MOTT MACDONALD

What is coding

And how can it help us?

Steve Grigg - Australian ACD Lead

APNA - strategic priorities

Doing things that makes us better

Finance

Focus on quality revenue
Min 15% profit 5% contingency
APNA profit £25m in 2021
Reduce working capital
Controllable overheads < 30%

Social Purpose

Improve people's lives
Target zero carbon
Avoid projects with poor environmental, social or economic outcomes

Digital

Working smarter
Enhance digital networks
Automate, code and script
Create data driven solutions

Collaboration

One APNA
One Mott MacDonald
Focus on simplicity
Build cross sector solutions

Excellence

The heart of our culture
Value innovation and creativity
Be an industry leader

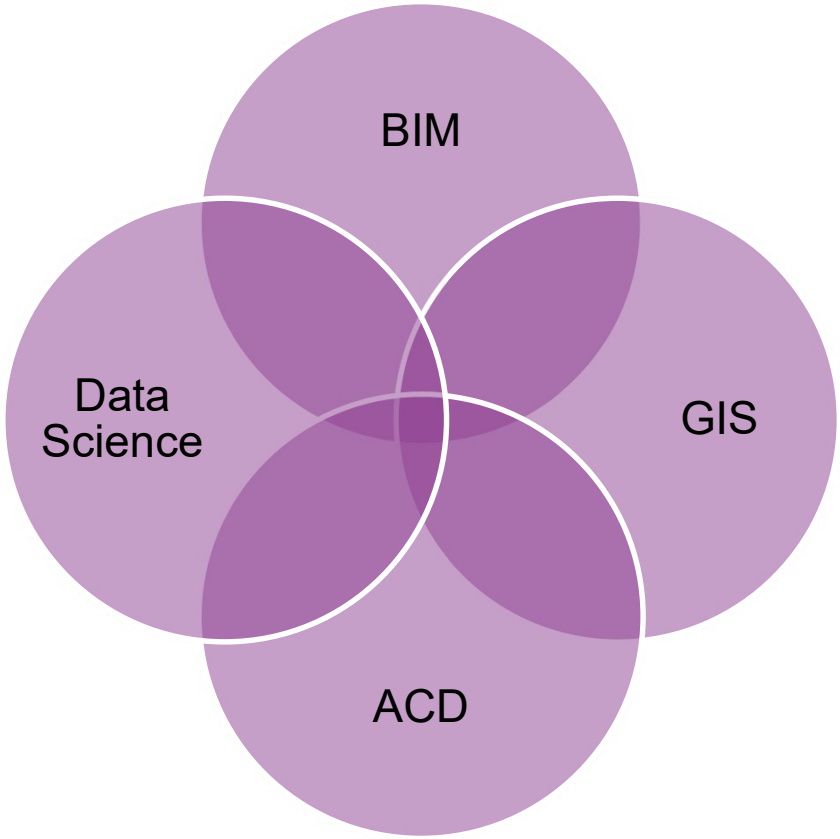
People

Inspire performance and wellbeing
Have better conversations
Diversity, equality, inclusion
Adopt agile working

