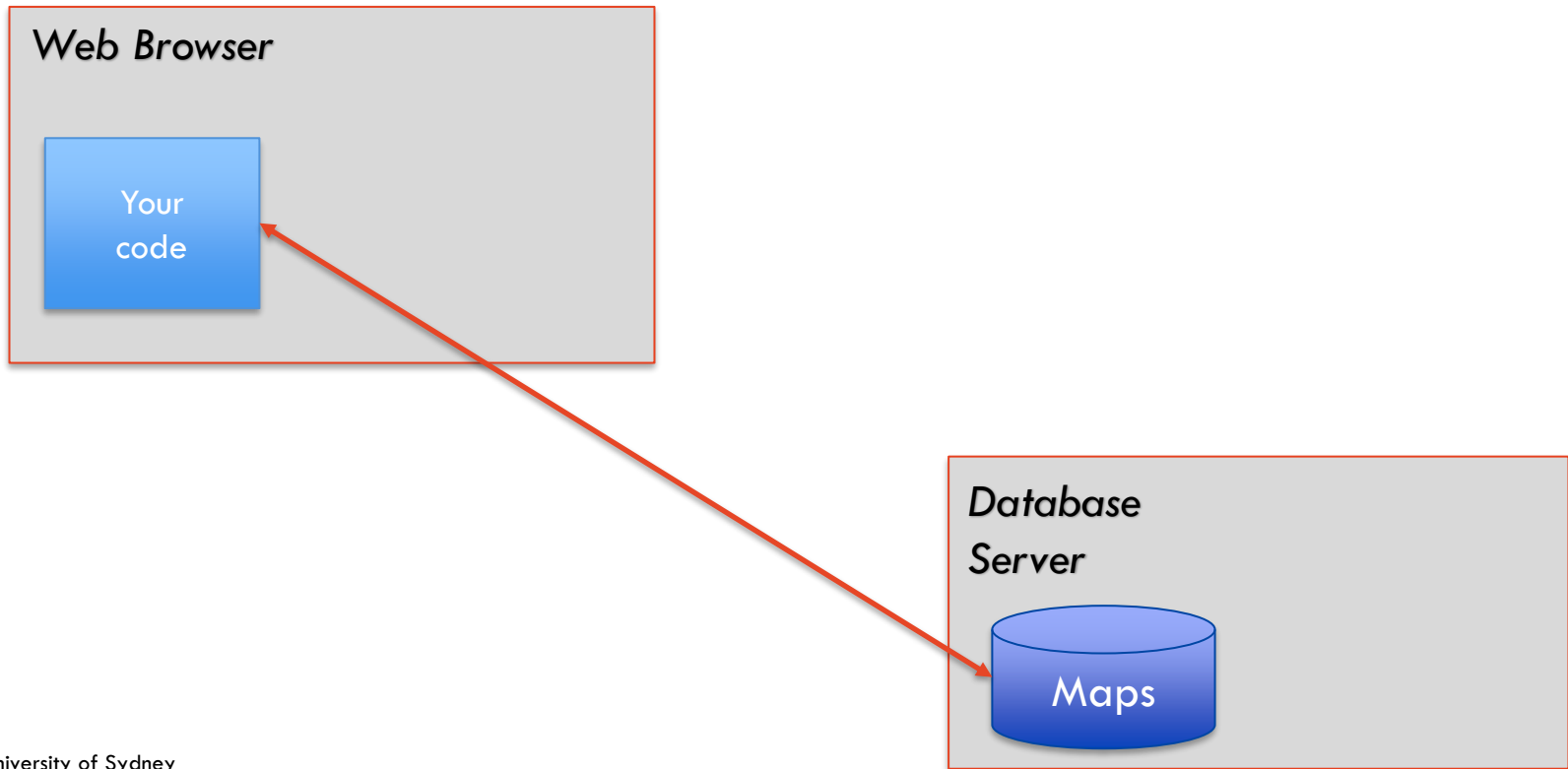


APIs

- Application Programming Interface
- E.g. google maps API
 - https://www.w3schools.com/graphics/google_maps_reference.asp

