Welcome!

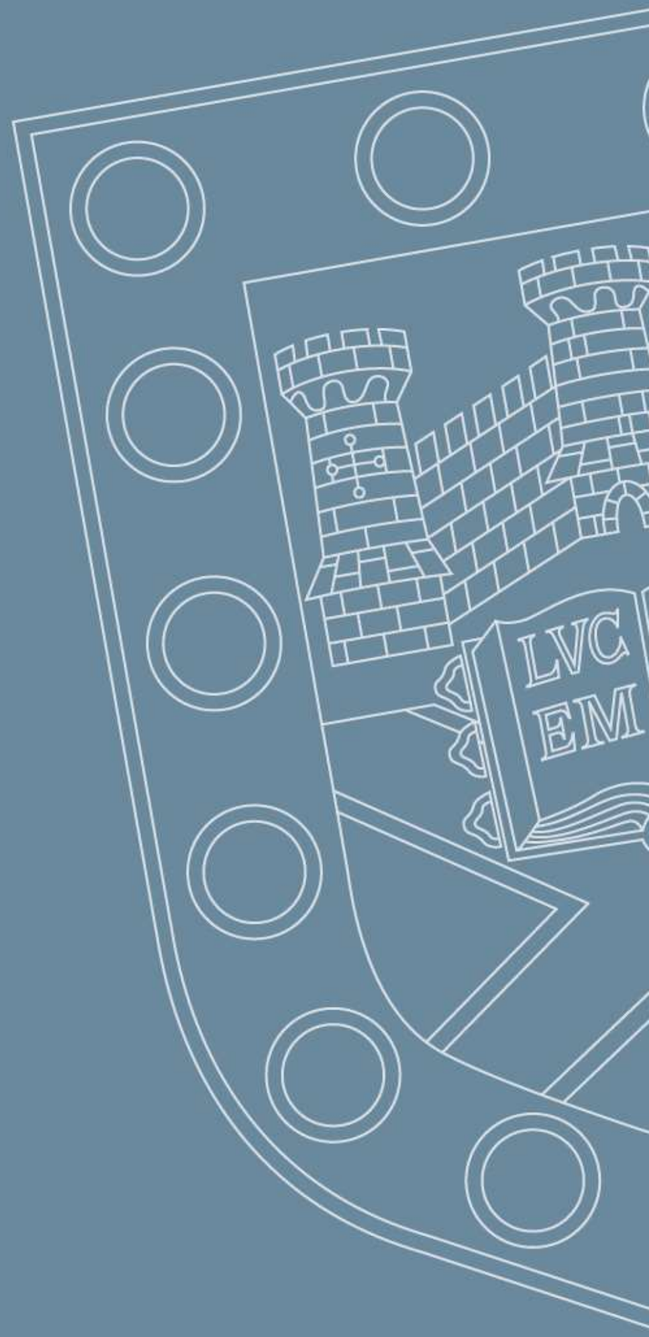
Block 1: Coding Boot Camp

22nd – 26th June 2020

UNIVERSITY OF EXETER

Python programming

Why program?



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WHY PROGRAM?

Course aims

Learn about -

Algorithms, functions, lists, loops, logic, reading and writing files, finding bugs, displaying results using graphs, etc.

Do -

Undertake a programming project applying skills you have learnt.

WHY PROGRAM?

The pre-history of programming

Computers are still very new.

At the end 19th century machines were developed to automate arithmetic for book keeping and the processing of census data.

By the middle of the 20th century digital computers were solving business problems.

WHY PROGRAM?

Computers everywhere

Towards the end of the 20th century almost everything became digital – TV, music, communication, archiving.

WHY PROGRAM?

Data on everything

Top videos

The following table lists the top 30 most-viewed videos on YouTube, with each total rounded to the nearest 10 million views, uploader and upload date.[B]

—Entries with this background color and a dagger (†) indicate that the upload is not a music video.

Top 30 most-viewed YouTube videos[15][16]

#	Video name	Uploader / artist	Views (billions)	Upload date	Note
1.	"Despacito"[17]	Luis Fonsi featuring Daddy Yankee	6.27	January 12, 2017	[C]
2.	"Shape of You"[22]	Ed Sheeran	4.26	January 30, 2017	[D]
3.	"See You Again"[23]	Wiz Khalifa featuring Charlie Puth	4.15	April 6, 2015	[E]
4.	†*Masha and the Bear* – "Recipe for Disaster"[30]	Get Movies	3.75	January 31, 2012	[F]
5.	"Uptown Funk"[31]	Mark Ronson featuring Bruno Mars	3.59	November 19, 2014	[G]

Agriculture

Indicator	Code	Time coverage	Region coverage	Get data
Agricultural land (% of land area)	AG.LND.AGRI.ZS			
Land under cereal production (hectares)	AG.LND.CREL.HA			
Cereal yield (kg per hectare)	AG.YLD.CREL.KG			
Agriculture, value added per worker (constant 2010 US$)	NV.AGR.EMPL.KD			

Climate

Indicator	Code	Time coverage	Region coverage	Get data
CO2 emissions (metric tons per capita)	EN.ATM.CO2E.PC			
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	EN.ATM.PM25.MC.M3			
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	EN.ATM.PM25.MC.ZS			
Average precipitation in depth (mm per year)	AG.LND.PRCP.MM			

WHY PROGRAM?