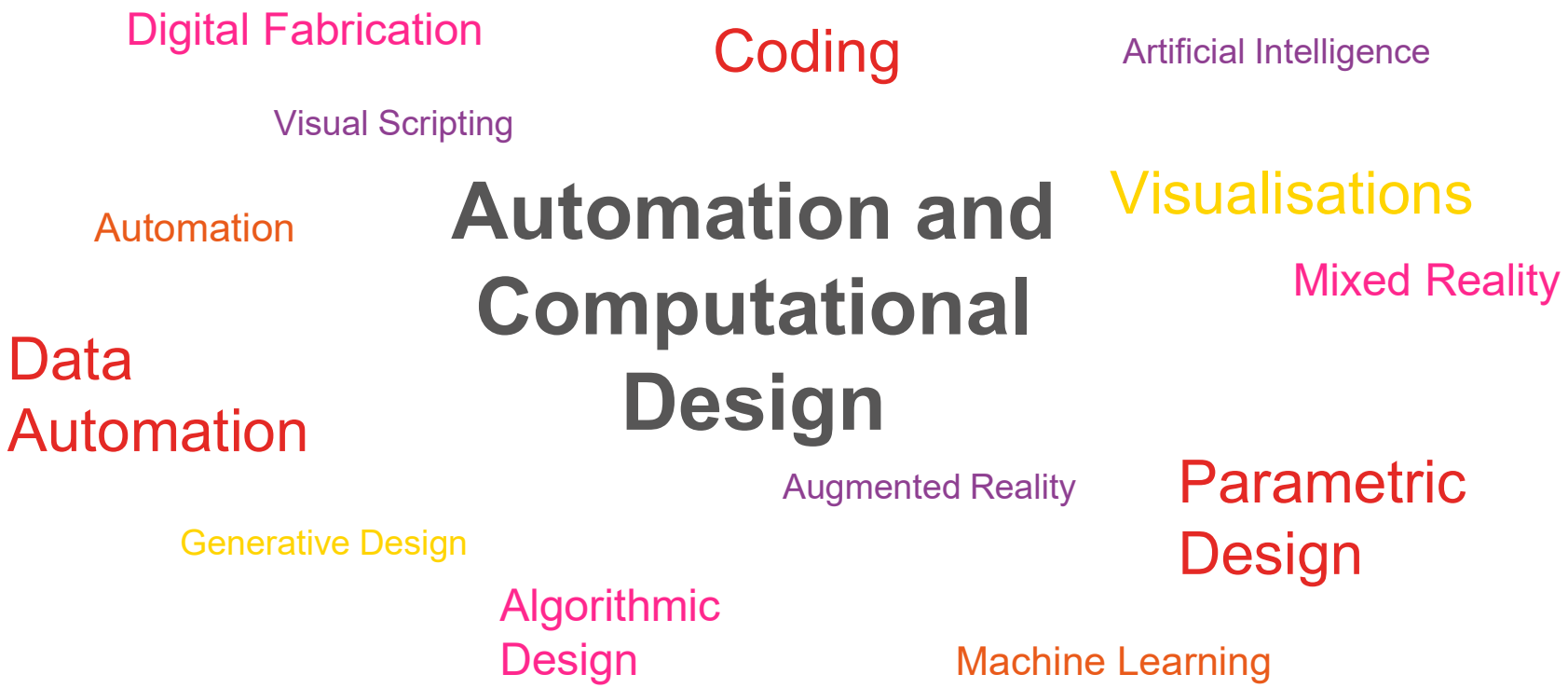
Clients

Winning more quality work
Focus on key clients
Deepen relationships
Deliver with pride and ownership

DDN



Automation and Computational Design



What is Coding?

