| Cycle _____ J276 Unit 1: Systems Architecture<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/59** | **Assessment Result:** | **/50** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Fetch | Execute | Cache Size |
| Clock Speed | CPU Components | MAR |
| Gigahertz | Megahertz | MDR |
| Accumulator | Virtual Memory | Program Counter |
| von Neumann architecture | Cache | Portability |
| Durability | Reliably | Robustness |

## Unit Description

In this unit you will learn about: The purpose of the CPU, The Von Neumann architecture, Common CPU components and their function, How common characteristics of CPUs affect their performance & Embedded systems
In addition you will learn about: The purpose of Memory: What is meant by RAM, Virtual Memory & ROM. You will also look at various storage devices and in what situation is best to use each type.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current unit.

| Unit 1: Systems Architecture | | ✓ |
|---|---|---|
| **7-9** | Know several examples of embedded systems. | |
| | Explain when & why virtual memory might be needed. | |
| | Explain what the von Neumann architecture is and how it works | |
| **6 - 7** | Explain the advantages and disadvantages of devices based on their characteristics | |
| | Explain the suitability of storage devices for given applications | |
| | Understand what the CPU of a computer does. | |
| | Understand the need for secondary storage. | |
| | Understand the need for virtual memory. | |
| | Understand the purpose of flash memory | |
| **5** | Know the difference between RAM and ROM. | |
| | Know the characteristics of storage devices. | |
| | Know what factors affect the speed of a CPU. | |
| **4** | Know the stages of the fetch, execute cycle. | |
| | Know the components of a CPU. | |
| | Know the purpose of ROM in a computer system. | |
| | Know the purpose of RAM in a computer system. | |
| | Know what the registers in a CPU are. | |
| | Know what is meant by the term: 'embedded system' | |

| Cycle _____ J276 Unit 2: Wired & Wireless Networks<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/70** | **Assessment Result:** | **/50** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Cloud/Hosting | HTTP/ HTTPS | FTP |
| TCP/IP | POP/ IMAP | SMTP |
| LAN | WAN | Encryption |
| MESH | STAR | Topology |

## Unit Description

In this unit you will look at Network topologies such as MESH, star, LAN & WAN. In addition you will look at network protocols & layers.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current unit.

| Unit 2: Wired & Wireless Networks | | ✓ |
|---|---|---|
| **7-9** | Explain packet switching | |
| | Explain the use of Ethernet standards to transmit data over a wired network | |
| | Explain wireless data transmission including frequency, Channels and encryption | |
| **6 - 7** | Explain the need for IP addressing of resources on the Internet and how this can be facilitated by the role of DNS services | |
| | Explain the need for Wireless Access Points (WAP) to create wireless hotspots. | |
| | Describe routers and switches needed to connect stand-alone computers into a Local Area Network | |
| | Explain what is meant by the cloud and Hosting | |
| | Describe the nature of the Internet as a worldwide collection of computer networks | |
| **5** | Explain the role of computers in client-server and peer-to-peer networks | |
| | Describe star and mesh network topologies | |
| | Describe the difference between a Local Area Network and a Wide Area Network. | |
| | Explain the need for IP addressing of resources on the Internet and how this can be facilitated by the role of DNS services | |
| | Explain the need for Wireless Access Points (WAP) to create wireless hotspots. | |
| **4** | Describe routers and switches needed to connect stand-alone computers into a Local Area Network | |
| | Explain what is meant by the cloud and Hosting | |
| | Describe the nature of the Internet as a worldwide collection of computer networks | |

| Cycle _____ J276 Unit 3: Systems Software & Security<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 3 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/65** | **Assessment Result:** | **/40** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Cloud Hosting | HTTP | HTTPS |
| TCP/IP | POP/IMAP | SMTP |
| FTP | Phishing | Malware |
| Drivers | Social engineering | Brute force attacks |
| User management | Encryption | File management |

