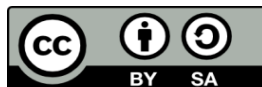




An Roinn Oideachais
agus Scileanna
Department of
Education and Skills



© PDST 2019



LEAVING CERTIFICATE COMPUTER SCIENCE

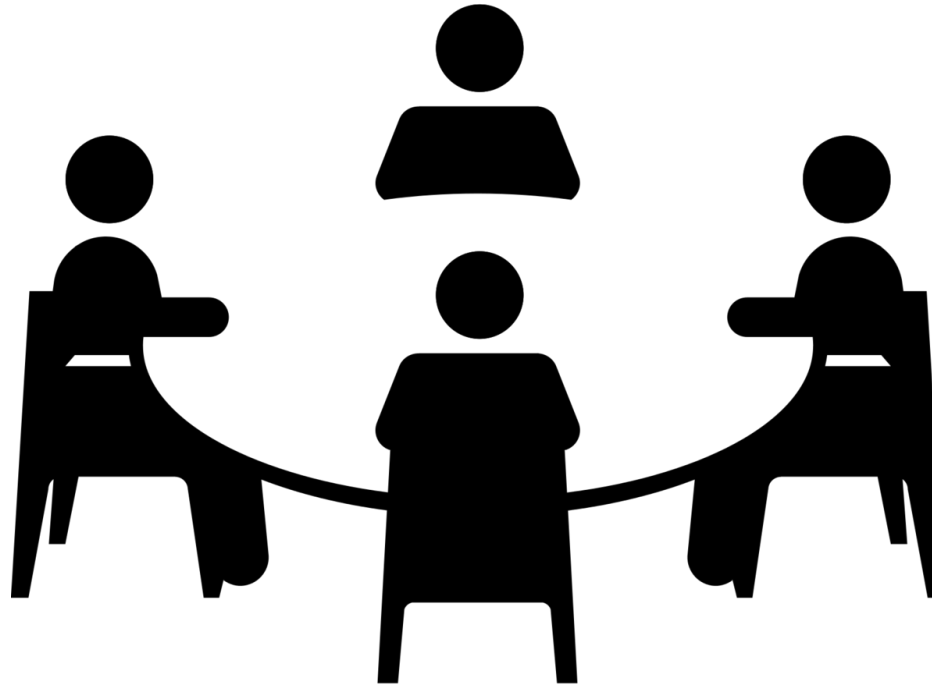
National Workshop 3

Session 2

ALT2 – Project Design and Development Curriculum & Assessment Planning

ALT2 – Project Design and Development

Main Group Activity

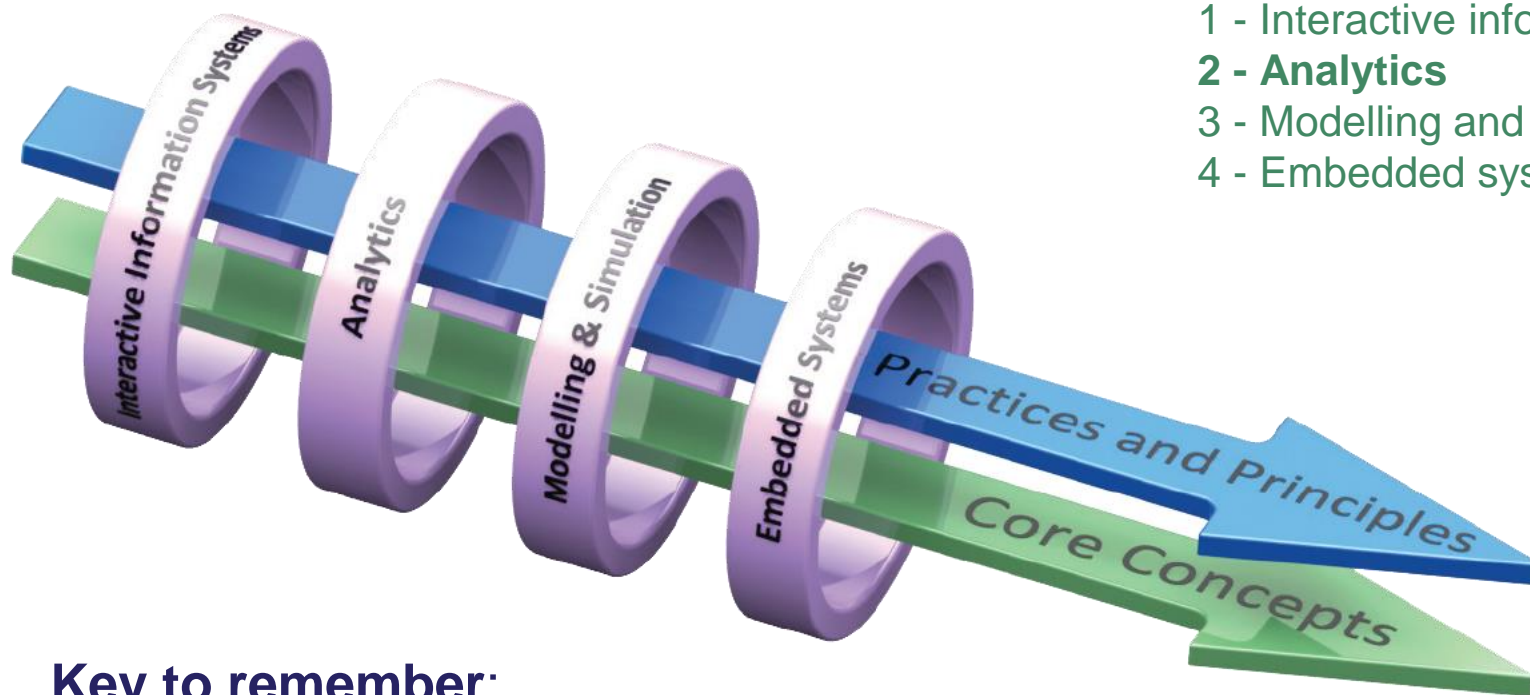


Groups will begin to develop a new ALT2

LCCS Interwoven

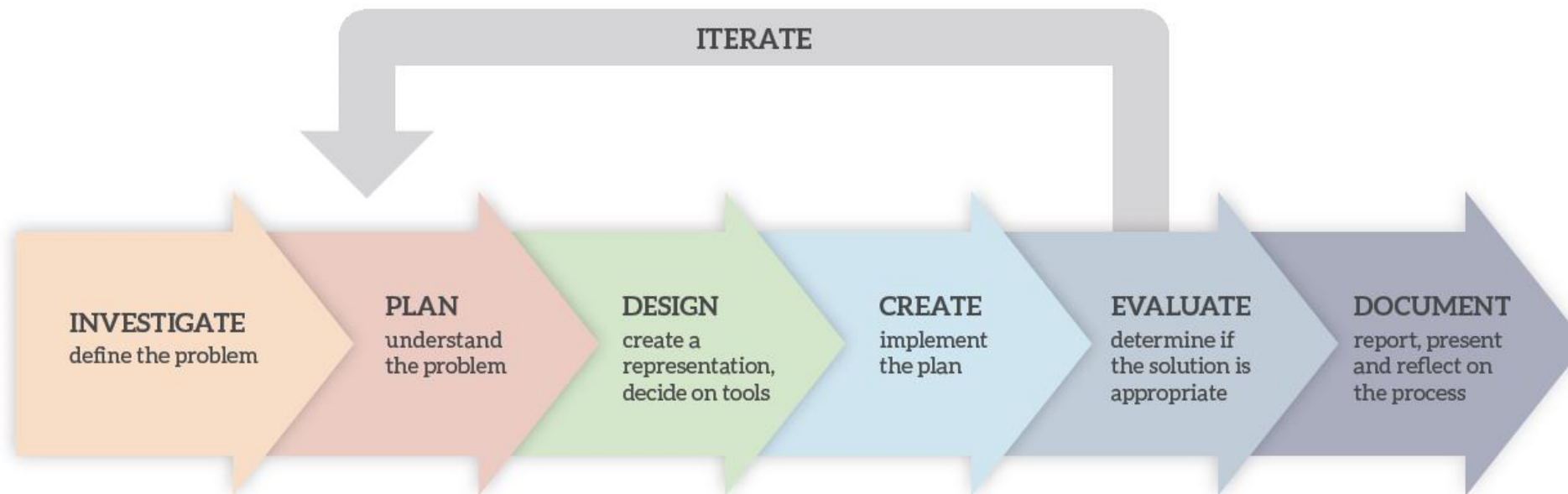
The four applied learning tasks explore the four following contexts:

- 1 - Interactive information systems
- 2 - **Analytics**
- 3 - Modelling and simulation
- 4 - Embedded systems.

