PDST

Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

An Roinn Oideachais agus Scileanna
Department of Education and Skills

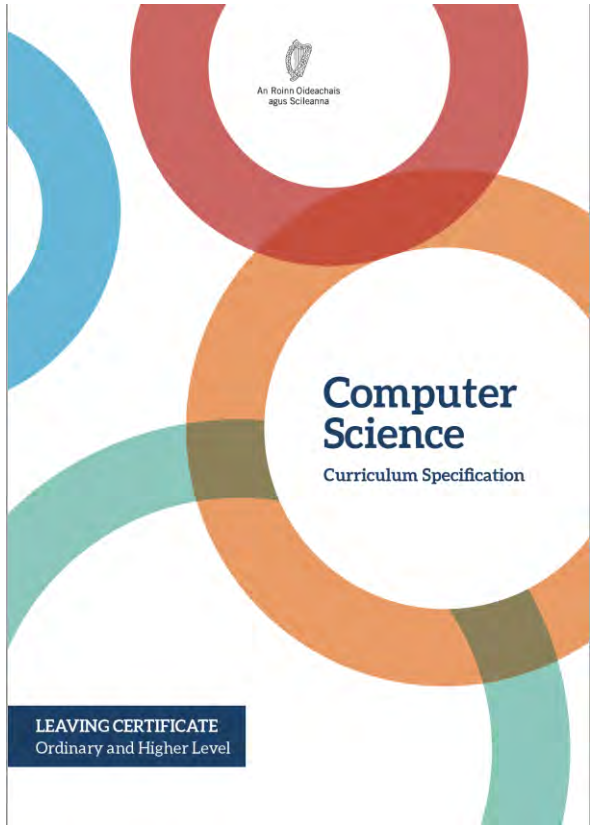
National Workshop 3

LEAVING CERTIFICATE
COMPUTER SCIENCE

PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

Session 3

Curriculum planning

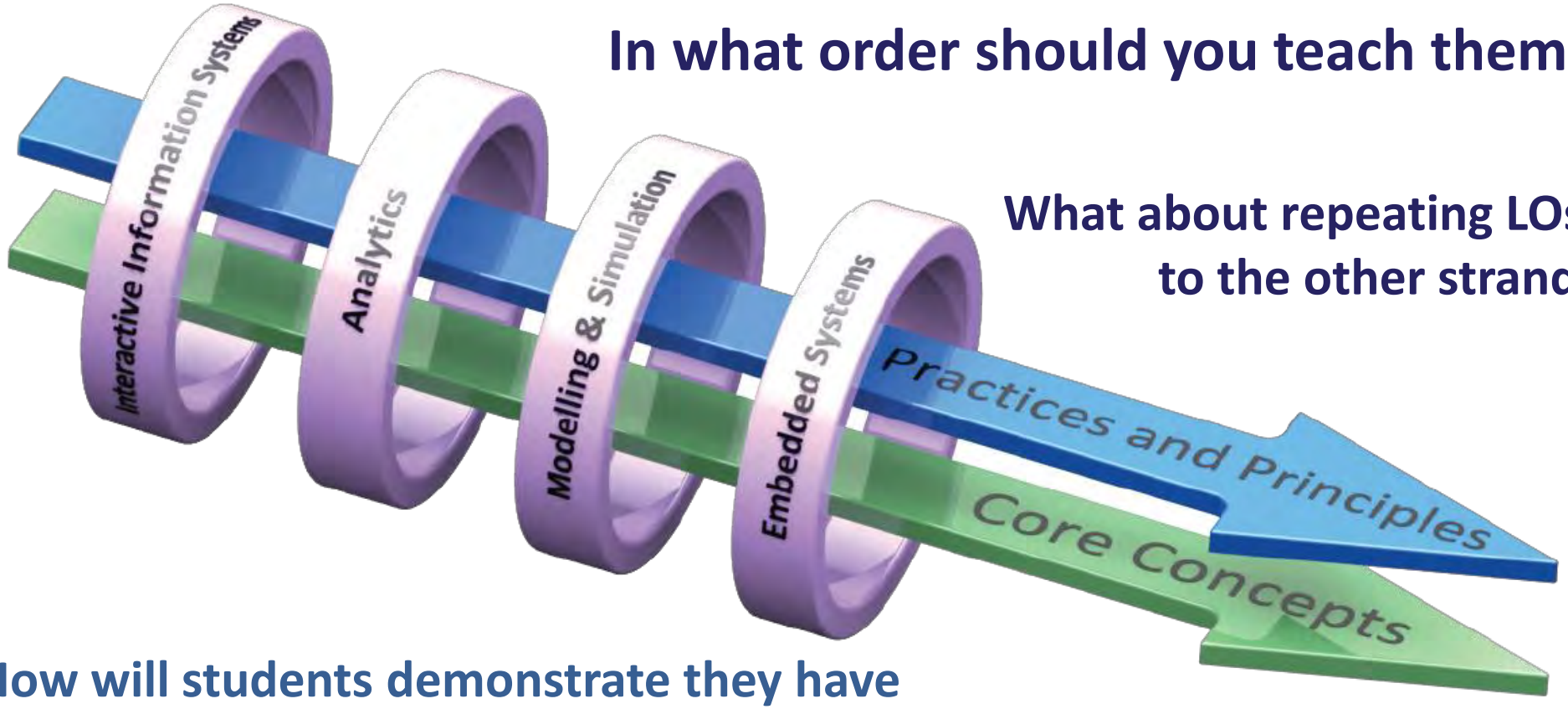


*'Learning outcomes can best be defined as statements of what a learner **knows**, **understands** and is **able to do** after completion of learning.'*

CEDEFOP (2009)

What will you do with LOs?

