Paper 1: Principles of CS Revision List

Topic	Revised
Define what is meant by the term 'digital computer'	
Give examples of different types of computer	
Define what is meant by the terms 'binary' and 'bit'	
Explain why binary is used to represent data and program instructions in a computer	
Describe the relationship between the number of available bits and the range of unique values that can be represented	
Determine the number of unique values that can be represented by a binary pattern of a given length (2^n)	
Define what is meant by the terms 'nibble' and 'byte'	
Convert between denary and 8-bit binary numbers	
Add together two positive 8-bit binary integers	
Define what is meant by the term 'overflow error'	
Describe the effects of an overflow error	
Differentiate between signed and unsigned integers	
Describe how positive and negative numbers are represented in two's complement	
Find the two's complement of a positive binary number	
Convert between signed denary numbers and two's complement binary numbers	
Determine the range of values that can be represented in two's complement by a binary number of a given length	
Apply logical left and right shifts to binary integers	
Use logical binary shifts to multiply and divide unsigned binary integers by powers of 2	
Explain why a number may be less precise after a binary shift right has been applied	
Apply arithmetic left and right shifts to signed binary numbers	
Describe how an arithmetic right shift differs from a logical right shift	
Use 'if elif else' in code	
Use flowchart decision symbol	
Use comments, white space, meaningful identifiers, and indentation in code	
Identify parts of code (variables, constants, selection, repetition)	
Define what is meant by the term 'hexadecimal'	
Explain why hexadecimal notation is used	
Convert between hexadecimal and binary	
Define what is meant by the term 'character set'	
Describe how characters are represented in 7-bit ASCII	
Given the ASCII code for one character derive the code for another	
Outline the shortcomings of ASCII and how encoding systems that use more bits overcome them	
Define what is meant by the 'stored program concept'	
Describe the hardware components used in the von Neumann architecture and explain their role in the fetch-decode-execute cycle	
Draw and label a diagram of the inside of a computer; label each hardware component and briefly describe its role	
Explain how the speed of the clock impacts on performance	
Explain how pipelining improves the performance of the CPU	
Explain the relationship between the width of the address bus and the number of memory locations that can be addressed	
Calculate the number of addressable memory locations provided by an address bus of a specified width	
Explain why secondary storage is needed	
Describe how data are stored on magnetic, optical and solid-state media	
Compare the capacity, speed and portability of magnetic, optical and solid-state storage devices	
Select an appropriate type of storage for a particular purpose	

Topic	Revised
Construct an expression to calculate data storage requirements	
Describe the role of the operating system in a computer system	
Identify tasks carried out by an OS	
Describe how the OS organises files and allocates space on a hard drive	
Construct an expression to calculate the number of blocks of space on a hard drive needed to store a file of a given size	
Describe how file permissions are used to control access to files	
Select an appropriate level of file access (read, write, delete, none) for a user	
Describe how an OS uses scheduling to give each active process a share of CPU time	
Describe the features of the round-robin scheduling algorithm	
Describe how the OS uses a paging algorithm to swap programs in and out of main memory.	
Define what is meant by the term 'peripheral'	
Describe how the OS uses drivers to communicate with and manage peripherals	
Explain the purpose of a user interface and describe features of a user interface	
Define what is meant by the term 'access control'	
Describe commonly used methods of authentication	
Select suitable access right for specified individuals	
Define what is meant by the term 'utility software'	
Identify different types of utility software	
Describe the purpose of:	
– file repair/recovery software	
– backup/recovery software	
– file compression software	
– disk defragmentation software	
Select which utility software tool to use for a particular task	