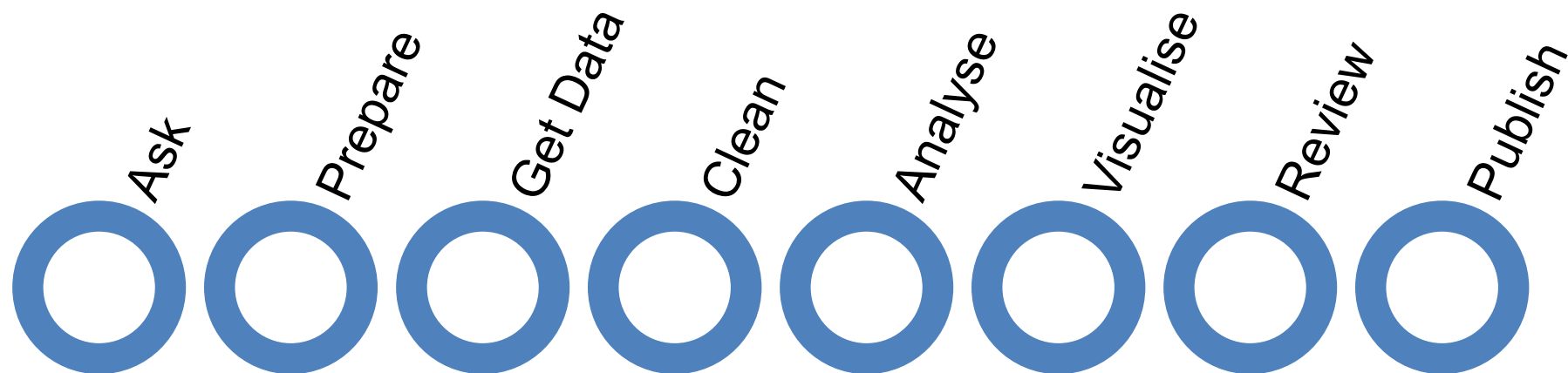


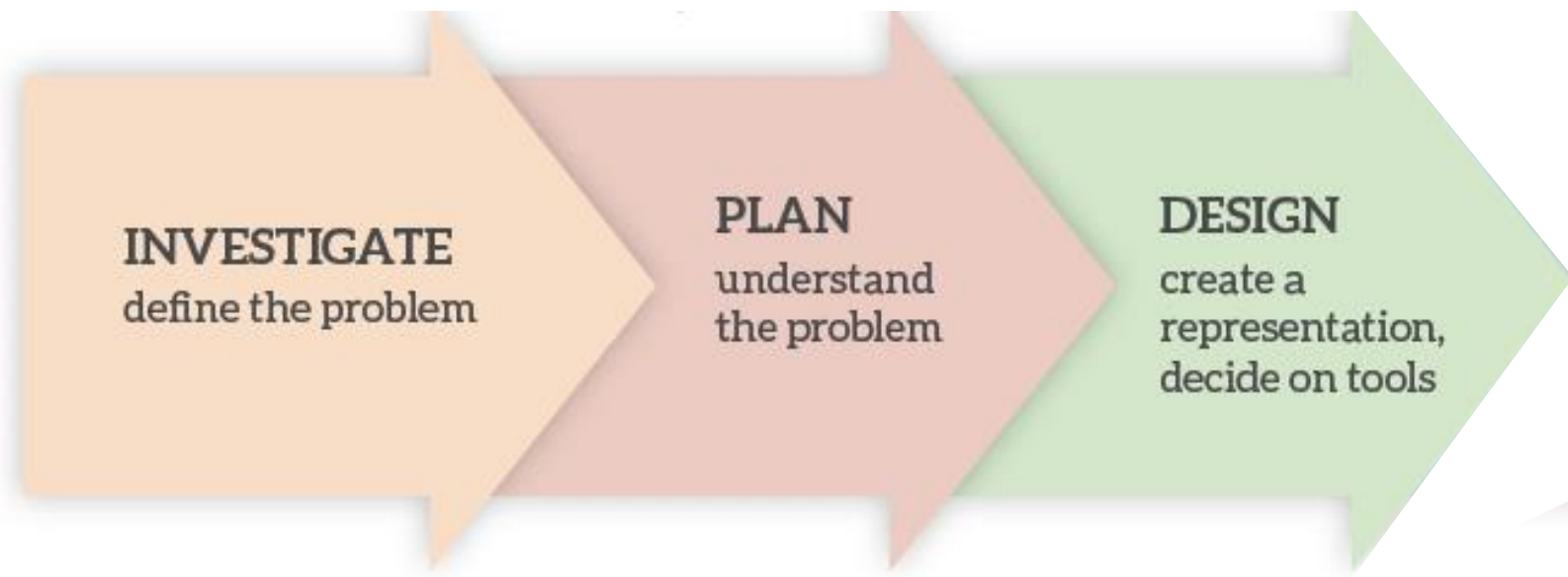
Key to remember:

Explore and teach the LOs through the lens of ALTs.



The Design Process





1

INVESTIGATE
define the problem

Warmup Activity - ALT 2 Brainstorm Follow Up

padlet

PDST LCCS +1 1m

Applied Learning Task 2 - Analytics

Brainstorming on ideas for ALT2

THE POWER OF BIG DATA ANALYTICS
Capture, Analyze and Act on Your Digital Information

1 Capture information from many sources
Capture data related to your business from Twitter, health, customer purchase, analytics, website data, patient health records, video surveillance footage and more.

2 Analyze data to get actionable information
Discover hidden patterns, correlations, and other useful information for your business using software tools or methods.

3 Act on the data insights to grow your business
Personalize products, services, and marketing campaigns, predict trends, and optimize your business based on data.

Temperature sensor

Collecting data and working with it.

Economical Data

CSO data website.

Analyze and visualize CAO points and subjects to see which subjects are

NCCA - Alt2 - Analytics

The ALT2 web resources explore levels of scaffolding that can be provided, whether these are guides for full implementation or resources that can be deconstructed by teachers and students. The interdisciplinary element is a key component of the analytics brief. Initial resources encompass text analysis (English, History) and image composition analysis (Art). An introductory CT challenge on cleaning data plus 2 file handling Python videos, will also support skills required for this brief.

Teachers and students are encouraged to use these resources as platforms to create their own resources, as forms of assessment and in particular as reflection pieces for learning portfolios. The resources are designed specifically to be used by students to record artefacts and reflect on their learning, in particular html and pdf resources.

CORGIS Datasets Project

Welcome to the Kennel Kennel kennel

How would you assess?

Does it work, See the graphs, a report, is there a conclusion backed up with data
Ala end of course assessment task.

9 Free Public Data Sets for Your First Data Science Project

19 Free Public Data Sets for Your First Data Science Project
Completing your first project is a major milestone
springboard blog

Home made energy meter.

Learning and Teaching Strategies

- *Flipped Classroom
- * Group Work

Links to others parts

- Embedded systems
- Web infrastructure networks
- Strand 2 data section all LOs
- Evaluation and testing
- Working in teams
- Communication and reporting

What teaching and learning strategies?

