A Level Computer Science Preparatory Work

Hello and welcome to the Pate's Grammar School Computing Department. In this document I will list some of the fundamental concepts that you should be familiar with to give yourself a good start to the Computer Science A Level.

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"There aren't any icons to click. It's a chalk board."

If you have not studied GCSE Computing and are unfamiliar with a programming language, then you should think about starting to improve your coding skills. The default language that we use at Pate's is Python – we use version Python 3.2. Version 3.5 can be downloaded for free here:
https://www.python.org/downloads/

I have included a set of PowerPoint presentations that I have used with classes when learning Python. You might find this a useful starting point. However, there are some excellent resources online that will help you take your first few steps in coding:

https://www.codecademy.com/   An excellent resource - Code Academy will track your progress and give you the skills that you need to get to grips with Python – although it can be a little frustrating when you know that you have got a particular problem correct – but not in the way that was expected by the website!

You don't have to learn Python. The key features of most programming languages are transferable, but use slightly different syntax e.g.

Displaying the message, hello world, on screen:

```
Python      print("hello world")
C           puts("hello world");
Java            public class HelloWorld {
                public static void main(String[] args) {
                System.out.println("Hello, World");
                }
                    }
Php         print("hello world");
```

No matter which language you pick, you should be able to understand and use:

Input	**Getting data from the user**
Outputs	**Displaying information**
Variable	**storing and changing values in a program**
Arrays	**storing a group of values**
Procedures with parameters	**sub parts of a program**
Loops (while / for)	**doing the same task over and over again**
Selections (If then else)	**using logical statements to make decisions**
File manipulation	**opening, reading from and writing to files**

It is much easier to learn a language if you have an actual task to complete.
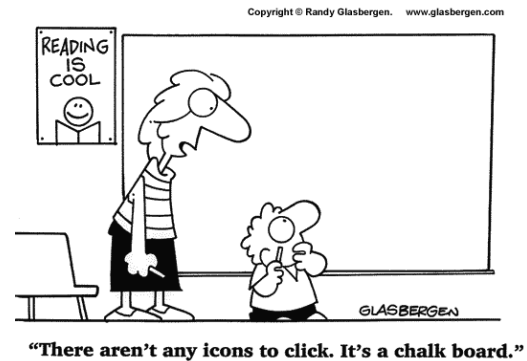
Practical Task 1
Whichever language you have chosen to use, try this seemingly simple task. Write a text based program that plays hangman. The rules are very similar to the natural rules of hangman (and you can adapt them if you so wish):
- **The computer picks up a "random" from words stored in the program or in a file**
- **The computer displays the number of letters, with underscores (i.e. _ _ _ _ _ _ _ _ _)**
- **A player has 9 lives (corresponding to the drawing)**
- **A player can guess one letter each turn**
- **The computer compares the guess with the "hidden" word**
- **The computer prints an updated version of the guessed work with underscores replaced by the correct letter(s)**
- **If the user gets all of the correct letters, they win**
- **If the user uses all nine lives without guessing the word, they lose.**

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Practical Task 2

If you have studied GCSE computing, then you should be fine, but because of the difficulties with coursework you may want to complete the GCSE task that I have included as a PDF.

If you didn't study Computing at GCSE, then you may like to try one of the programming tasks that students have been asked to complete in the past. I have included a PDF with the instructions with this pack. The main aim of this task is to improve your programming skills, but a useful exercise is creating the *write-up*, which is where you actually achieve the marks at A-Level.

"We back up our data on sticky notes because sticky notes never crash."

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I have also included an electronic GCSE book, which covers the theory. If you have studied GCSE ICT a number of these topics will be familiar. But if you are new to computer science then a quick read would be useful, but I am not expecting you to have learned the whole book by the time that you arrive in September!

Extension Work

If you would like a challenge, and it's a wet and miserable summer, then creating a program that controls a webpage is a good place to begin.

Try and create a simple webpage that accepts a student's details (name & address) and saves them into a database. For this you will need HTML, CSS (– if you'd like your page to look good), php to do the programming and SQL to store and retrieve details

XAMMP will turn your computer into a local webserver. Just download XAMMP, create your web pages in the xammp/htdocs, you can then run these calling the address localhost/webpage.html from your browser.

You will need:
XAMMP   https://www.apachefriends.org/index.html
HTML
JavaScript
CSS

Even using
PHP & SQL

The website W3schools is a great resource for web skills (http://www.w3schools.com/)

Good luck!

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