

GCSE Computing (J276): Personal Progress Record

Component 01: Computer systems

1.1 Systems Architecture			
	RED	AMBER	GREEN
1. The purpose of the CPU			
2. Von Neumann architecture			
<i>MAR (Memory Address Register)</i>			
<i>MDR (Memory Data Register)</i>			
<i>Program Counter</i>			
<i>Accumulator</i>			
3. Common CPU components and their function:			
<i>ALU (Arithmetic and Logic Unit)</i>			
<i>CU (Control Unit)</i>			
<i>Cache</i>			
4. The function on the CPU as fetch and execute instructions stored in memory			
5. How common characteristics of CPUs affect their performance:			
<i>Clock speed</i>			
<i>Cache size</i>			
<i>Number of cores</i>			
6. Embedded systems:			
<i>Purpose of embedded systems</i>			
<i>Examples of embedded systems.</i>			
1.2 Memory			
1. The difference between RAM and ROM			
2. The purpose of ROM in a computer system			
3. The purpose of RAM in a computer system			
4. The need for virtual memory			
5. Flash memory			
1.3 Storage			
1. The need for secondary storage			
2. Data capacity and calculation of data capacity requirements			
3. Common types of storage:			
<i>optical</i>			
<i>magnetic</i>			
<i>solid state</i>			
4. Suitable storage devices and storage media for a given application, and the advantages and disadvantages of these, using characteristics:			
<i>Capacity</i>			
<i>Speed</i>			
<i>Portability</i>			
<i>Durability</i>			
<i>Reliability</i>			
<i>Cost</i>			
1.4 Wired and Wireless Networks			
1. Types of networks:			
<i>LAN (Local Area Network)</i>			
<i>WAN (Wide Area Network)</i>			
2. Factors that affect the performance of networks			

3. The different roles of computers in a client-server and a peer-to-peer network			
4. The hardware needed to connect stand-alone computers into a Local Area Network			
<i>Wireless access points</i>			
<i>Routers / Switches</i>			
<i>NIC (Network Interface Controller / Card)</i>			
<i>Transmission media</i>			
5. The internet as a worldwide collection of computer networks:			
<i>DNS (Domain Name Server)</i>			
<i>Hosting</i>			
<i>The Cloud</i>			
6. The concept of virtual networks.			
1.5 Network topologies, protocols and layers			
1. Star and mesh network topologies			
2. Wifi:			
<i>frequency and channels</i>			
<i>encryption</i>			
3. ethernet			
4. The uses of IP addressing, MAC addressing and protocols including:			
<i>TCP/IP (Transmission Control Protocol / Internet Protocol)</i>			
<i>HTTP (Hyper Text Transfer Protocol)</i>			
<i>HTTPS (Hyper Text Transfer Protocol Secure)</i>			
<i>FTP (File Transfer Protocol)</i>			
<i>POP (Post Office Protocol)</i>			
<i>IMAP (Internet Message Access Protocol)</i>			
<i>SMTP (Simple Mail Transfer Protocol)</i>			
5. The concept of layers			
6. Packet switching			
1.6 System Security			
1. Forms of attack			
2. Threats posed to networks:			
<i>Malware</i>			
<i>Phishing</i>			
<i>People as the 'weak point' in secure systems (social engineering)</i>			
<i>Brute force attacks</i>			
<i>Denial of service attacks</i>			
<i>Data interception and theft</i>			
<i>The concept of SQL injection</i>			
<i>Poor network policy</i>			
3. Identifying and preventing vulnerabilities:			
<i>Penetration testing</i>			
<i>Network forensics</i>			
<i>Network policies</i>			
<i>Anti-malware software</i>			
<i>Firewalls</i>			
<i>User access levels</i>			
<i>Passwords</i>			
<i>Encryption</i>			
1.7 Systems Software			
1. The purpose and functionality of systems software			
2. Operating systems:			
<i>User interface</i>			
<i>Memory management / multitasking</i>			
<i>Periheral management and drivers</i>			

<i>User management</i>			
<i>File management</i>			
3. Utility system software			
<i>Encryption software</i>			
<i>Defragmentation</i>			
<i>Data compression</i>			
<i>The role and methods of backup:</i>			
<i>full</i>			
<i>incremental</i>			
1.8 Ethical, legal, cultural and environmental concerns			
1. How to investigate and discuss Computer Science technologies while considering:			
<i>Ethical issues</i>			
<i>Legal issues</i>			
<i>Cultural issues</i>			
<i>Environmental issues</i>			
<i>Privacy issues</i>			
2. How key stakeholders are affected by technologies			
3. Environmental impact of Computer Science			
4. Cultural implications of Computer Science			
5. Open source vs proprietry software			
6. Legislation relevant to Computer Science:			
<i>The Data Protection Act 1998</i>			
<i>Computer Misuse Act 1990</i>			
<i>Copyright Designs and Patenets Act 1988</i>			
<i>Creative Commons Licensing</i>			
<i>Freedom of Information Act 2000</i>			