Constructivist, e.g. Group work, think pair share.
Pose the question to the class "What is the objective "
Start with definition/formula of pressure, $p = \frac{F}{A}$
Identify dependent/ independent data.
Students to come up with ideas on how we can measure the variables?
Identify sensors needed
What data will they need and what

Assessment

- * Peer assessment
- * Presenting their data
- * Group discussion

Alt 2: Analytics

Carpark Task

- Data Gathering (Maybe homework?)
- Sourcing data?
- Analysing data...

Interdisciplinary

Business
Maths
Accounting
Economics
Art??

Data

Project: ALT2 Analytics. Use micro bit and pressure/humidity/light dependent resistors sensor (ala inventors kit). E.g. Buy helium balloons and fishing line. Put up in air. Put light sensors around school. Capture data. Clean it, format it, analyze. E.g looking for patterns and visualization data

CSO Data

The Financial Sector in Ireland's National Accounts 2016

Breakdown of Financial Sector Assets

Category	Percentage
Government Securities	25%
Other Financial Assets	40%
Loans	10%
Equity	7%
Other	2%

Home - CSO - Central Statistics Office
CSO

Data.gov.ie

When is the next train, when is the next bus?

Loads of different data bases that can be explored



padlet

1. In your assigned groups start brainstorming again as to possible project ideas for for ALT2.
2. Aim for as many ideas as you can.
3. Fill in your ideas on the Padlet board supplied – can be text / images / videos etc.



padlet

[https:// pdstlccs.padlet.org/cpd/
6s9qwbnzl8rm](https://pdstlccs.padlet.org/cpd/6s9qwbnzl8rm)



LiveSlides web content

To view

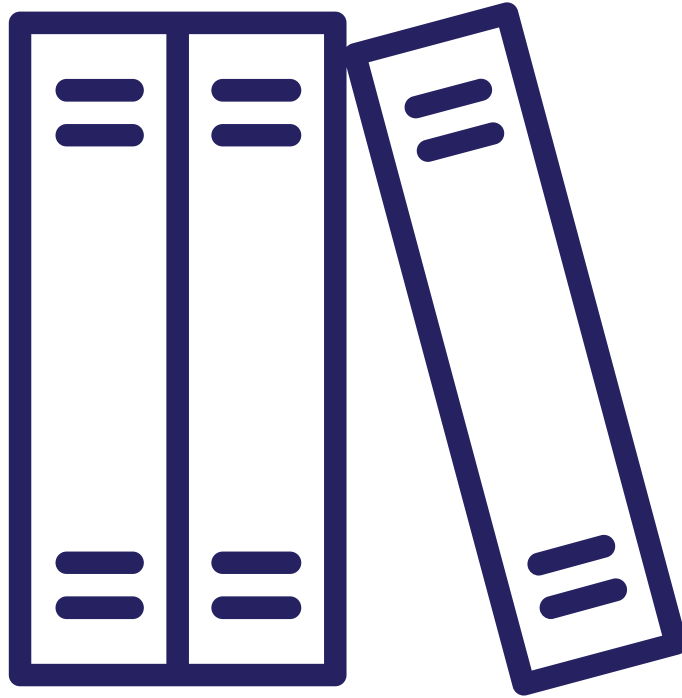
Download the add-in.

liveslides.com/download

Start the presentation.

Additional Resources

Data Sets





LiveSlides web content

To view

Download the add-in.

liveslides.com/download

Start the presentation.



2

PLAN
understand
the problem

Pick one of the suggestions for ALT2

Dissect the idea

Is there a broad theme or a specific topic?

What is the data you will use?

What teaching & learning strategies could you use? Is it suitable for students taking Ordinary Level Maths

What does your project do?

Does your project idea cover all the LOs for this ALT?

What other LOs can be taught through the lens of this project?

What tools or materials are needed?

What are the roles in the group?

What links can be made to other subject areas?

Inter-disciplinary nature of data (LC)

Chemistry Mathematics
Irish History PE English
Politics and Society Economics
German Biology Art
Physics Geography T4
Wellbeing Chemistry

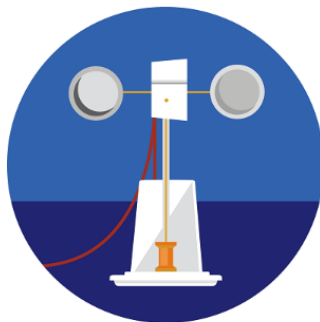
Additional Resources

Useful Tutorials

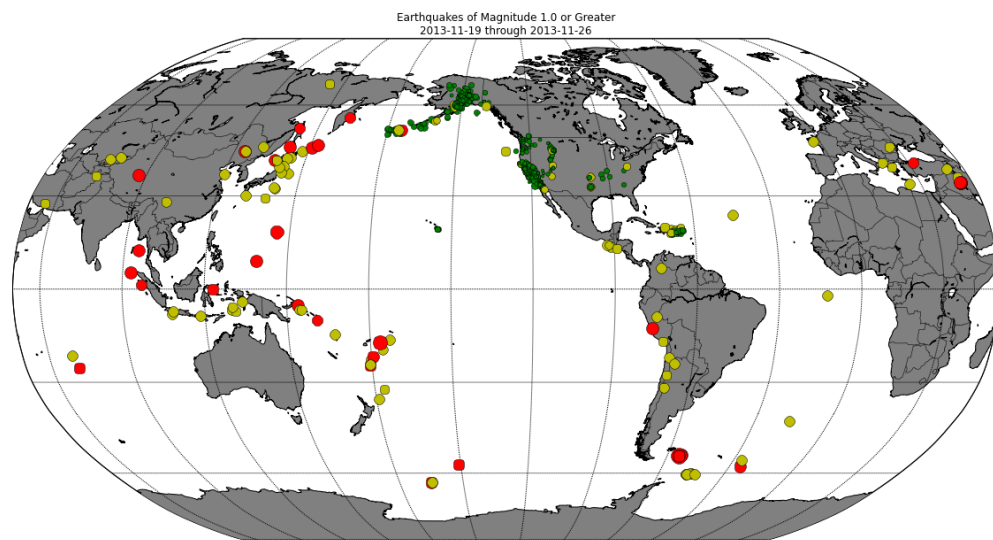


Comparing Speeds

 **Microsoft**
Hacking STEM



Anemometer



http://introtopython.org/visualization_earthquakes.html

<https://realpython.com/tutorials/data-science/>



Pythonic Data Cleaning With
NumPy and Pandas

Mar 26, 2018  data-science  intermediate



The Ultimate Guide To Speech
Recognition With Python

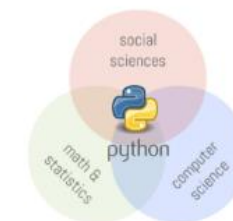
Mar 21, 2018  advanced  data-science

 machine-learning



Python Plotting With Matplotlib
(Guide)