In what order should you teach them?



What about repeating LOs / linking to the other strands?

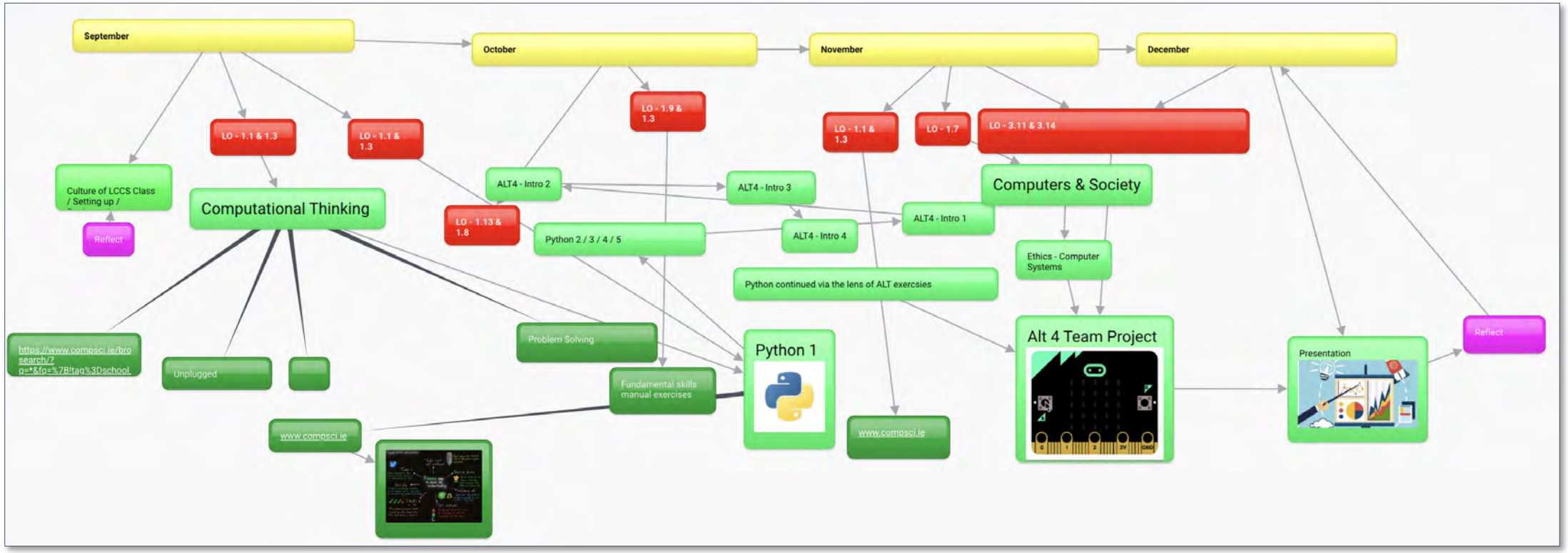
How will students demonstrate they have achieved the learning outcomes?

What content or resources do you need?

Key Message to remember:

Explore and teach the LOs through the lens of ALTs.

There are several ways to achieve this.



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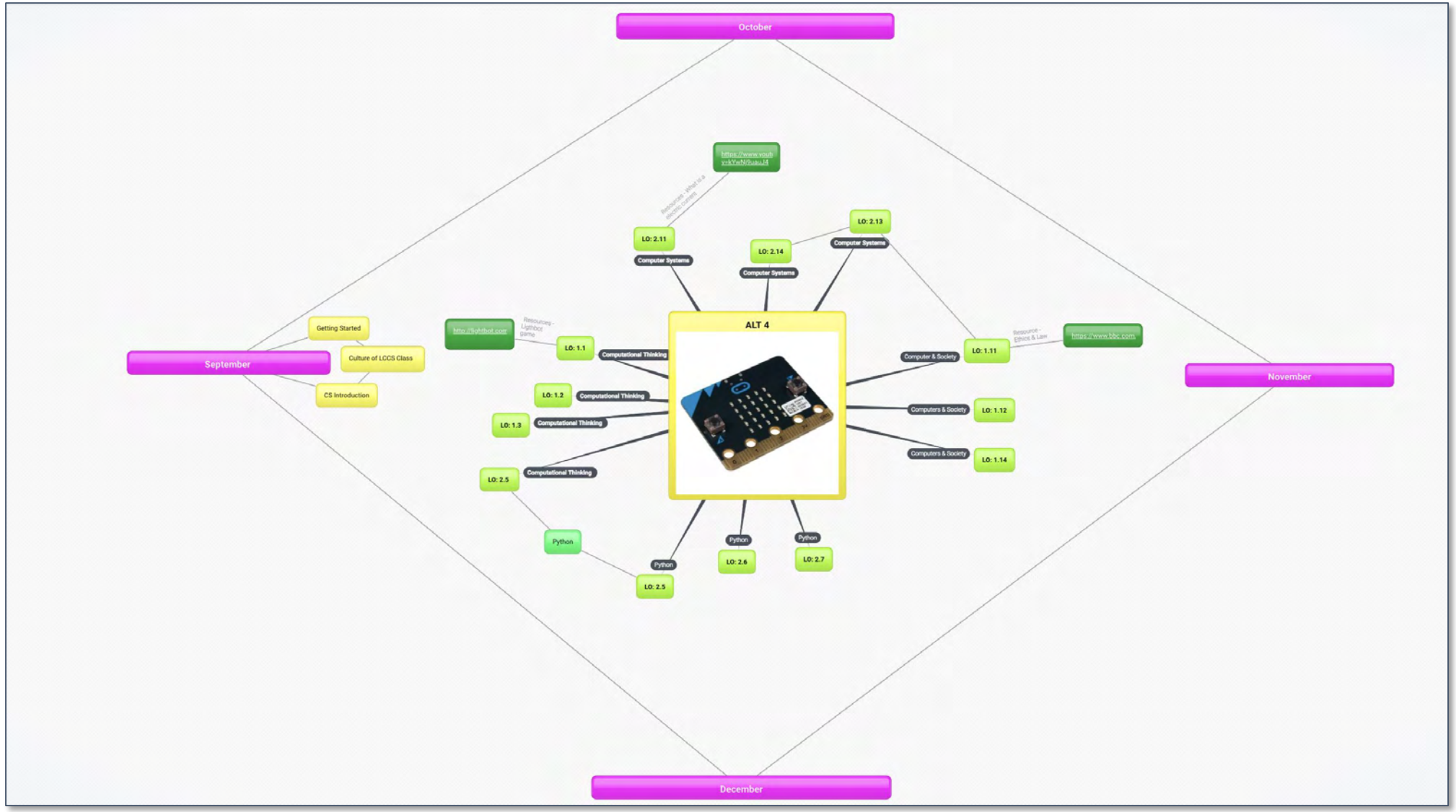