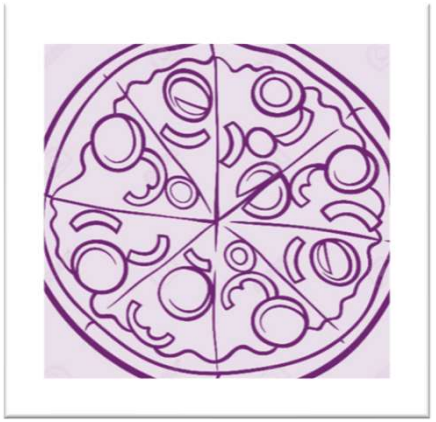
Ingredients

Inputs

Recipe

Operations

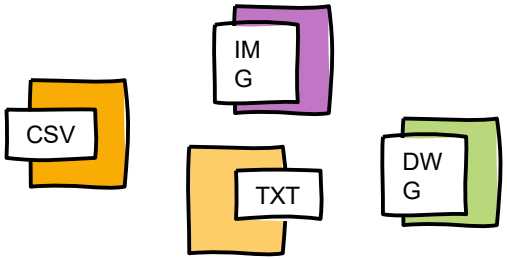
Pizza



Output

Inputs

External Data



Slider

7 -------[]---------->

String

Apples, Eggs, Lemon, Chocolate

3D Model

Revit or Civil 3D element

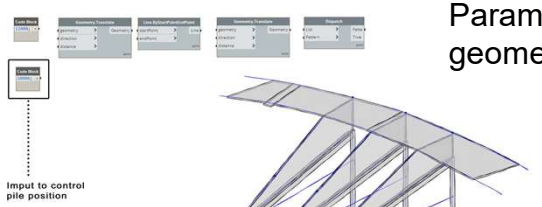
Imported SAT, DWG, IFC, etc

Model data

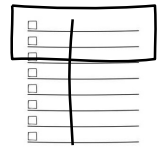
Element parameters

Operations

Output



Parametric geometry



Updated model data and project documentation

Optimisation, generative design and model analysis

What is a Programming Language

Common Programming Languages

Web Development
Javascript is commonly used by web developers including the website layout, creating immersive and interactive content

Scientific
Clean, simple to use languages, usually number intensive and good at solving mathematical equations

Software and Applications
Specific languages for each platform. For example creating an app for an iphone will be a different language to creating an app for android

Visual
Visual programming uses node based interface that does not require the writing of code. Used for repetitive tasks, analysis and complex geometry.

Grasshopper = Rhino

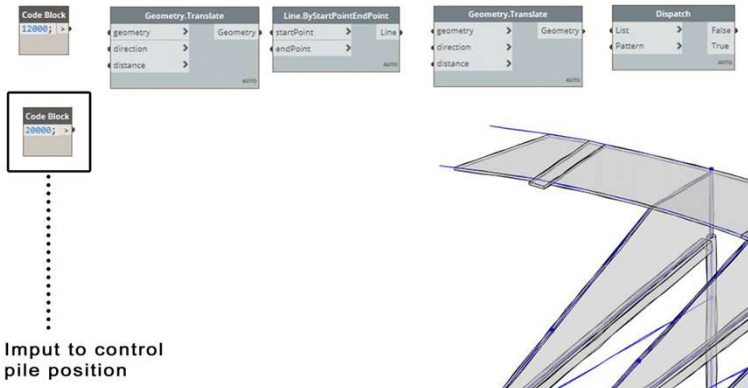
Dynamo = Revit

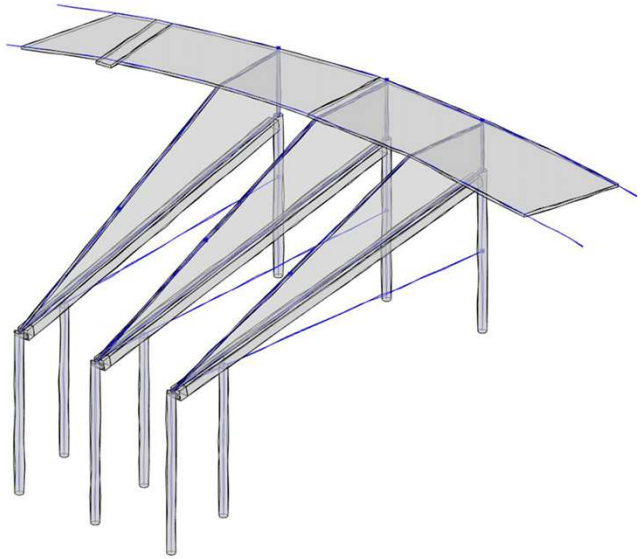
What is Programming Language

Natural Language vs Programming Language

Myth	Truth
Lots of maths	A good foundation in Maths is sufficient
Tertiary education in computer science	Can be as simple as using an Excel spreadsheet
Dry maths in IT land	Successful examples in natural science, fine arts, sociology, environmental industries
Change of profession	Bring domain experts to the next level in their specialities
Requires expensive soft / hardware	Most soft / hardware and supporting resources are FREE!