Feb 28, 2018  basics  data-science




Python for Social Scientists

 data-science  python

pandas 
 $y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$

Using Pandas to Read Large Excel
Files in Python

 data-science



Analyzing Obesity in England
With Python

 basics  data-science

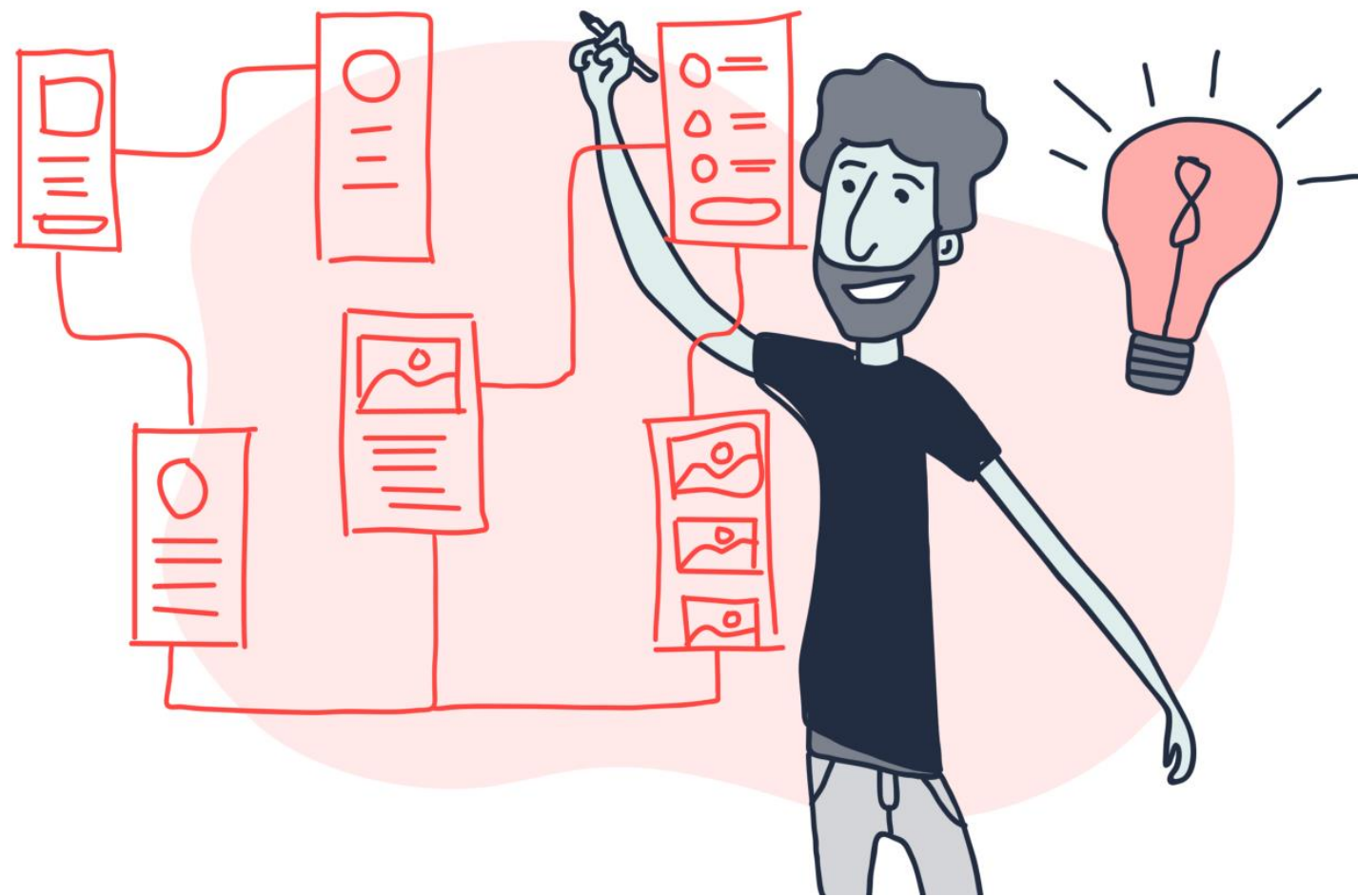




3



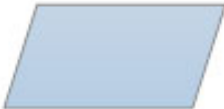


DESIGN

create a
representation,
decide on tools



<https://blog.overflow.io/8-tips-for-creating-better-user-flows-e46eb0d2a2c6>

Flow charts

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

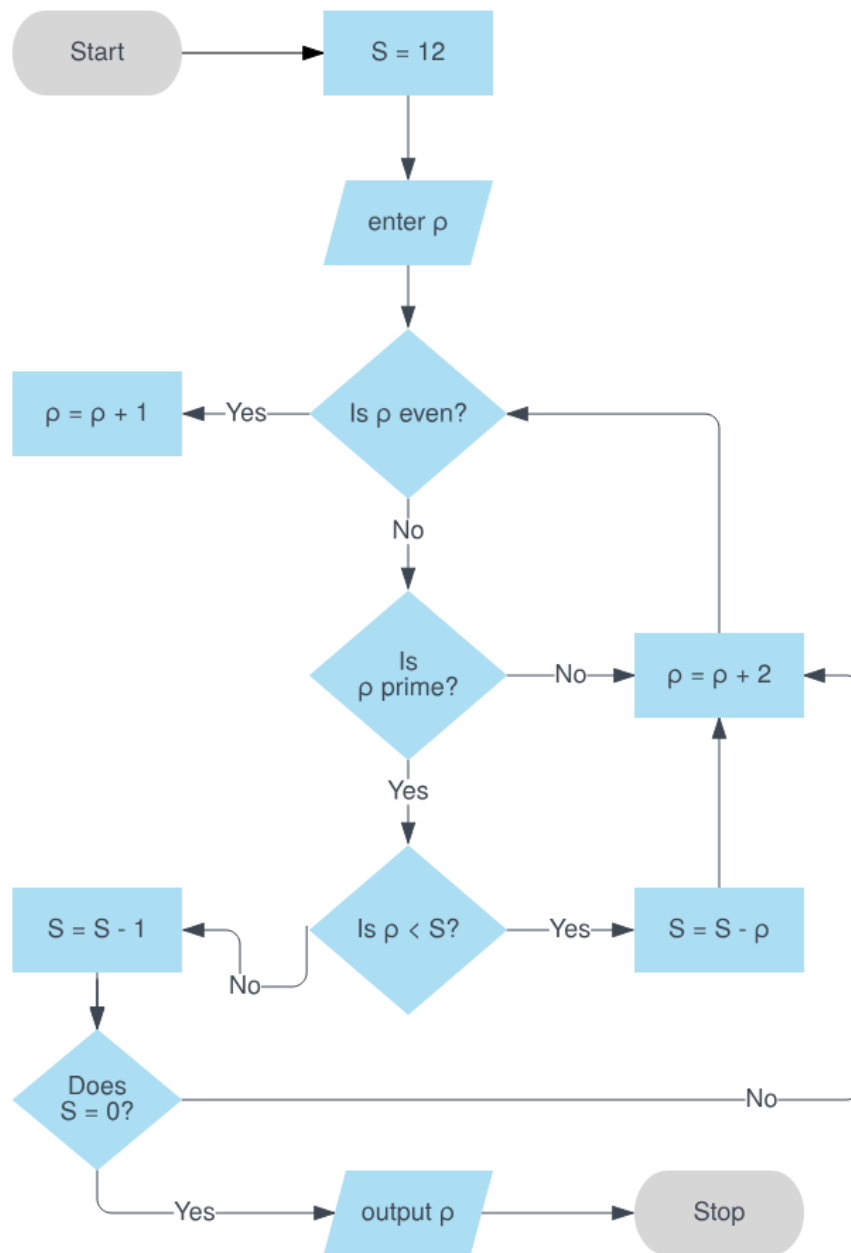
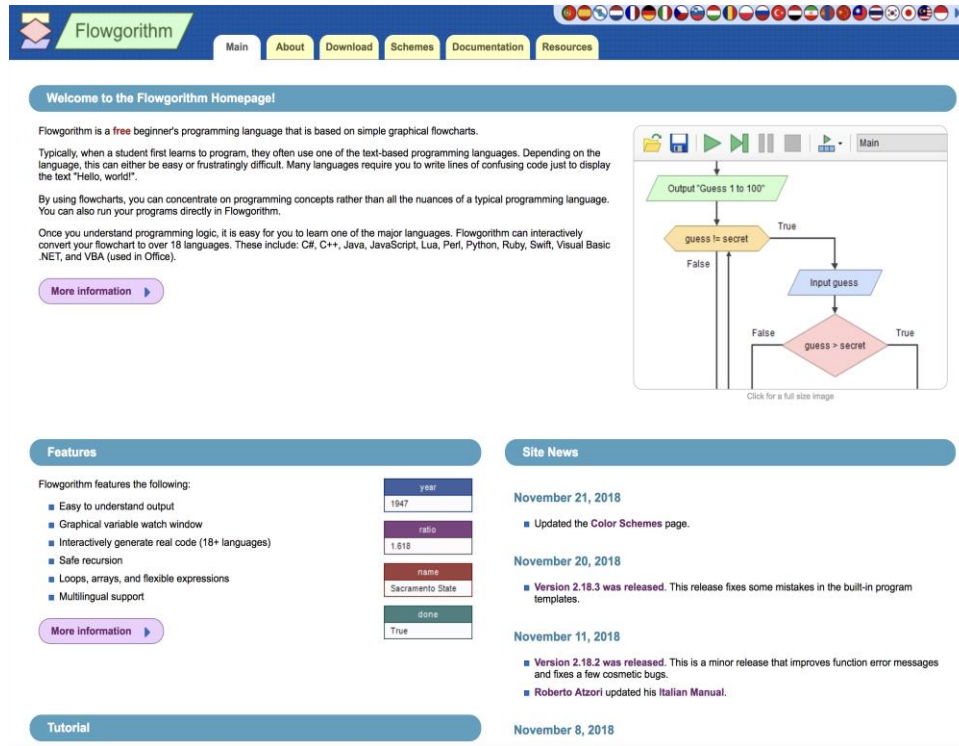