https://bubbl.us/NDcyMDQ2My84MDI4MjMvMzcxNTMzNDBhMTlkZWUyZDBkYTg5ZTUzYzI1ZjJlZTA=@X?utm_source=shared-link&utm_medium=link&s=9057731

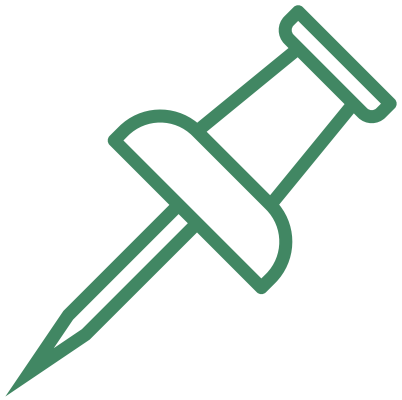
bubbl.us

Created by priyanka
from Noun Project

Group Activity

Develop a curriculum map for January to April

Focus on ALT2



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. *Have a copy of the LCCS specification to hand.*
2. *In the Chat, click on the link to the Google doc.*
3. *In the Google doc, click on the link to the Bubbl.us diagram corresponding to your breakout room number.*
4. *Develop a detailed curriculum map for January to April – ALT2*
5. *Work in your group and consider…*

   Topics / LOs / Resources / Assessment / Build up to ALT2 / ALT2 / Equipment etc.
6. *Present back to the wider group.*

What will you do with LOs for ALT2?

In what order should you teach them?

What about repeating LOs / linking to the other strands?

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?

Are there any considerations you should make for your students with SEN?

What about differentiation and extension of tasks?

Key Skills of Senior Cycle

LCCS Specification: p12

What LOs will your students experience?

Are there links to the other strands?

Why did you make these decisions?

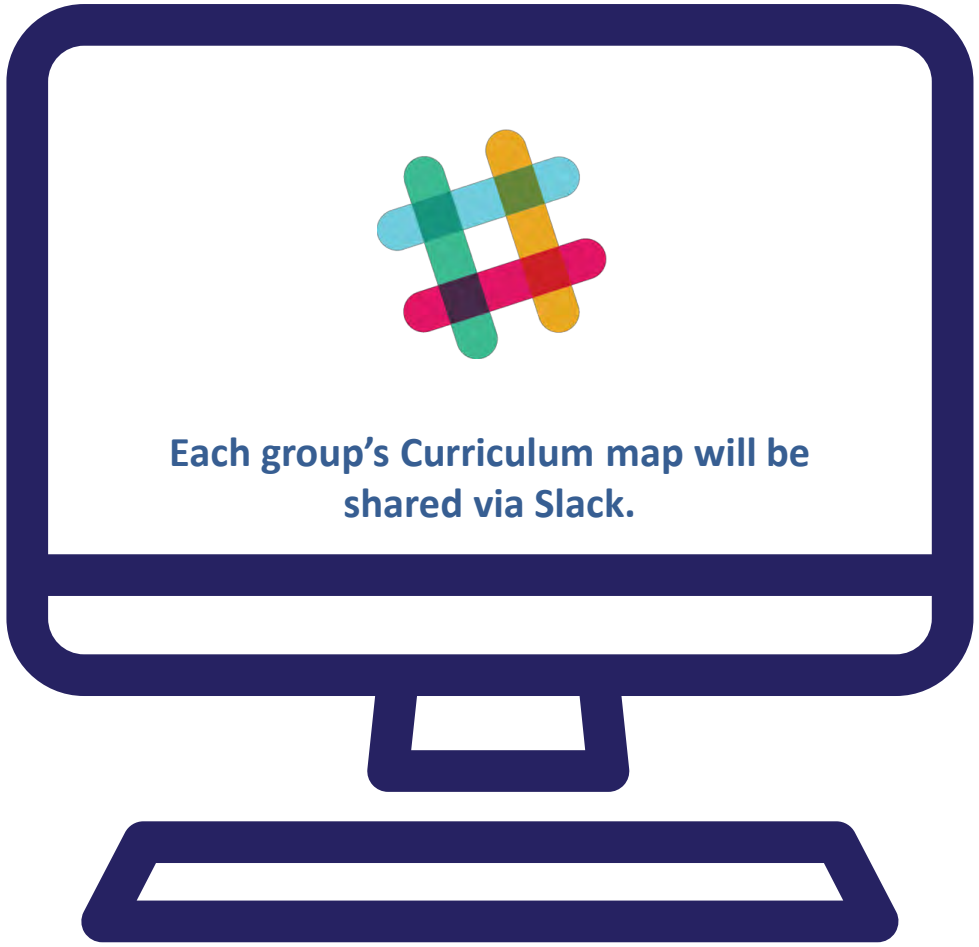
What learning experiences will help your students to achieve these LOs?