## Unit Description

In this unit you will look at various security threats and measure you can put into place to prevent those using techniques such as: Encryption, Anti-Virus, Anti-Malware software etc.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current unit

| Unit 3: Systems Software & Security | | ✓ |
|---|---|---|
| **7-9** | Describe the purpose and use of encryption software | |
| | Describe the purpose and use of defragmentation software | |
| **6 - 7** | Explain the difference between POP & IMAP | |
| | Describe the purpose and use of data compression software | |
| | Understand forms of attack and threats posed to a network such as Malware, Phishing & Social engineering | |
| **5** | Identify and understand the prevention of vulnerabilities | |
| | Explain what Malware is | |
| | Understand why we need device drivers | |
| **4** | Explain the need for an  of an operating system | |
| | Understand forms of attack and threats posed on a network. | |
| | State what is meant by Cloud Computing | |

| Cycle ____ J276 Unit 4: Social, Legal, Moral & Ethical Issues<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/35** | **Assessment Result:** | **/3** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| DPA | CMA | CDPA |
| CC Licence | Ethical | Cultural |
| Moral | Open Source | Proprietary |
| Stakeholder | Privacy | Social |
| Moral | Legal | Legislation |

**Unit Description**

In th it we explore the evolution of computers over time and how this has had an impact on us, the laws that protect us and the different impact in relation to the Social & moral issues.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current uni

| | Unit 4: Social, Legal, Mo & Ethical Issues | ✓ |
|---|---|---|
| **7-9** | Discuss privacy issues related to the c ection of electronic data by government and commercial organisations | |
| | Consider the ethical and cultural issue elated to computer science technologies | |
| **6 - 7** | Consider how key stakeholders are af ted by technologies | |
| | Describe legislation relevant to Comp r Science: | |
| | • The Data Protection Act 1998 | |
| | • Computer Misuse Act 1990 | |
| | • Copyright Designs and Patents Act 1988 | |
| | • Creative Commons Licence | |
| | • Freedom of Information Act 2000 | |
| **5** | Consider the environmental impact of computer science | |
| | Consider security issues | |
| | Compare open source and proprietary software | |
| **4** | State two clauses of the data protection act | |
| | State the clauses of the computer misuse act | |

**Cycle _____ J276 Unit 5: Algorithms**
**Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 5**

| **Name:** | | | | | | **TARGET** | | |
|---|---|---|---|---|---|---|---|---|
| **HWK Mark** | **/87** | **Assessment Result:** | **/50** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| **KEYWORDS** | | |
|---|---|---|
| Algorithm | Abstraction | Decomposition |
| Sorting | Searching | Selection |
| Iteration | Process | Linear Search |
| Merge Sort | Bubble Sort | Insert Sort |
| Binary Search | Pattern recognition | |

## Unit Description

*In this unit you learn to think about problems in terms of their parts. The parts can be understood, solved and developed to come up with a solution.*

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current unit

| **Unit 5: Algorithms** | | ✓ |
|---|---|---|
| **7-9** | Correct or complete a complex algorithm | |
| | Use pseudocode to define the steps in a complex algorithm | |
| **6 - 7** | Explain how the Bubble & Merge Sort work | |
| | Explain how the Binary & Linear search work | |
| | Explain how decomposition may be used in an algorithm for a given problem | |
| | Explain how abstraction is used in a given scenario | |
| **5** | State what is meant by decomposition | |
| | State what is meant by abstraction | |
| | State what is meant by an algorithm | |
| **4** | Know the condition of a list that is needed in order to do a Linear Search | |
| | Know how the Binary Search Works | |
| | Know the difference between searching and sorting | |

| Cycle _____ J276 Unit 6: Programming<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 6 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/97** | **Assessment Result:** | **/45** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Sequence | Selection | Iteration |
| Procedures | Functions | Records |
| Files | Flowchart | String Handling |
| Pseudocode | Datatypes | MOD / DIV |
| String | Real | Boolean |

## Unit Description

In this unit you will explore programming concepts such as sequence, selection & iteration. You will look at using procedures & functions in your created programs along with file handling such as reading/writing to a CVS/txt file.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge students will also apply and theory learnt to create algorithms

The **final assessment** given assesses student's knowledge of the current unit.