Uses for programming

Building software

Solving, or modelling, problems

Manipulating and moving data

Gluing programs together

Adding features to software

WHY PROGRAM?

```
shapeList4 = [('0', 'Conical', ''),
              ('6', 'Inverse Conical', ''),
              ('1', 'Spherical', ''),
              ('2', 'Hemispherical', ''),
              ('3', 'Cylindrical', ''),
              ('4', 'Tapered Cylindrical', ''),
              ('10', 'Inverse Tapered Cylindrical', ''),
              ('5', 'Flame', ''),
              ('7', 'Tend Flame', '')]

leaftypes = [('0', 'Rotated Alternate', 'leaves rotate around the stem and face upwards'),
             ('1', 'Rotated Opposite', 'pairs of leaves rotate around the stem and face upw
             ('2', 'Alternate', 'leaves sprout alternately from each side of the stem, uses
             ('3', 'Opposite', 'pairs of leaves sprout from opposite sides of stem, uses ro
             ('4', 'Palmately Compound', 'multiple leaves radiating from stem tip, uses rot
             ('5', 'Radial', 'leaves rotate around the stem (for needles)')]

axes = [(("+0"), "X", ""),
        (("+1"), "Y", ""),
        (("+2"), "Z", "")]
```

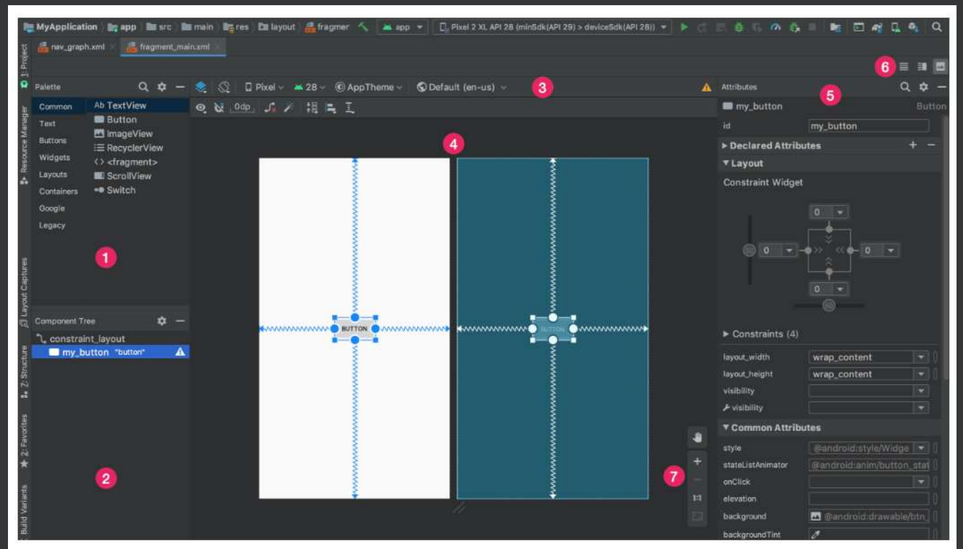
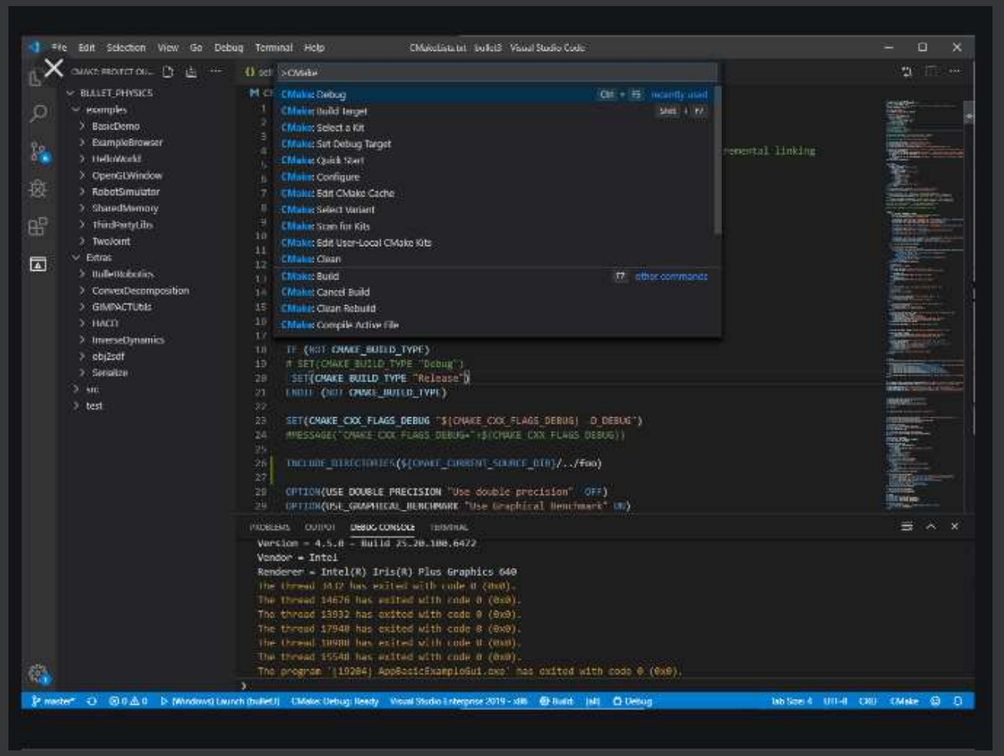