Where do you want to be in September 2021 in terms of the course?

What did you find challenging about this task?

How was your thinking extended in relation to curriculum planning?

In what way will you teach the LOs through the lens of the ALTs?


Each group’s Curriculum map will be shared via Slack.

Additional Resources

Data Sets

kaggle

amazon

yelp

Census AtSchool

DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION
FIDELITY BRAVERY INTEGRITY

airbnb

unicef

worldometer

DATA.GOV.IE

An Phríomh-Oifig Staidrimh
Central Statistics Office

INTERNATIONAL MONETARY FUND

Data Science Communities

IBM Data Science Community - https://community.ibm.com/community/user/datascience/home

Open Data Science - https://ods.ai/

Data Science Central - https://www.datasciencecentral.com/

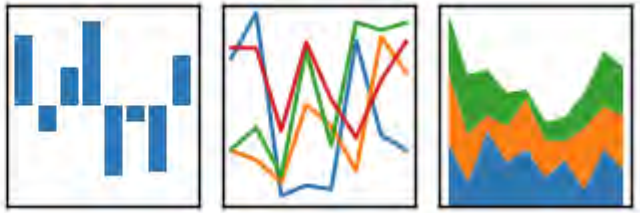
Driven Data - https://www.drivendata.org/


COMPSCI.IE
All of these resources can be found on Compsci.

Analytics Toolkit

pandas

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



plotly

NumPy

matplotlib

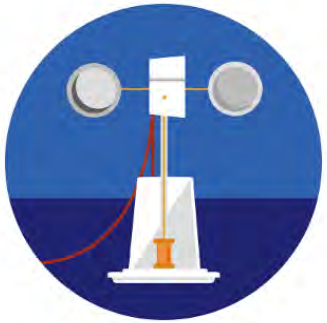
Version 3.0.2

Useful Tutorials

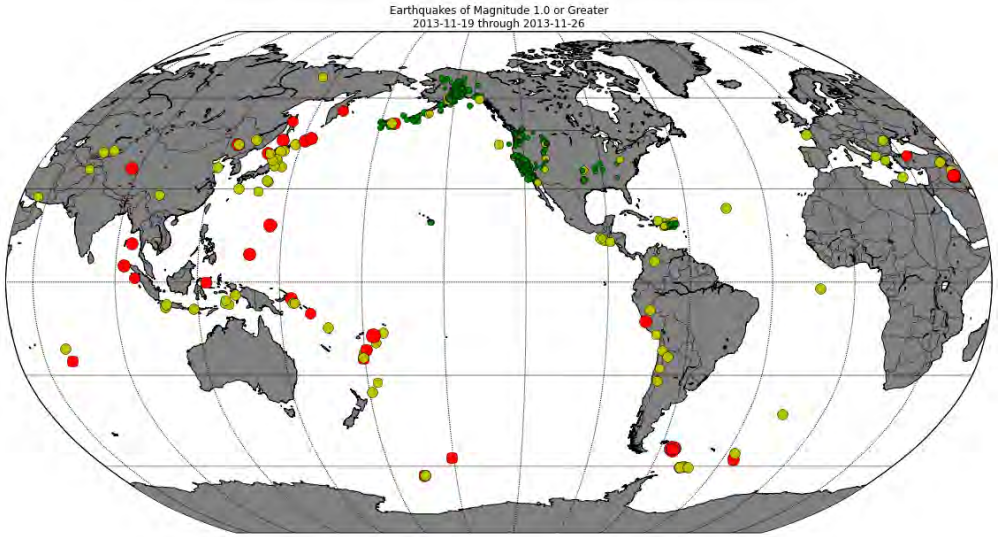
Comparing Speeds

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

Using Pandas to Read Large Excel Files in Python

data-science

Analyzing Obesity in England With Python

basics data-science

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Python Libraries for ALT2

A quick introduction

statistics
re
matplotlib
pandas

Measures of Central Tendancy

```
# A simple program to calculate and display averages
from statistics import *

# Initialise a list of values
values = [2,3,5,2,4]

# Compute the 3 averages
arithmetic_mean = mean(values)
median_value = median(values)
modal_value = mode(values)

# Display the answers
print("The mean is ", arithmetic_mean)
print("The median and mode are %d and %d" %(median_value, modal_value))
```