Image sourced from Lucid Software

Flow charts – Additional Online Tools



The Flowgorithm homepage features a navigation bar with links to Main, About, Download, Schemes, Documentation, and Resources. A welcome message states: "Welcome to the Flowgorithm Homepage! Flowgorithm is a free beginner's programming language that is based on simple graphical flowcharts. Typically, when a student first learns to program, they often use one of the text-based programming languages. Depending on the language, this can either be easy or frustratingly difficult. Many languages require you to write lines of confusing code just to display the text 'Hello, world!'." It then explains that using flowcharts allows users to concentrate on programming concepts rather than the nuances of a typical programming language, and that programs can be run directly in Flowgorithm. A "More Information" link is provided. Below this, a sample flowchart is shown: "Output 'Guess 1 to 100'", followed by a loop where "guess < secret" is true, leading to "Input guess", then a decision "guess > secret". If true, it loops back; if false, it ends. A "Click for a full size image" link is at the bottom. The "Features" section lists: Easy to understand output, Graphical variable watch window, Interactively generate real code (18+ languages), Safe recursion, Loops, arrays, and flexible expressions, and Multilingual support. A "More Information" link is also present. The "Site News" section lists updates from November 21, 20, and 11, 2018, including version releases and manual updates. A "Tutorial" link is at the bottom.

Flowgorithm

Main About Download Schemes Documentation Resources

Welcome to the Flowgorithm Homepage!

Flowgorithm is a free beginner's programming language that is based on simple graphical flowcharts. Typically, when a student first learns to program, they often use one of the text-based programming languages. Depending on the language, this can either be easy or frustratingly difficult. Many languages require you to write lines of confusing code just to display the text "Hello, world!".

By using flowcharts, you can concentrate on programming concepts rather than all the nuances of a typical programming language. You can also run your programs directly in Flowgorithm.

Once you understand programming logic, it is easy for you to learn one of the major languages. Flowgorithm can interactively convert your flowchart to over 18 languages. These include: C#, C++, Java, JavaScript, Lua, Perl, Python, Ruby, Swift, Visual Basic .NET, and VBA (used in Office).

[More Information](#)

Click for a full size image

Features

Flowgorithm features the following:

- Easy to understand output
- Graphical variable watch window
- Interactively generate real code (18+ languages)
- Safe recursion
- Loops, arrays, and flexible expressions
- Multilingual support

[More Information](#)

Site News

November 21, 2018

- Updated the Color Schemes page.

November 20, 2018

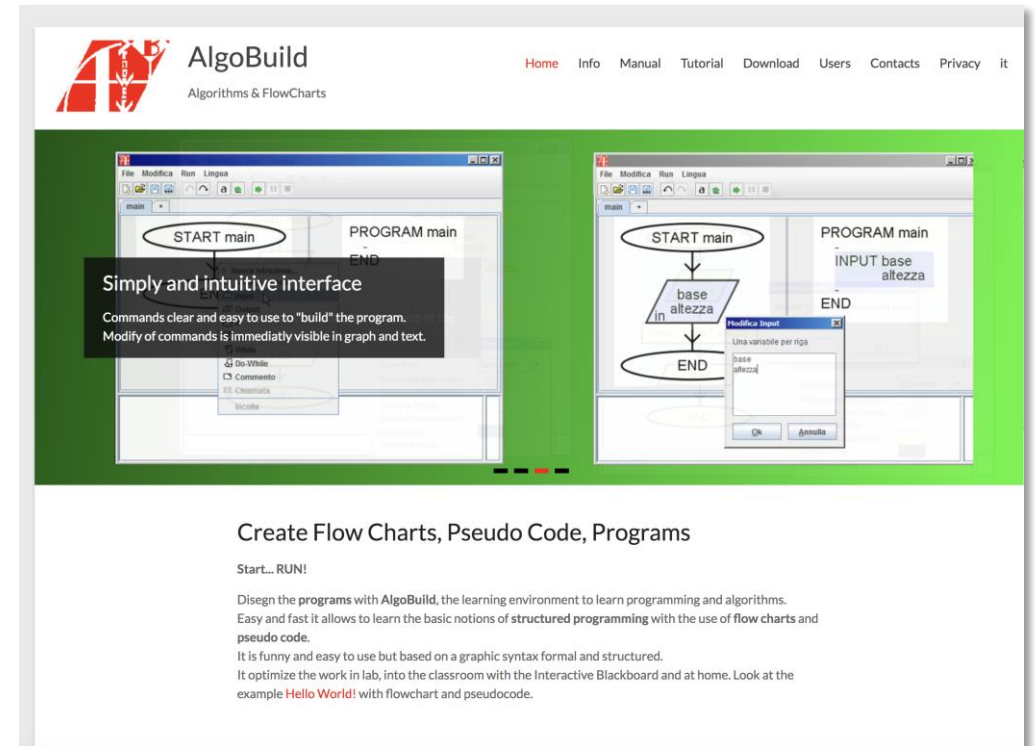
- **Version 2.18.3 was released.** This release fixes some mistakes in the built-in program templates.

November 11, 2018

- **Version 2.18.2 was released.** This is a minor release that improves function error messages and fixes a few cosmetic bugs.
- Roberto Atzori updated his Italian Manual.

Tutorial

www.flowgorithm.org



The AlgoBuild homepage features a navigation bar with links to Home, Info, Manual, Tutorial, Download, Users, Contacts, Privacy, and it. The main content area shows two screenshots of the AlgoBuild interface. The left screenshot displays a flowchart with "START main", "PROGRAM main", "base altezza", and "END". A text box overlay says: "Simply and intuitive interface. Commands clear and easy to use to 'build' the program. Modify of commands is immediatly visible in graph and text." The right screenshot shows a similar flowchart with a "Modifica Input" dialog box open, showing "base altezza" and "Una variabile per riga". Below the screenshots, the text "Create Flow Charts, Pseudo Code, Programs" is followed by "Start... RUN!". A paragraph describes AlgoBuild as a learning environment for programming and algorithms, easy and fast to learn, and based on a graphic syntax formal and structured. It mentions optimizing work in lab, classroom, and at home, and provides an example "Hello World!" with flowchart and pseudocode.

AlgoBuild

Algorithms & FlowCharts

Home Info Manual Tutorial Download Users Contacts Privacy it

Simply and intuitive interface

Commands clear and easy to use to "build" the program. Modify of commands is immediatly visible in graph and text.