Dynamo Practical Uses



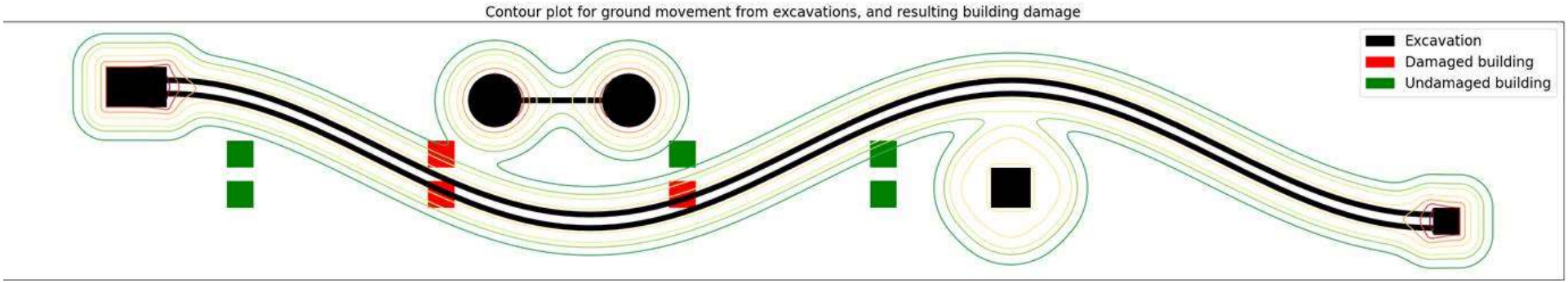


Dynamo

Python Practical Uses

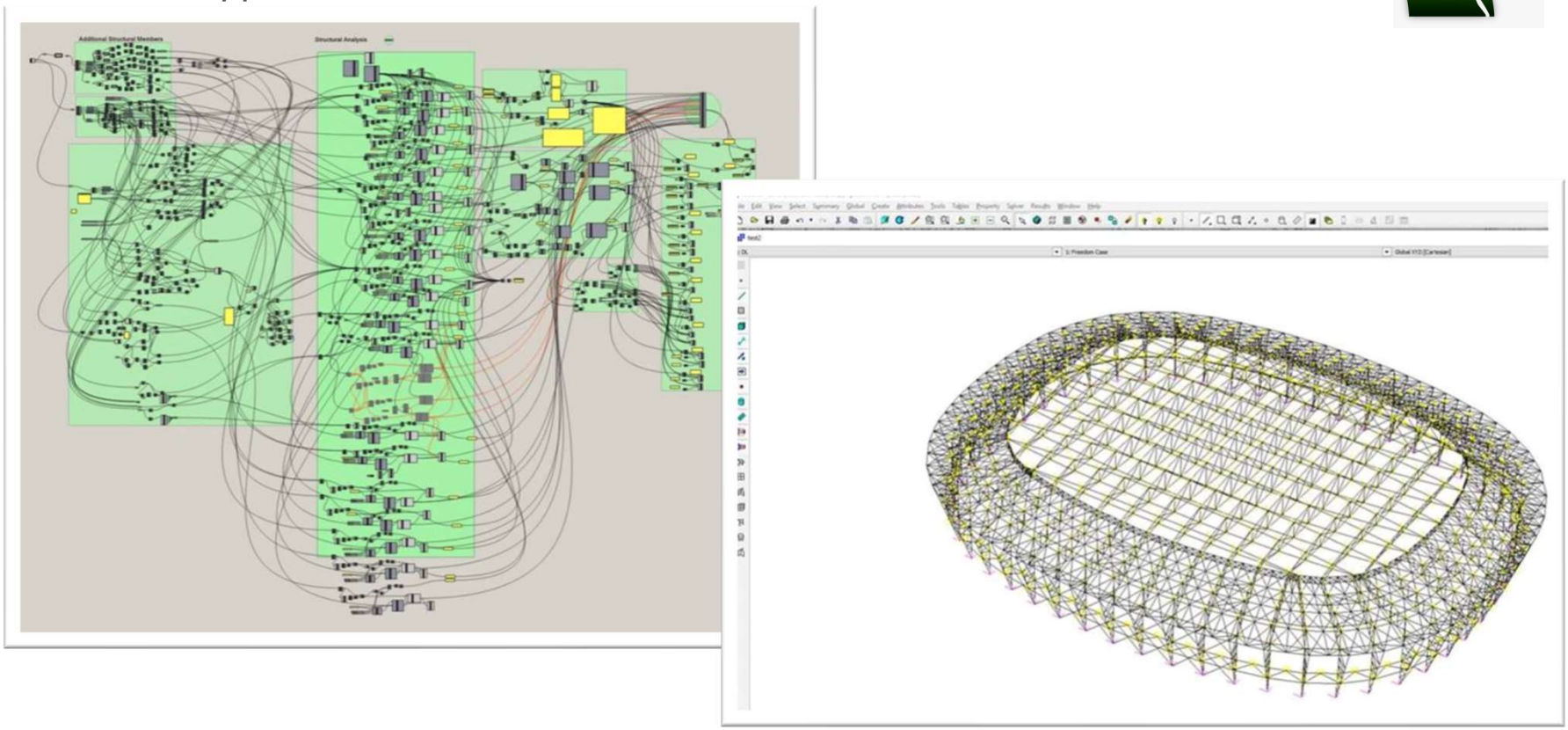
Ground Movement from excavations

- Tool to predict ground movement due to excavation
- Large amount of data needed to be processed in multiple formats
- Using Python saved countless hours of manual work
- Analysis was optimised to compute 1000x faster by making smart use of the information.