When the program is run the output looks like this:

```
The mean is  3.2
The median and mode are 3 and 2
>>>
```

Measures of Central Tendancy

Check out the online documentation

Averages and measures of central location

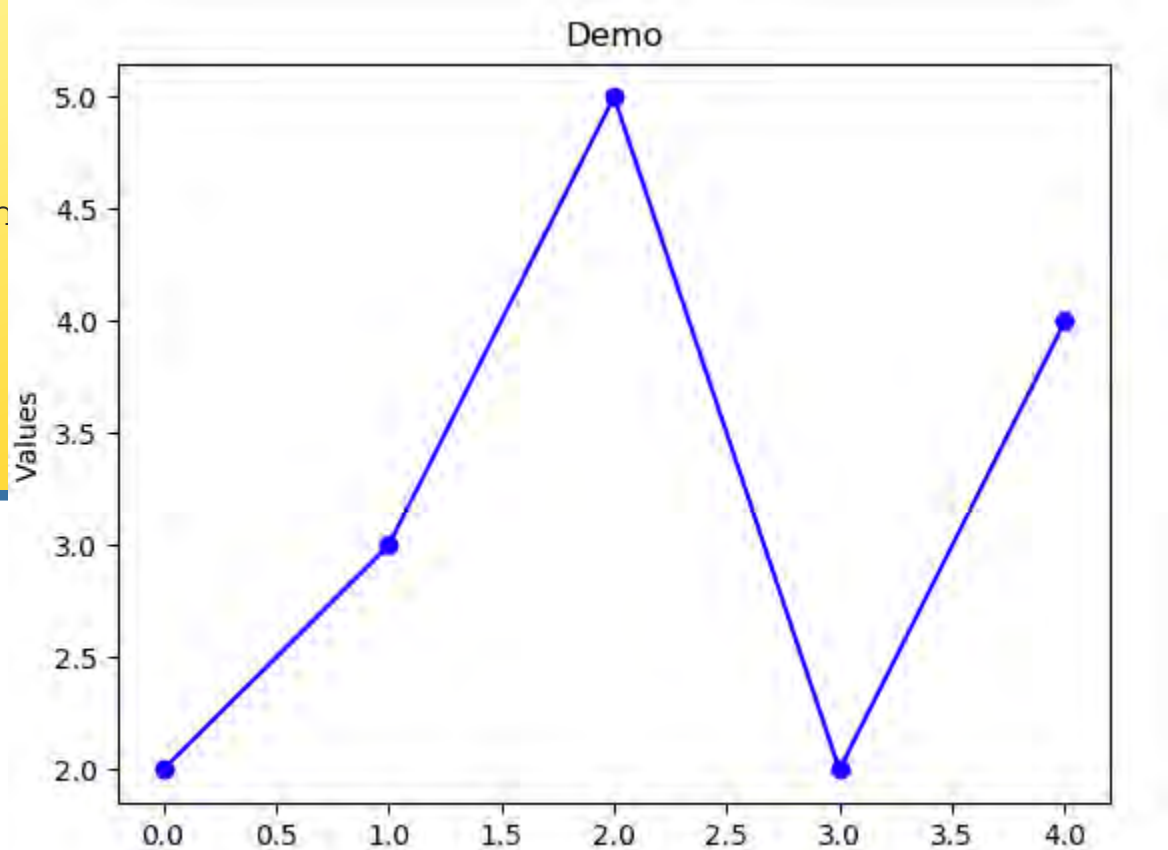
These functions calculate an average or typical value from a population or sample.

`mean()`	Arithmetic mean ("average") of data.
`fmean()`	Fast, floating point arithmetic mean.
`geometric_mean()`	Geometric mean of data.
`harmonic_mean()`	Harmonic mean of data.
`median()`	Median (middle value) of data.
`median_low()`	Low median of data.
`median_high()`	High median of data.
`median_grouped()`	Median, or 50th percentile, of grouped data.
`mode()`	Single mode (most common value) of discrete or nominal data.
`multimode()`	List of modes (most common values) of discrete or nomimal data.
`quantiles()`	Divide data into intervals with equal probability.