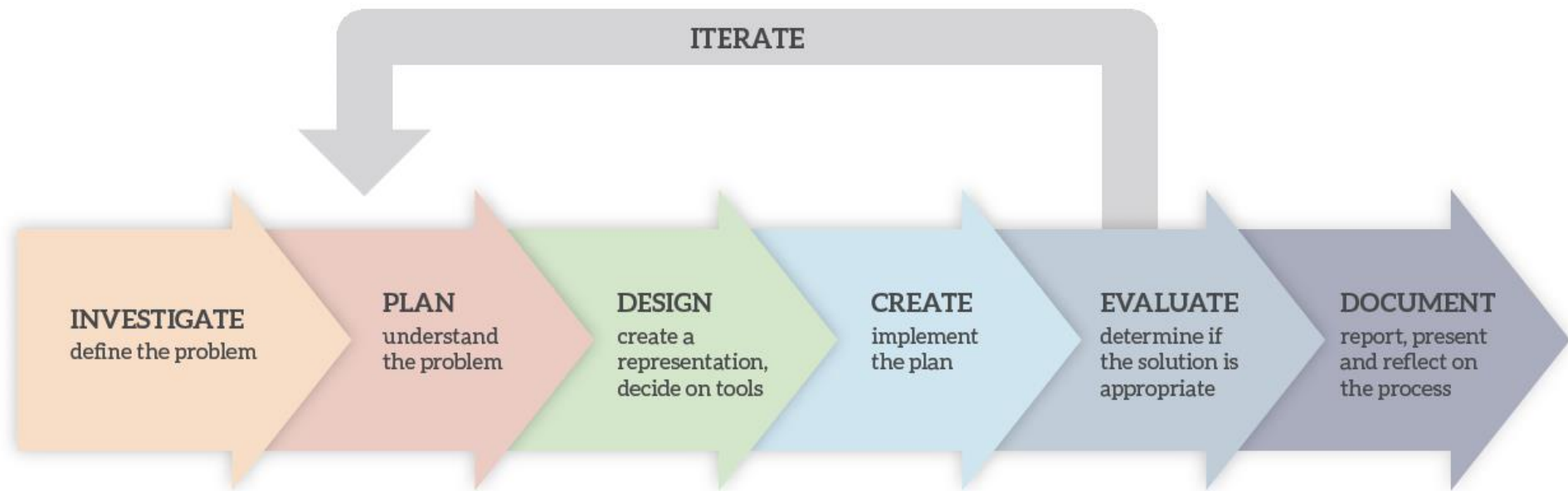
Create Flow Charts, Pseudo Code, Programs

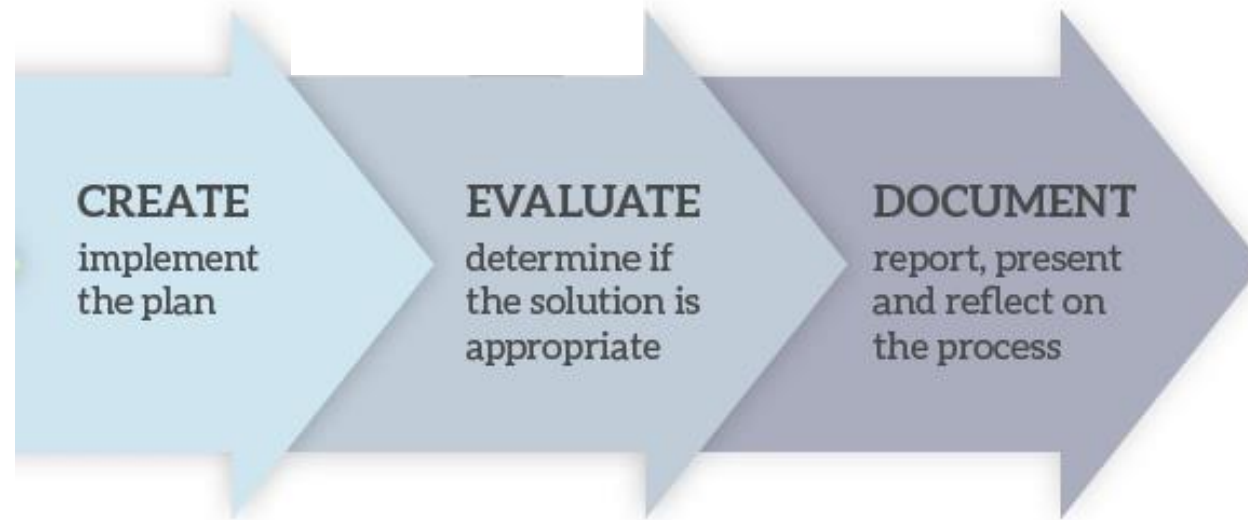
Start... RUN!

Design the programs with AlgoBuild, the learning environment to learn programming and algorithms. Easy and fast it allows to learn the basic notions of structured programming with the use of flow charts and pseudo code. It is funny and easy to use but based on a graphic syntax formal and structured. It optimize the work in lab, into the classroom with the Interactive Blackboard and at home. Look at the example **Hello World!** with flowchart and pseudocode.

www.algobuild.com











What did you do?

How did you do it?

How would you support students
to engage in a similar process

Roles & Group Dynamics

What has challenged your thinking?

Making Links

Problems

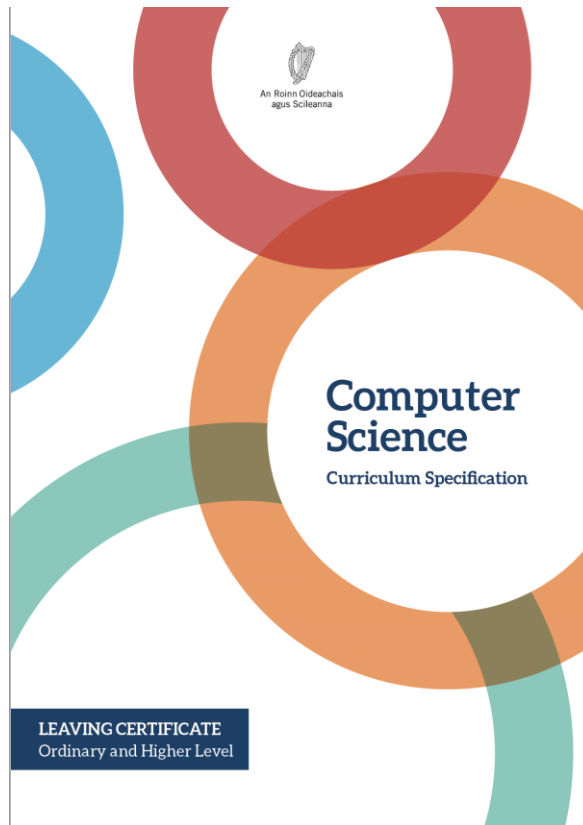
Which LOs did
you use?

How did you engage
with the Design
Process?