Other Practical Uses

Grasshopper



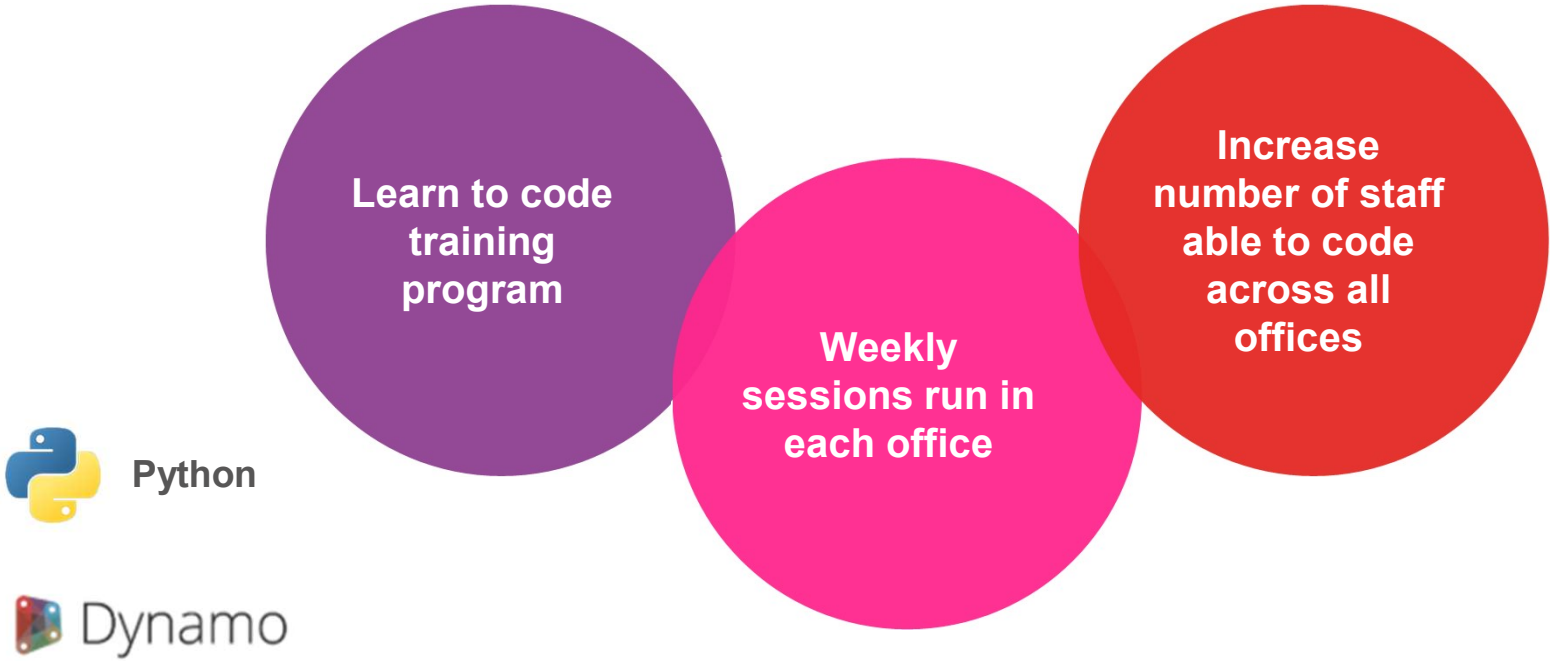
Practical Uses

Summary

- Automation
- Increased efficiency
- Adapt to changing requirements
- Enable teams to focus on the real problems

LET'S CODE

Coding Clubs



Coding Clubs

Outline

10-15 mins
Review last weeks topic, discuss the solutions that were reached.

15 mins
Introduce the club to the current weeks content.

60-90 mins
Time to code. Work on the content for this week.

6 weeks course.

Python

Dynamo

Python Coding Club Overview

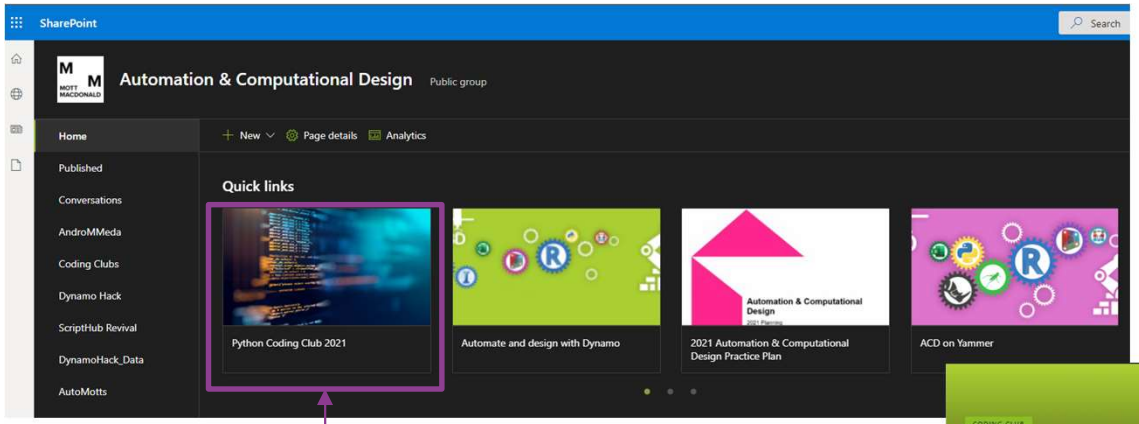
- Week 1
  - Coding Process Overview
- Week 2
  - Computer Vision
- Week 3
  - Excel Manipulation and Data Processing
- Week 4
  - Natural Language with PDF and Word
- Week 5
  - Internet Scraping
- Week 6
  - Real Time data extraction

Python

Coding Club – Office Support

Adelaide – Benjamin Bleckly
Melbourne – Kalyan Kamepalli
Sydney – Tony Ridley
Brisbane – Andrew Cato

What's Next?



[Automation & Computational Design - Home (sharepoint.com)]

Details of upcoming coding club can be found here

Complete short registration form

MOTT MACDONALD

Thankyou