https://docs.python.org/3/library/statistics.html

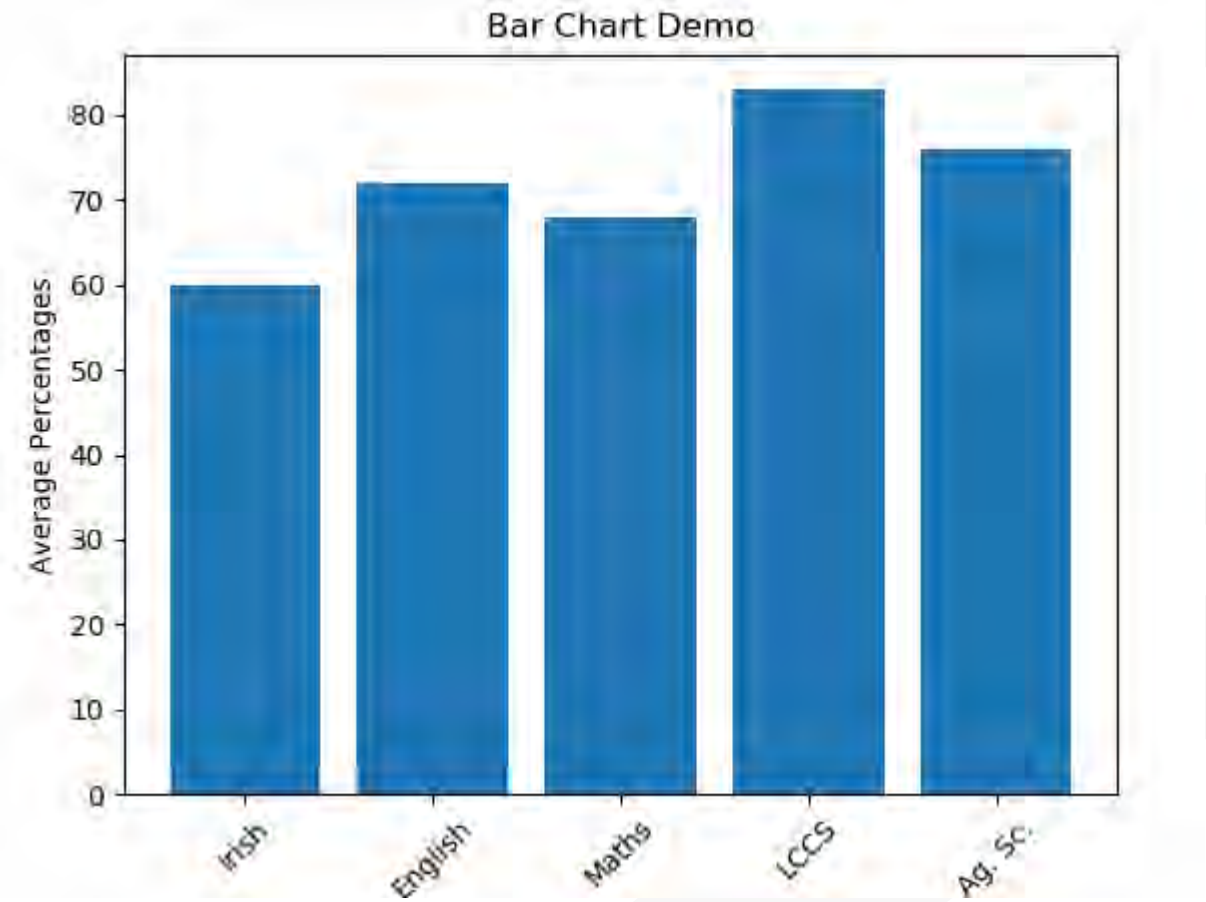
Demonstration of matplotlib

```
# A simple program to demonstrate use of matplotlib
from matplotlib import pyplot as plt

# Initialise a list of values
values = [2,3,5,2,4]

# Intervals for the x-axis
x_axis = [0, 1, 2, 3, 4]

plt.plot(x_axis, values, color='blue', lin

plt.title("Demo") # graph title
plt.ylabel("Values") # label the y-axis
plt.show() # Display the plot
```



Demonstration of matplotlib

```
# A simple program to demonstrate use of matplotlib
from matplotlib import pyplot as plt

# Initialise a list of subjects
subjects = ['Irish', 'English', 'Maths', 'LCCS', 'Ag. Sc.']

percentages = [60, 72, 68, 83, 76] # Avera

# Plot a bar chart
plt.bar(subjects, percentages)

plt.title("Bar Chart Demo") # graph title
plt.ylabel("Average Percentages") # label
# put the names of the subjects on the x-a
plt.xticks(range(len(subjects)), subjects,

plt.show() # Display the plot
```



