OPGS Computer Science Summer Work

Programming

For weeks in Summer:

String-1 Basic python string problems -- no loops

Logic-1

String-2 Medium python string problems -- 1 loop.

if quantityOfProgrammingPractice == 0:

levelOfProgrammingAblity -= 10

#if you don't practice over summer you will get worse!

- 1. Create a free account at: <u>https://codingbat.com/python</u>
- 2. Link your account to my teacher account by clicking prefs in the top right corner

CodingBat	code practice	about help code help+videos done report	prefs	beeney opgs.org
Welcome to Codingbat. See help for the latest.			L	og out]
Java	Python			

3. Add my email address in the "teacher share" section and click share

	CodingBat code prac	tice						
	> CodingBat Home							
	Account Settings							
	Change password							
	Password must contain at least	t 6 characters						
	New Password		show/hide					
	Teacher Share							
	Enter the email address of the teacher account. This will make your done page and solution code visible to that account.							
	Share To	cbeeney@opgs.org]					
		Share	_					
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	Generally this is left blank. A teacher may ask you to fill this in.							
	Memo		1					
		Update Memo	- <u>,</u>					
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	privacy statement							
4.	. Complete the 8 sections in the Python section (Make sure you are in Python. not Java!)							
	CodingBat code practice about help code							
	Welcome to Codingbat. ee help for the l	atest.						
	Java Pytho	n						
	Warmup-1	Warmup-2 ☆☆		If you need help, try here:				
	Simple warmup problems to get start loops (solutions available)	ted, no Medium warmup string/list problems with loops (solutions available)						

•	Python	Example	e Code

- Python Strings
- Python Lists
- Python If Boolean

Or use your GCSE notes to help you!

If you get stuck, solutions are available for the two warm up sections to help you get used to the system (you only write the function requested, not any code to call it)

Try to spread this out over the summer so that you do a little each week!

List-1 And Basic python list problems -- no loops.

List-2 AAA Medium python list problems -- 1 loop.

ogic puzzles -- if else and

Logic-2 Medium boolean logic or not

Research Tasks

Emerging Computing Technology

In this task you get to investigate **any area of emerging computer technology which interests you.** You can pick any area which interests you, but examples could be:

- Artificial intelligence
- Robotics
- Automated self driving cards
- Quantum computing

In no more than ONE side of TYPED A4 summarise the area you have chosen under the following four headings:

- 1. What is it?
- 2. What are the possible Social, Moral, Cultural and Ethical **benefits** of this technology on society
- 3. What are the possible Social, Moral, Cultural and Ethical risks of this technology on society
- 4. My conclusion on this technology and what it will mean for our world 10 years from now

For additional help and support in structuring your answer you might like to watch some of the videos from the following Craig 'n' Dave playlist:

SLR 19: Moral, social, legal, cultural issues https://student.craigndave.org/videos/slr19-moral-social-legal-cultural-issues

Systems Architecture

The CPU "Central Processing Unit" is the central core of any computer system. You will study what it contains and how it works it in depth at A Level.

Start by watching the following 3 videos from Craig 'n' Dave

- 1. AQA: <u>https://student.craigndave.org/videos/aqa-alevel-slr17-the-processor-and-its-major-components</u>
- 2. AQA: <u>https://student.craigndave.org/videos/aqa-alevel-slr17-alu-cu-registers-and-buses</u>
- 3. AQA: <u>https://student.craigndave.org/videos/aqa-alevel-slr17-performance-of-the-cpu</u>

Produce a fully annotated diagram on a single sheet of A4 / A3 paper which shows how the CPU works. Make sure the diagram includes and covers:

- 1. Major CPU components and what they are for:
 - Arithmetic Logic Unit (ALU)
 - Control Unit (CU)
 - Cache
- 2. The main registers
 - Program Counter (PC)
 - Memory Address Register (MAR)
 - Current Instruction Register (CIR)
 - Memory Data/Buffer Register (MDR / MBR)
- 3. Fetch-decode-execute cycle
- 4. Include annotations which explain how the performance of a CPU can be improved by:
 - Increasing the clock speed
 - Increasing the cache size
 - Increasing the number of cores

Both of these research tasks will need to be submitted electronically in the first lesson in September.