Presentation & Debrief

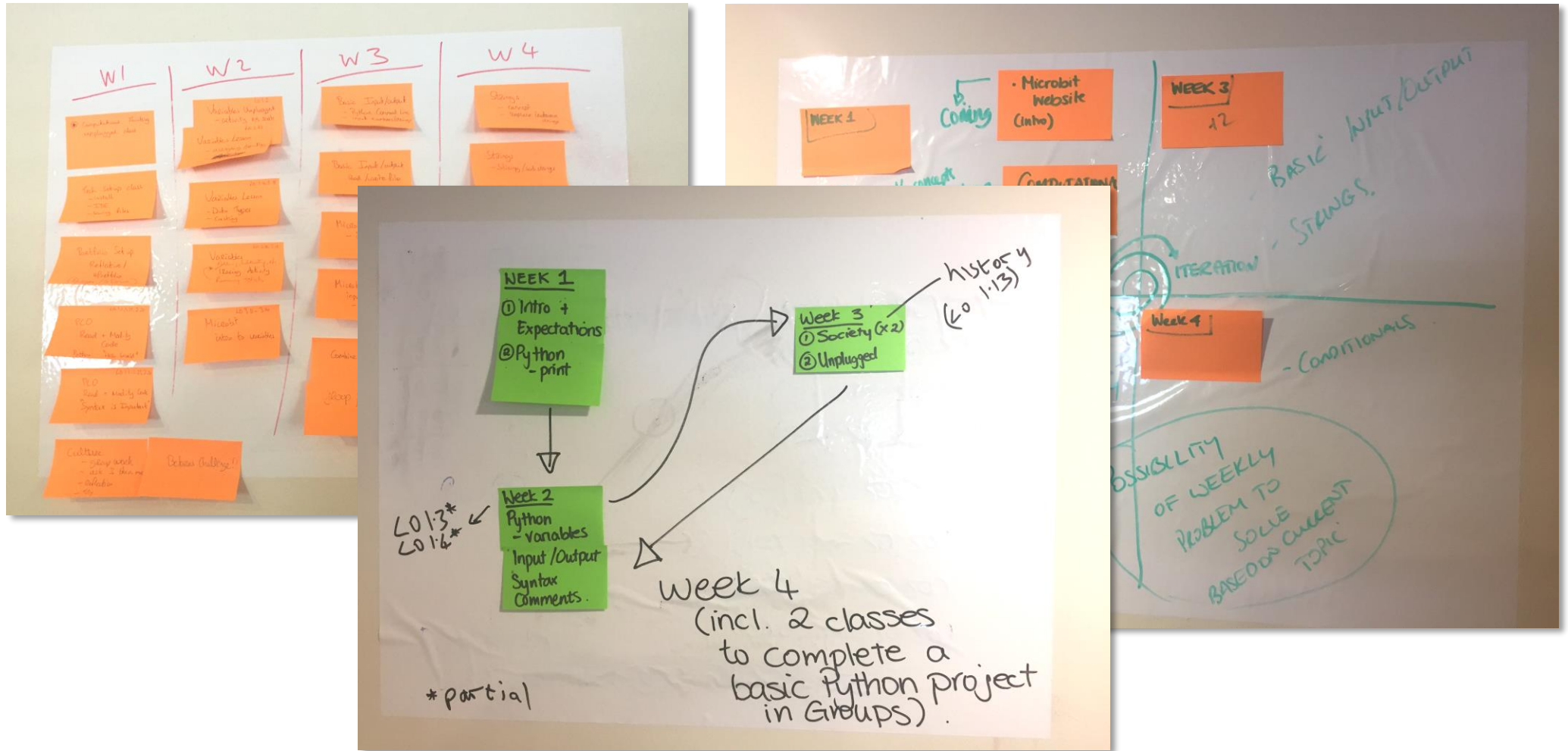
Curriculum & Assessment Planning



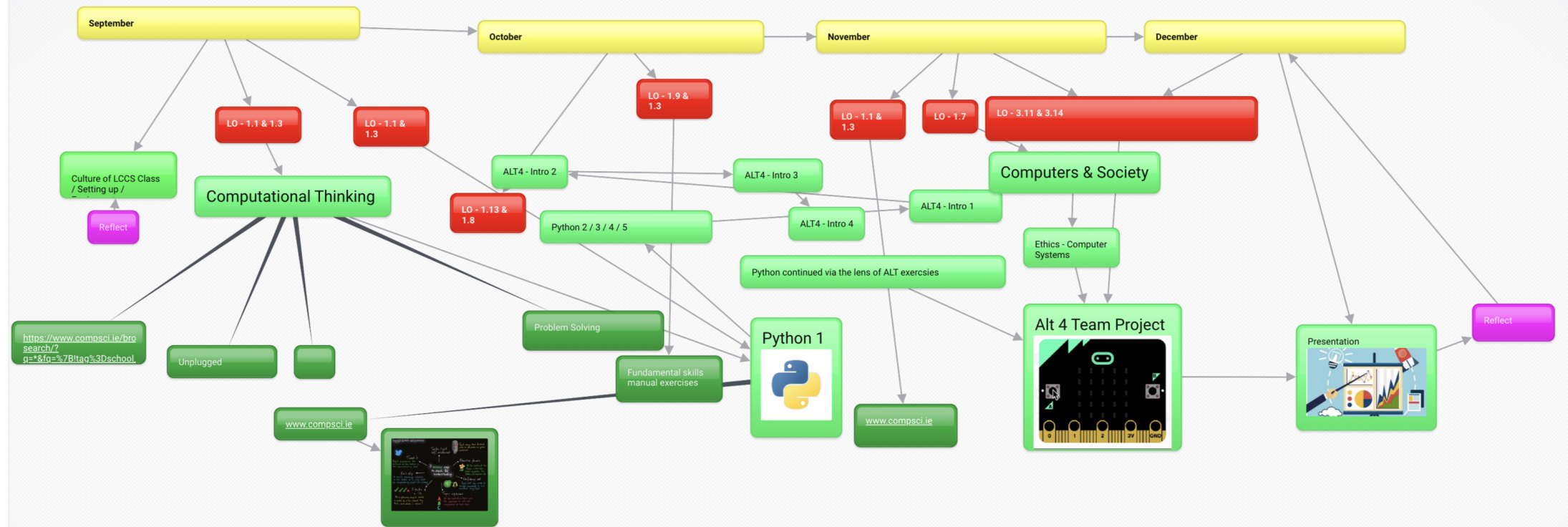
‘Learning outcomes can best be defined as statements of what a learner knows, understands and is able to do after completion of learning.’

CEDEFOP (2009)