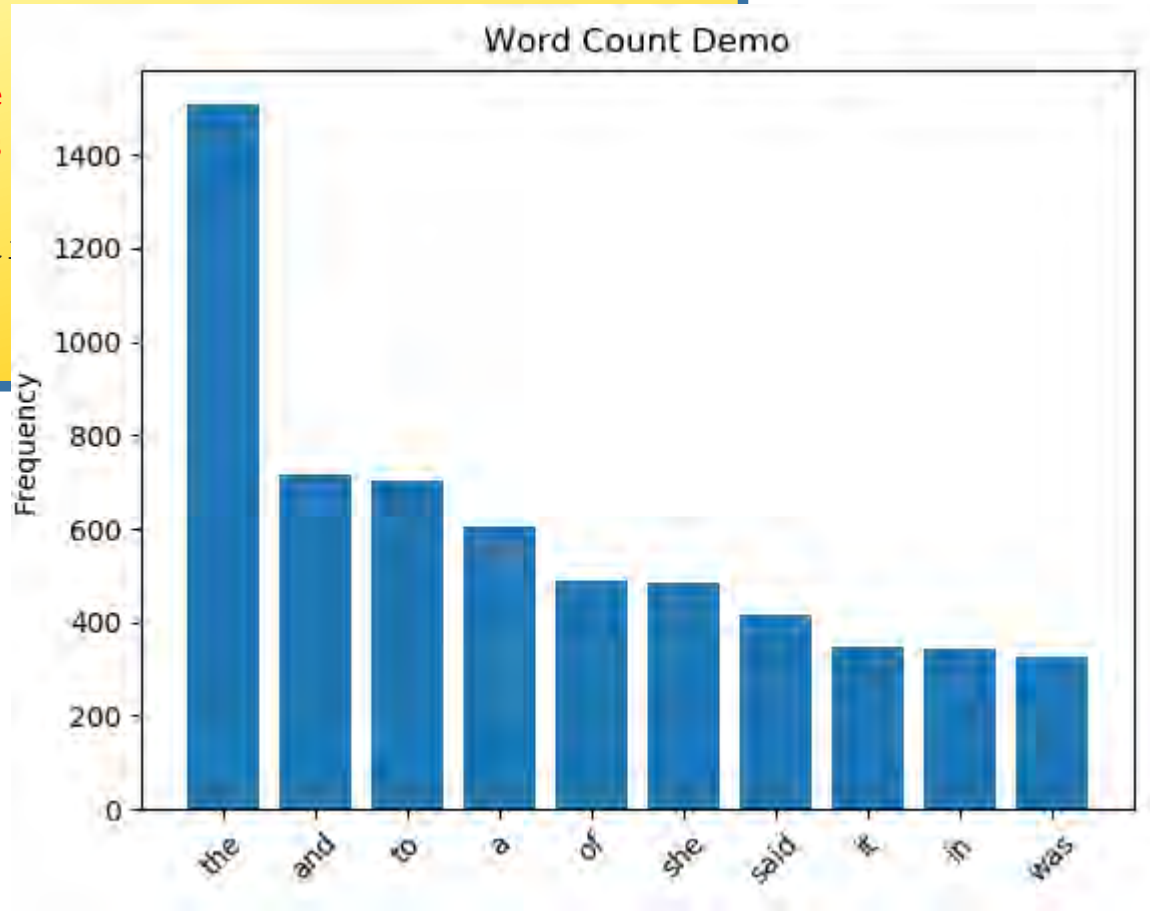
Text Analysis – word frequency

```
# A program to visualise the most common words in a file
from matplotlib import pyplot as plt
from collections import Counter

# IMPORTANT: Make sure book.txt exists in runtime directory
bookFile = open("book.txt","r") # Open the file
text = bookFile.read() # read the file
bookFile.close() # close the file
text_list = text.split() # create a list

# use counter to return the most common words
# format is .... [('the', 1507), ('and', 714), etc
most_common_words = Counter(text_list).most_common(10)

words = [] # an empty list of words
word_count = [] # an empty list of counts

# Build up the lists
for word, count in most_common_words:
    words.append(word) # append the word to the words list
    word_count.append(count)

# Now create and display the chart ….
```

Text Analysis – word frequency

… continued from previous slide

```
# Now create and display the chart ….

# Create the chart
plt.bar(words, word_count)
plt.title("Word Count Demo") # graph title
plt.ylabel("Frequency") # label the y-axis
# put the words on the x-axis
plt.xticks(range(len(words)), words, rotati
plt.show() # display the chart
```



Regular Expressions

A language that enables us to look for patterns in strings

```
import re

text1 = "THERE are 99 RED balloons"
print(re.sub('[0-9]', '', text1)) # remove digits
print(re.sub('[A-Z]', '', text1)) # remove uppercase
print(re.sub('[A-Z0-9]', '', text1)) # remove uppercase and digits
print(re.sub('[^a-z]', '', text1)) # leave lowercase
print(re.sub('[^a-zA-Z ]', '', text1)) # leave letters and spaces
print(re.sub('[^a-zA-Z0-9]', ' ', text1)) # leave letters and digits
print(re.sub(r'\b\w{1,4}\b', '', text1)) # remove words of length 1-3

text1 = "$%^$% joe ^&$%^&"
print(re.sub('[^a-zA-Z0-9]', '', text1))
```

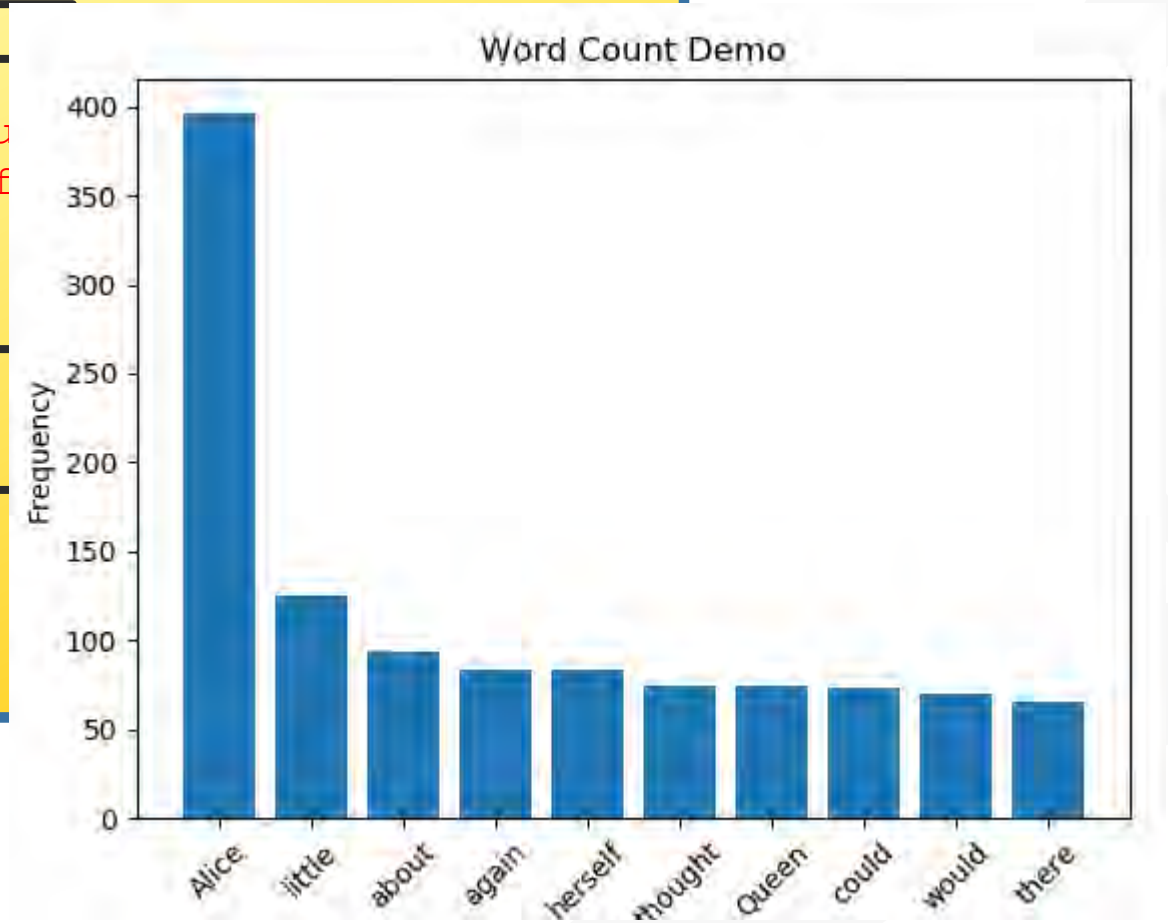
Output

```
THERE are  RED balloons
 are 99  balloons
 are   balloons
areballoons
THERE are  RED balloons
THERE are 99 RED balloons
THERE    balloons


joe
```

