Anglo European Sixth Form

Summer Transition Work

Subject: Computer Science

Exam Board: OCR

Qualification: A level Computer Science – H046, H446

Compulsory tasks:

These tasks must be completed by students before their first lesson in September.
These tasks will be reviewed by the class teacher.

Part 1 – Programming challenge

Choose **1** of the following challenges and solve it using:

- A flowchart
- Pseudocode
- Programme code (any high-level language will do, you may wish to try out a different language to test yourself, but Python is fine)

Password reset program

Only accept a new password if it is:

1. At least eight characters long
2. Has lower case and uppercase letters.

The password reset program should also make the user input their new password twice so that the computer knows that the user has not made any mistakes when typing their new password.

Extensions:

1. Make some sort of algorithm to suggest how strong the password is (Weak, Medium, and Strong) depending on length, whether or not the password has special characters in etc.
2. Let the user input their username. The program should go to a text file with a list of usernames and old passwords, and the program should only let you change your password if you input your old password.

Types of processors

Research and explain the main features of the **Von Neumann Architecture** and the **Harvard Architecture**. Draw suitable diagrams for each, identifying the main differences.

Next, look into the differences between **RISC** and **CISC** Processors, draw out tables to show the differences between the two.

Advisory tasks:

These tasks will support you to excel in the course. They may not be explicitly reviewed by your teachers, but they will allow students to demonstrate a genuine passion for going "above and beyond" in this subject

Algorithms

Research into Big O Notation and how it is used within algorithms Next Research into Dijkstra's Shortest Path and also the A* Algorithms.

Note down how these algorithms compare to those you studied at GCSE.

Data Structures

Beyond GCSE Spec, research the following data structures:
Tuples, Queues, linked lists, Stacks, Hash tables, Graphs and Trees

Useful web links?

Below are links to websites that contain useful material that we shall be covering on the course. Familiarise yourself with the first couple of topics from the specification.

Isaac Computer Science
OCR A Level Specification
Computing 101