Figure 1. The Layout Editor



AFTER THIS COURSE

Working with research and experiment data

Automating tasks

Learn more Python – Data analysis, ML, Image processing, GIS…

Learn other programming languages

Teach it forward – help a friend learn to program

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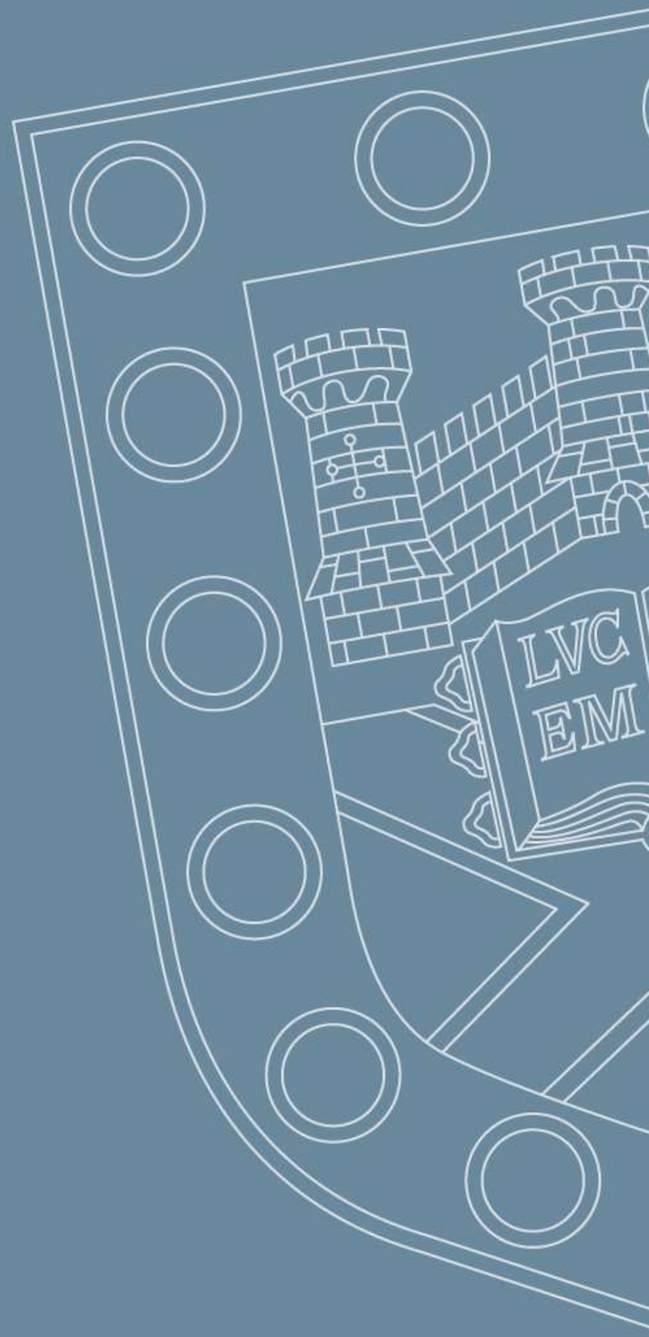

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