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Computer Science Independent Learning Activity

Hand in by your first lesson.

Aim of the activity:

To develop independent learning skills as part of the way that you need to study on your Computer Science A Level.

The activity will be split into two parts: Principles of Computing and Algorithms with Problem Solving, which match the Computer Science A Level specification.

You will be expected to spend at least 4 to 6 hours on this activity.

You will be provided with all of the resources to complete the activity which will consist of video based learning and internet based research.

You can submit the results of your activity in a word processing document or presentation alongside any print screens of sample code files.

You can use a programming language of your choice, but it will need to be a higher level language such as Python or Java. You will also be expected to scan in hand written pseudo code algorithms.

Principles of Computing:

Research and read the following material and answer the sample exam questions. This will review some previous learning from GCSE Computer Science.

https://gcsecomputing.org.uk/lmc/

https://www.youtube.com/watch?v=V04dtxEUjsI&list=PLCiOXwirraUB7V2i0SJ4SSJFqRV_LtgzW&index=1

https://www.youtube.com/watch?v=wJxvYeD0ESs&list=PLCiOXwirraUA-oG_EN3G46jVG0E_G4eBt&index=3

1. Describe what is meant by the term register [1]

2. An example of a register is the Accumulator (ACC) Give a Little Man Computer instruction that will copy the contents of the accumulator into memory when executed. [1]

3. Another register is the program counter (PC) State what the program counter holds [1]

4. Give the name of two Little Man Computer instructions that may change the contents of the Program Counter when executed. [2]

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Algorithm and Problem Solving:

You are to research what a stack is in terms of a data structure and how this could be used in an algorithm to problem solve with a string.

Watch this video lesson to learn what a stack is and how it is an abstraction. Make notes for your learning. Use key words, Push, Pop, Last In First Out LIFO, top, element, list, insertion, deletion, integers. State how stack data structures can be used in real life.
https://www.youtube.com/watch?v=F1F2imiOJfk

Now watch this video on how to use stacks using an array. Make notes for your learning. Use keywords: list, push, pop, element, top, array, linked list, integers, function, argument, index, global variable, local variable, pseudo code, indices, operations, overflow, dynamic array, string

Now watch the following video and learn how to create a stack using a linked list. This is quite challenging!
https://www.youtube.com/watch?v=MuwxQ2IB8lQ

Now learn how to reverse a string as a linked list using a stack data structure. https://www.youtube.com/watch?v=hNP72JdOIgY

Now using what you have learned, go to the following link and watch the video, read the tutorial and practice sample code on the IDE. Print screen your working code and add to your learning notes. Then hand write out your algorithm – as in your exam you will need to write the algorithms.
http://www.geeksforgeeks.org/stack-set-3-reverse-string-using-stack/

Use the following Pseudo Code cheat sheet to help with your pseudo code and remember to include comments.
http://student.craigndave.org/specification-key-terminology-and-cheat-sheets

Add a glossary that lists all of the key word and descriptors you have learnt.