| Unit 6: Programming | | ✓ |
|---|---|---|
| **7-9** | Use one- and two-dimensional arrays in the design of solutions to simple problems | |
| | Explain the advantages of using subroutines in programs | |
| **6 - 7** | Use arithmetic operators including MOD and DIV | |
| | Use in-built functions such as "round" | |
| | Use NOT, AND and OR when creating Boolean expressions | |
| | Understand and use basic file handling operations: open, read, write, close | |
| | Understand and use iteration in an algorithm | |
| **5** | Know that subroutines may use local variables which are accessible only within the subroutine | |
| | Use string handling and conversion functions | |
| | Write algorithms in pseudocode involving sequence, selection and iteration | |
| | Use random number generation | |
| | Declare and use constants and variables | |
| **4** | Understand and use data types: integer, real, Boolean, character and string | |
| | Write simple input & output statement | |
| | Write an algorithm using flowchart or pseudocode | |

| Cycle ____ J276 Unit 7: Logic & Languages<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 7 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/71** | **Assessment Result:** | **/47** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Binary | Truth Tables | Hexadecimal |
| AND Gate | OR Gate | NOT gate |
| Circuits | Errors | Trace Table |
| Compiler | Assembler | Interpreter |
| Validation | Input Sanitation | Authentication |

## Unit Description

In this unit you will explore how computers use binary to represent binary. In addition you will look at logic gates and logic circuits including AND, NOT & OR gates along with truth tables and how to interpret logic circuits

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge in isolation and longer questions in which students are asked to analyse a situation or justify their answer to questions.

The **final assessment** given assesses student's knowledge of the current unit.

| Unit 7: Logic & Languages | | ✓ |
|---|---|---|
| **7-9** | Describe the characteristics of an assembler, a compiler and an interpreter | |
| | Use a trace table to trace through a program | |
| | Interpret the results of truth tables | |
| **6 - 7** | Describe defensive design considerations:<br>• Such as Input sanitisation<br>• Validation<br>• Planning for contingencies<br>• Anticipating misuse<br>• Authentication | |
| | Be able to write a simple authentication routine involving a username and password | |
| | Be able to write simple data validation routines | |
| **5** | Construct truth tables for the following logic gates: NOT, AND & OR | |
| | Distinguish between types of error in programs (logic, syntax, runtime) | |
| | Create, modify and interpret simple logic circuit diagrams | |
| **4** | Know the criteria for an NOT gate to output TRUE | |
| | Know the criteria for an OR gate to output TRUE | |
| | Know the criteria for an AND gate to output TRUE | |

| Cycle _____ J276 Unit 8: Data Representation<br>Recommended Reading: PG Online OCR GCSE J276 Computer Science Chapter 8 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name:** | | | | | | **TARGET** | | |
| **HWK Mark** | **/76** | **Assessment Result:** | **/50** | **SBE** | **BE** | **E** | **AE** | **SAE** |

| KEYWORDS | | |
|---|---|---|
| Binary | Hexadecimal | Right Shift (divide) |
| Compression | Sound | Left Shift (multiply) |
| Lossey | Lossless | Pixel |
| Denary | Convert | 0 (off) |
| 1 (on) | Overflow | Bit |

## Unit Description

In this unit you will explore how computers use binary to represent binary. You will perform some conversions from Denary to Binary & Hexadecimal and look at how images & sound are represented in binary.
You will create a python solution that will assist in converting denary into binary & Hex and vice-versa.

**Homework** is given for each lesson. These consist of a mixture of short, factual questions assessing knowledge and also students ability to apply suitable conversion

The **final assessment** given assesses student's knowledge of the current unit

| Unit 8: Data Representation | | ✓ |
|---|---|---|
| **7-9** | Explain how different file compression systems work and how they affect the sound quality | |
| | Add two 8-bit binary integers and explain overflow errors which may occur | |
| **6 - 7** | Explain the term character set and the use of binary codes to represent characters | |
| | Explain the use of hexadecimal numbers to represent binary numbers | |
| | Explain the relationship between file size and image resolution | |
| | Explain how each pixel is represented in binary | |
| **5** | Convert between binary and hexadecimal equivalents of the same number | |
| | Understand that the number of bits per pixel determines the number of available colours for an image | |
| | Convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa | |
| | State units of measurement in size order | |
| **4** | Know what a nibble is | |
| | Know what a byte is | |
| | Know what a bit is | |