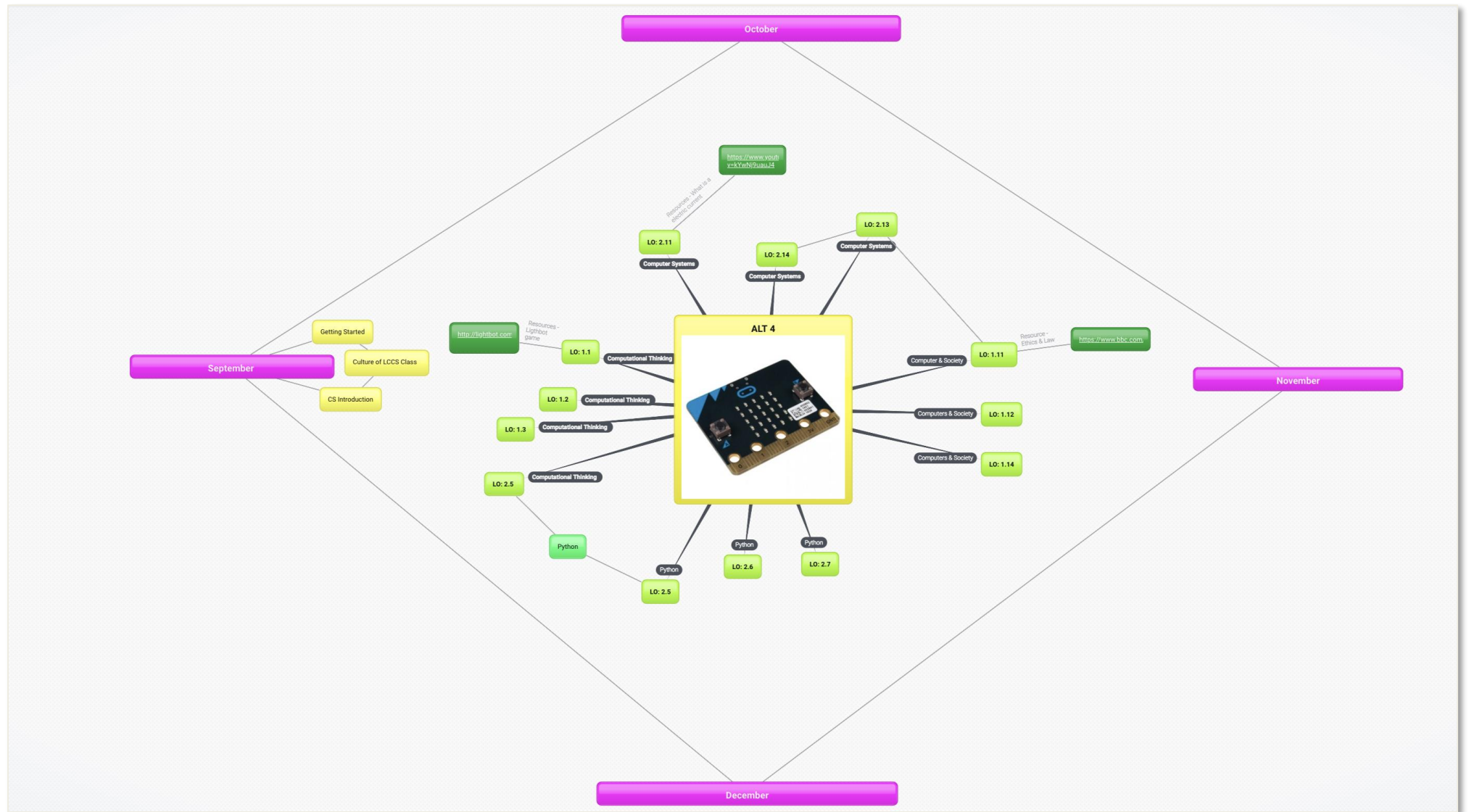
Mapping Activity from NW1 - May



Mapping Activity from NW2 - September

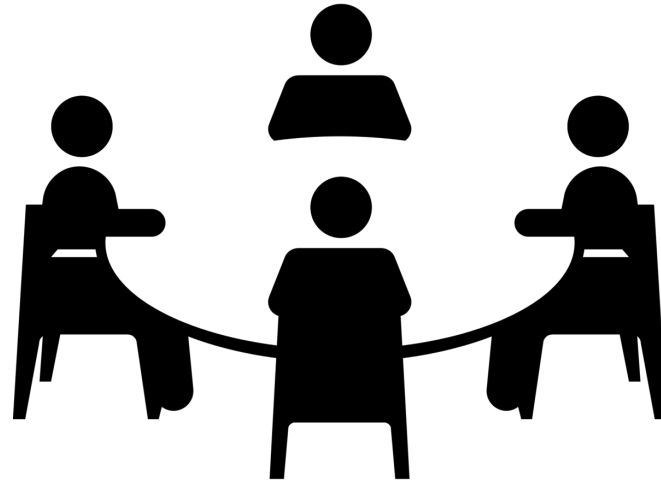


https://bubbl.us/NDcyMDQ2My84MTA1MjEvMDY4Zjc4M2E0N2Y3N2E3OWNIMGQ2NzUxZTk2M2NiMGE=@X?utm_source=shared-link&utm_medium=link&s=9137683

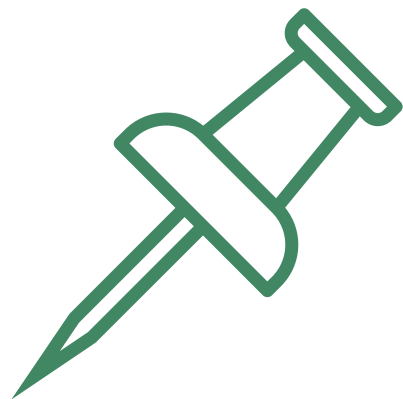


https://bubbl.us/NDcyMDQ2My84MDI4MjMvMzcwNTMzNDBhMTlkZWUyZDBkYTg5ZTUzYzI1ZjJlZTA=@X?utm_source=shared-link&utm_medium=link&s=9057731

Group Activity



Develop in groups a curriculum map for January to May 2019 – Focus on ALT2 initially but include space for ALT3.



Key Message to remember:

*Explore and teach the LOs through the lens of
ALTs.*

There are numerous ways to achieve this.

Group Activity - Instructions

1. *In your assigned group go to the breakout area.*
2. *Take one laptop, pen and paper and the LCCS specification.*
3. *Log into the Bubbl site using your group's URL(see slack for url)*
4. *Develop in groups a detailed curriculum map for January to May – ALT2 & ALT3.*
5. *Work in your group and consider – Subject Topics / LOs / Resources / Assessment / Build up to ALTs / ALTs / Equipment etc.*
6. *Present back to the wider group.*



**See slack for URLs
for each group's
URL.**

What will you do with LOs for ALT2 /ALT3?

What order should you teach them in?

**What about repeating LOs / Linking
to other part of the course?**

**How will students demonstrate they have
achieved the learning outcomes?**

What content or resources will you need?

**What can you include for the Ordinary level
students?**



Key Skills of Senior Cycle

LCCS Specification: p12



What has worked well for you?

What has challenged your thinking?

Why did you make these decisions?

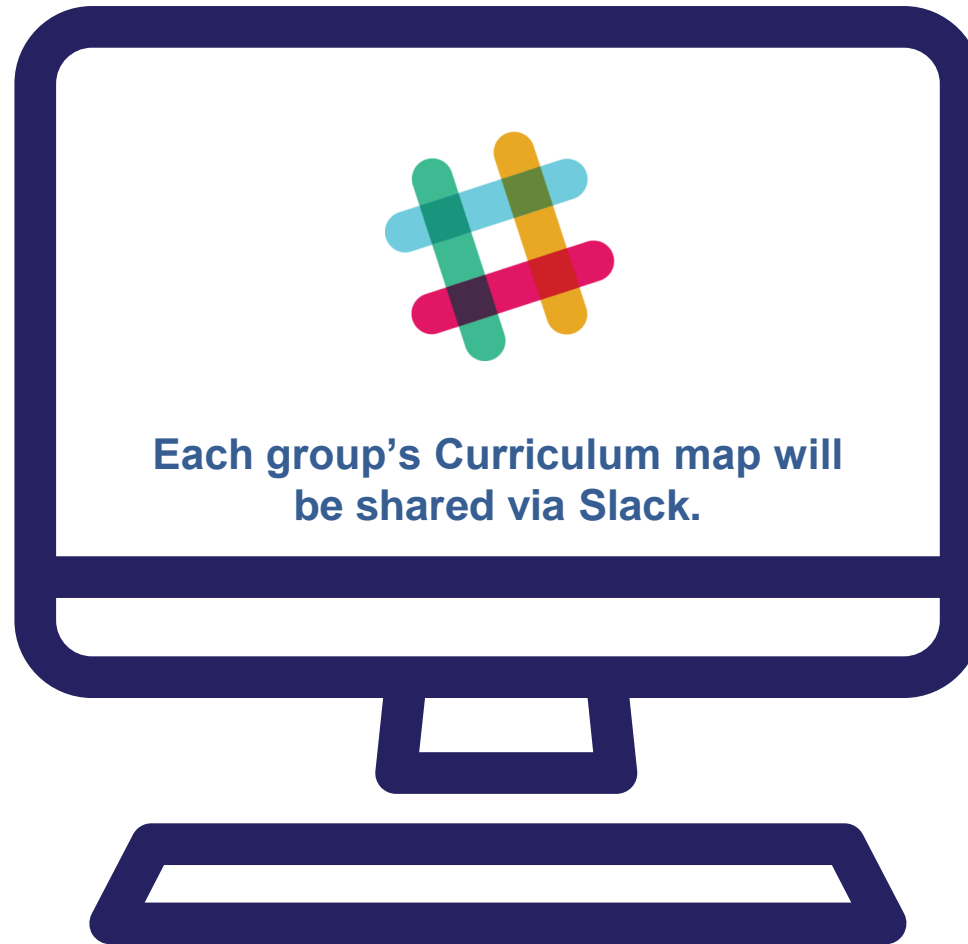
Where are the links to other parts of the course

Which LOs did you use?



Where do you want to be in September 2019 in terms of the course?

Presentation & Debrief





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