

## Section 1: CPUs, The F-D-E Cycle & Clock Speed

1. Name the steps that the CPU carries out in order to process instructions.
  - Fetch
  - Decode
  - Execute
2. Describe what happens during each of the stages written in your last answer.
  - Fetch: Data/Instructions are fetched from the RAM. The CPU requests the contents of a memory address (sending this request along the address bus). The RAM sends the contents back to the CPU (along the data bus).
  - Decode: The CPU makes sense of the instruction that it receives by looking up its meaning in its instruction set.
  - Execute: The CPU carries out (executes) the instruction.
3. Bob's PC struggles to perform when playing the latest computer games, due to the CPU being unable to process instructions quick enough. Instead of upgrading his CPU, what could he try to do to improve the performance of his CPU and what issues may he be faced with?
  - Bob could overclock his CPU, increasing the clock speed and therefore the amount of F-D-E cycles it can perform each second.
  - The issue will be that the CPU will be working harder than it is designed to and so will get hotter than designed.
  - The extra heat will need to be managed otherwise the CPU will become damaged.

## Section 2: IPs, URLs and DNS

1. Explain, using examples, the following acronyms: IP address, ISP and URL.
  - Internet Protocol Address – It is a unique number (e.g. 324.45.321.23) given to every computer on the internet so they can each be identified.
  - Internet Service Provider – The company who provide you with your internet connection (e.g. BT, Sky or Virgin).
  - Uniform Resource Locator - Another name for a web address, such as "http://www.bbc.co.uk" or "http://www.google.com".
2. What is DNS for and how does it work?
  - DNS stands for DOMAIN NAME SYSTEM and is the system used to find a webserver's IP address that's hosting the website that you're trying to access.
  - The user types in the website's URL;
  - The URL is sent to the ISP which then looks up the URL in their DNS;
  - If it finds a match it will return the associated IP address back to the user's computer;
  - The computer can then connect directly to the website.

## Section 3: The Role of the Operating System

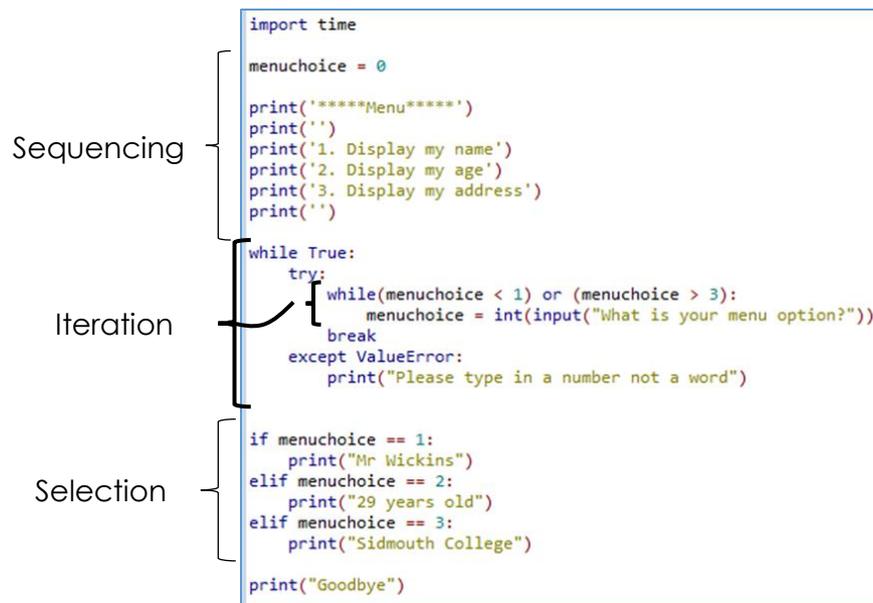
1. Using an example, explain why an Operating System is essential when running applications on a computer.
  - Without an operating system, applications would not be able to communicate with the computer's hardware.
  - The operating system bridges the gap. It gets the application and hardware working together.
  - Without an operating system, a music player would not be able to talk to the speakers and therefore would not play any sound.

- The operating system would pass instructions from the application to the speakers to allow sound to play.

2. What is the role of the Operating System's Kernel?

- The kernel is the heart of the operating system and is responsible for looking after "the most low-level hardware operations".
- It is the kernel that applications make use of when they want to operate the computer's hardware.

## Section 4: Programming Constructs



## Section 5: Translators

1. Can computers understand high level programming code? Explain your answer.
  - No
  - Computers can only process 0s and 1s (machine code) and as such high level programming code needs to be translated (converted) into machine code for the CPU to be able to decode and execute the program's instructions.
2. Explain the similarity and differences between 'Compilers' and 'Interpreters'.
  - Both Compilers and Interpreters translate high level code into machine code (but do this differently).
  - Compilers will translate the entire code first and then execute the program.
  - Translators will translate the code one instructions at a time and execute that instruction before moving on to the next instruction.

## Section 6: Binary Numbers

- 1) 01100011 = **99**
- 2) 11101010 = **234**
- 3) 00101001 = **41**
- 4) 10101010 = **170**