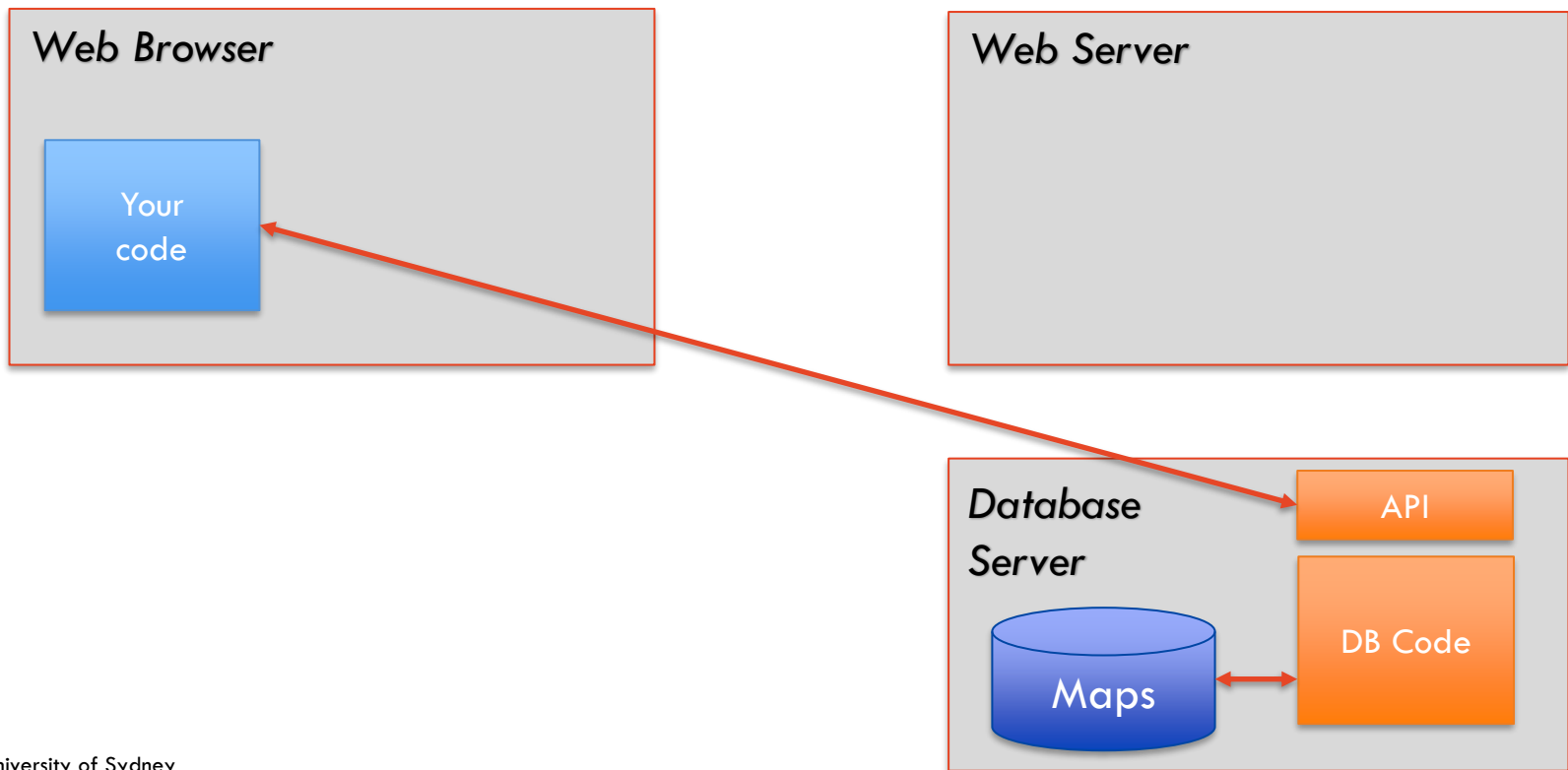
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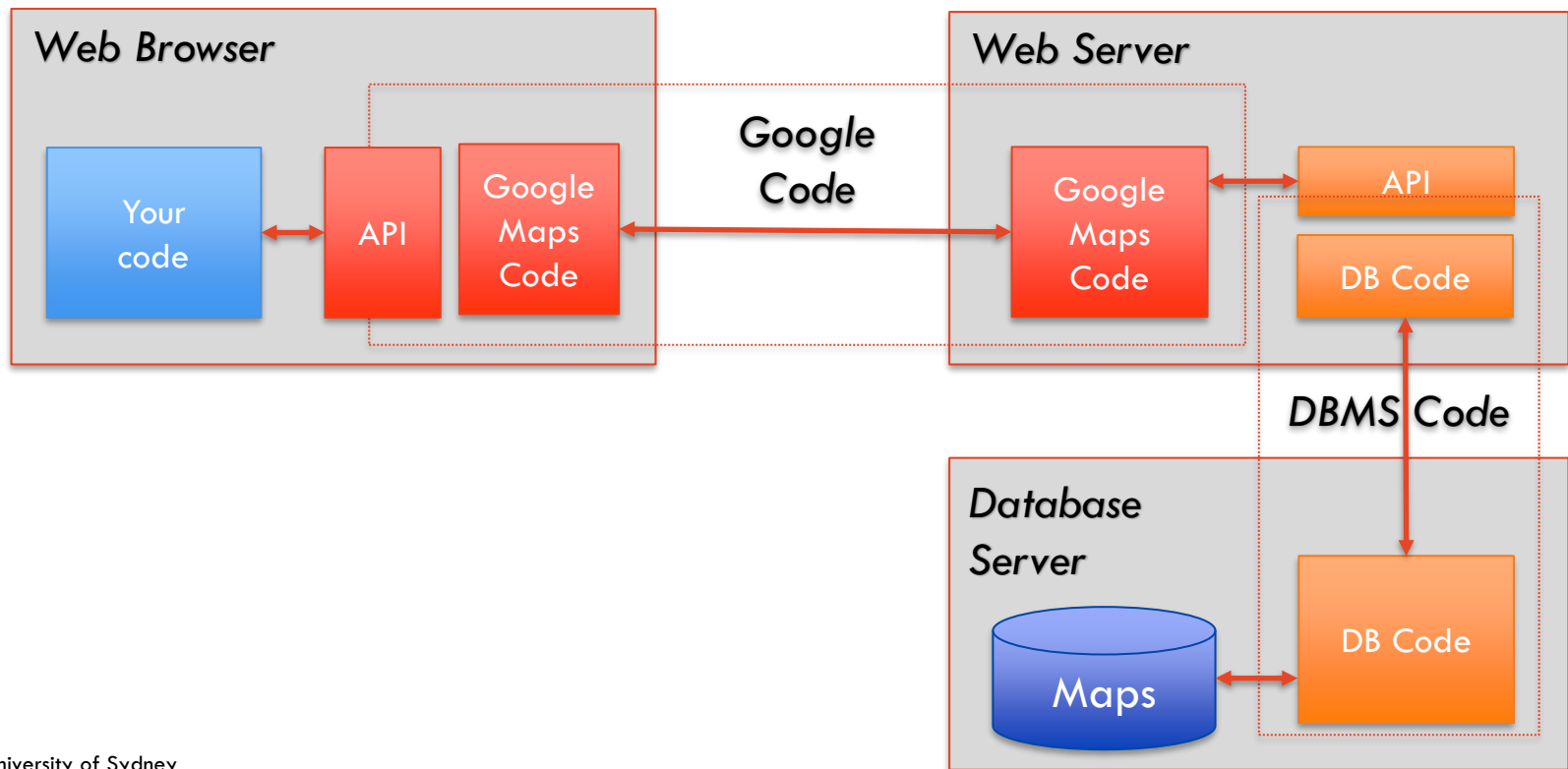