Text Analysis – word frequency

Eliminate words of three letters or less … use Regular Expressions

```
# A program to visualise the most common words in a file
from matplotlib import pyplot as plt
from collections import Counter
import re

# IMPORTANT: Make sure book.txt exists in ru
bookFile = open("book.txt","r") # Open the f
text = bookFile.read() # read the file
bookFile.close() # close the file

text = re.sub('[^a-zA-Z0-9 \n]', ' ', text)
text = re.sub(r'\b\w{1,4}\b', '', text)

text_list = text.split() # create a list

# Continue as before …
```



Import the `re` library

Use the `sub` method

Pandas

Useful for very large files … this file was sourced on Kaggle

1	short_name	age	dob	height_cm	weight_kg	nationalit	club_nam	value_eur	wage_eur	player_po	preferred
2	L. Messi	33	24/06/1987	170	72	Argentina	FC Barcelc	67500000	560000	RW, ST, CF	Left
3	Cristiano Ronaldo	35	05/02/1985	187	83	Portugal	Juventus	46000000	220000	ST, LW	Right
4	J. Oblak	27	07/01/1993	188	87	Slovenia	AtlÃ©ticc	75000000	125000	GK	Right
5	R. Lewandowski	31	21/08/1988	184	80	Poland	FC Bayern	80000000	240000	ST	Right
6	Neymar Jr	28	05/02/1992	175	68	Brazil	Paris Saint	90000000	270000	LW, CAM	Right
7	K. De Bruyne	29	28/06/1991	181	70	Belgium	Manchest	87000000	370000	CAM, CM	Right

… …

18911	C. Pizarro	20	18/09/1999	176	70	Chile	UniÃ³n La	45000	500	CB	Right
18912	Shan Huanhuan	21	24/01/1999	185	70	China PR	Dalian YiF	50000	2000	ST	Right
18913	R. Dinanga	18	06/12/2001	182	73	Republic c	Cork City	45000	500	ST	Right
18914	J. Browne	19	10/09/2000	180	73	Republic c	Finn Harp:	45000	500	ST	Right
18915	P. McGarvey	16	02/08/2003	180	76	Republic c	Finn Harp:	30000	500	GK	Right
18916	Xie Xiaofan	22	15/03/1998	177	75	China PR	Jiangsu Su	45000	2000	CM	Right
18917	Wang Haijian	19	02/08/2000	185	67	China PR	Shanghai	45000	1000	CM	Right
18918	A. Cetiner	18	20/07/2001	175	70	Republic c	Shelbourr	40000	500	CM	Right
18919	Huang Jiahui	19	07/10/2000	186	74	China PR	Dalian YiF	40000	1000	CB	Right
18920	A. Phelan	19	20/06/2001	176	72	Republic c	Waterforc	40000	500	CM	Right
18921	J. Akintunde	24	29/03/1996	175	75	England	Derry City	40000	550	ST	Right

Let’s explore the player’s value

Pandas

```
# Using pandas - recommended for larger files
import statistics
import pandas

# Read the entire CSV file into a pandas DataFrame
df = pandas.read_csv('FIFA21-player-list.csv')

# Filter out the column, value_eur
player_values = df['value_eur']

# Compute and display the mean
mean_value = round(statistics.mean(player_values), 2)
print("Mean Value:", mean_value)

# Compute and display the median
median_value = statistics.median(player_values)
print("Median Value:", median_value)

# Compute and display the min and max values
print("Min: €%f, Max: €%f" %(min(player_values),max(player_values)))
```

Output looks like this:

```
Mean Value: 2224813.29
Median Value: 650000.0
Min: €0.000000, Max: €105500000.000000
```

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agus Scileanna
Department of
Education and Skills