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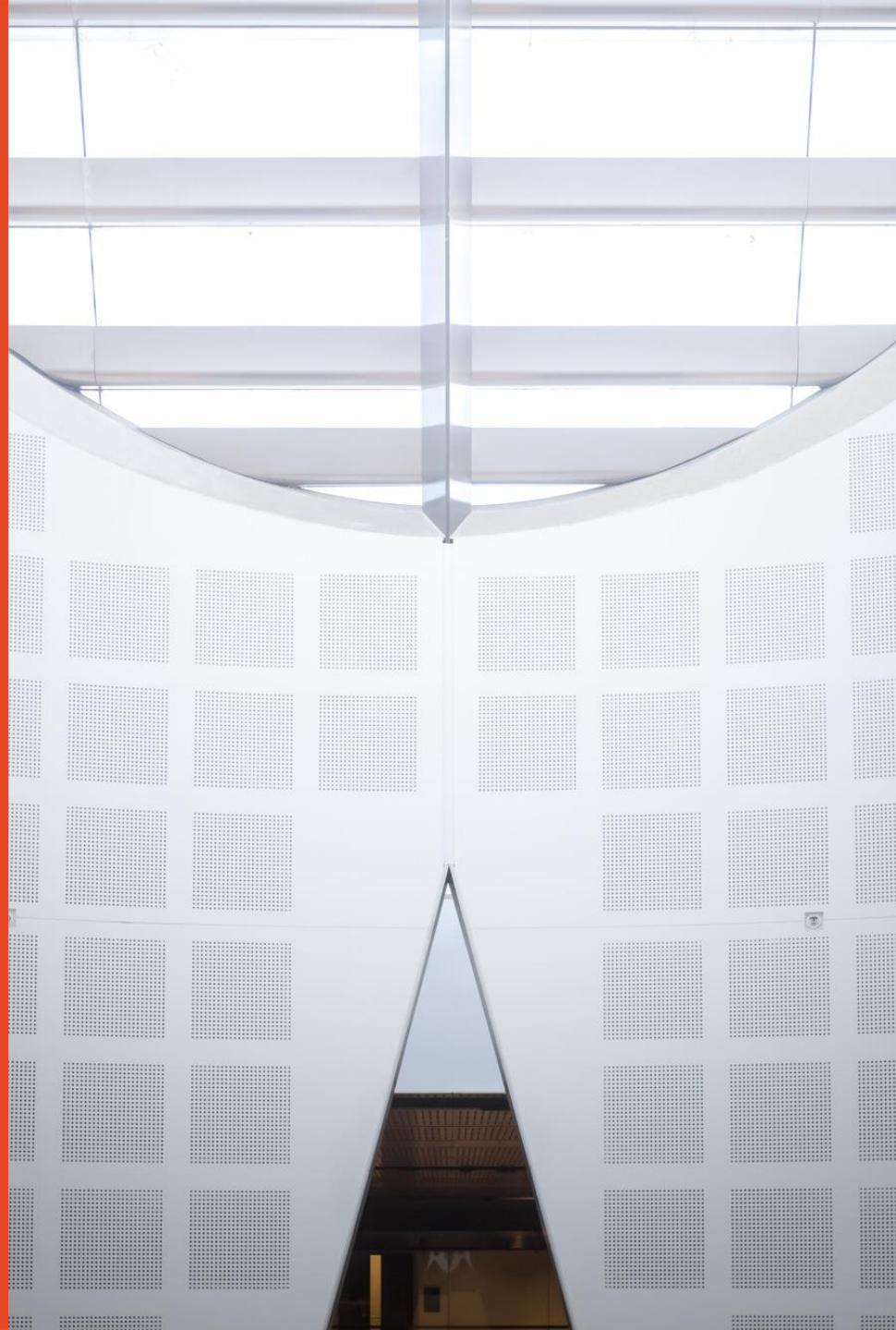
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Make files

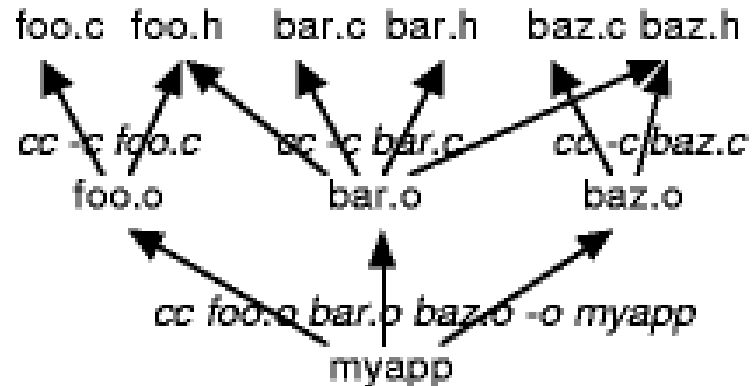


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“Making” an application

- Often involves a number of steps...
- With complex interdependencies



Solution: a makefile

- Comprises
 - Targets
 - The items (files) can be “created” or updated
 - Dependencies
 - The items (files) that a target depends on
 - Process
 - How to bring a target up to date

```
test1: test2
    echo "Creating test1"
    touch test1
```

```
test2:
    echo "Creating test2"
    touch test2
```

```
test1: test2
    echo "Creating test1"
    touch test1
```

```
test2:
    echo "Creating test2"
    touch test2
```

```
filename=INFO1111_Group_Project_CC99-01
bibfile=main.bib
```

```
pdf: ${filename}.pdf
    echo
    echo "PDF files now up to date"
```

```
test1: test2
      echo "Creating test1"
      touch test1
```

```
test2:
      echo "Creating test2"
      touch test2
```

```
filename=INFO1111_Group_Project_CC99-01
bibfile=main.bib
```

```
pdf: ${filename}.pdf
      echo
      echo "PDF files now up to date"
```

```
${filename}.pdf: ${filename}.tex ${bibfile}
      pdflatex ${filename}
      bibtex ${filename}||true
      pdflatex ${filename}
      pdflatex ${filename}
      echo
      echo ${filename} "has been updated"
```

```
${filename}.bib:
```

```
${filename}.tex:
```

```
test1: test2
    echo "Creating test1"
    touch test1
```

```
test2:
    echo "Creating test2"
    touch test2
```

```
filename=INFO1111_Group_Project_CC99-01
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```
pdf: ${filename}.pdf
    echo
    echo "PDF files now up to date"
```

```
${filename}.pdf: ${filename}.tex ${bibfile}
    pdflatex ${filename}
    bibtex ${filename}||true
    pdflatex ${filename}
    pdflatex ${filename}
    echo
    echo ${filename} "has been updated"
```

```
${filename}.bib:
```

```
${filename}.tex:
```

```
clean:
    rm -f ${filename}.{ps,pdf,log,aux,out,dvi,bbl,blg,toc}
```

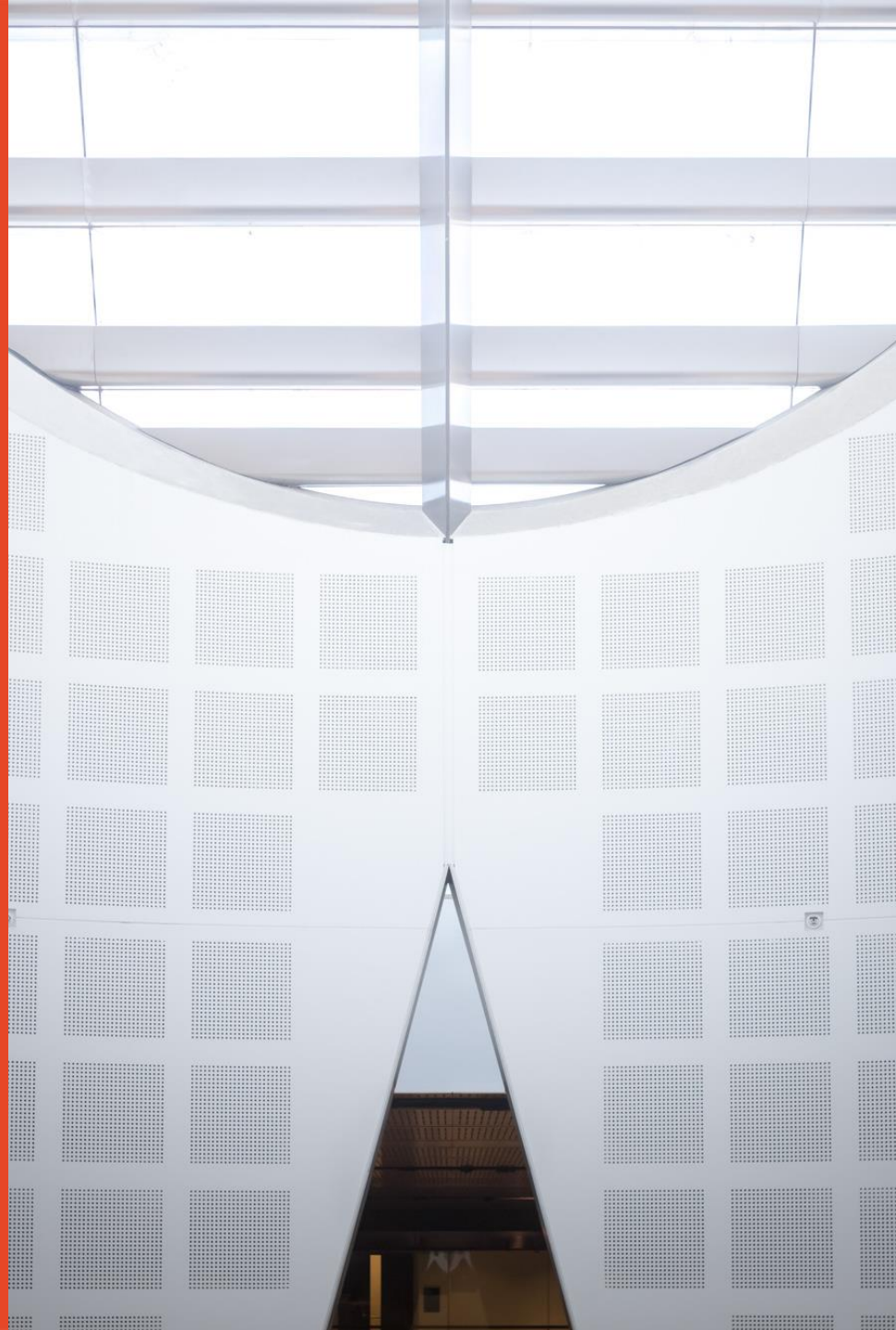
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Wrap-up



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Wrap-up

- Tutorial – Week 4
 - Skills project / Self-Learning
 - Makefiles
- Self-learning
 - Topics should be approved this week (though there is nothing stopping you from already starting)
 - Submission 1 is due in 2½ weeks (Week 6)
- Skills
 - Submission 1 is due in 2½ weeks (Week 6)