YEAR 9

Computing @Turton

# Theme 1

## Computer Systems

**HOMEWORK** BOOKLET

Name

Form

CS

# Introduction

*During theme 1, we will explore the inner workings of a computer at it's most basic. Binary – a collection of off and off switches that dictate all functioning within our machines. We will know, understand and be able to analyse how binary is used to store and manipulate various pieces of data in our devices including: Numbers, Images, Characters & Instructions*

***At the bottom of each homework, you will see an icon which will tell you how the homework will be assessed.***
*See below to find out what the icons mean:*

*Self Assessment: You will mark your work at the start of next lesson.*
***ENSURE YOU COMPELTE HOMEWORK AS MARKS WILL BE COLLECTED IN!***

*Teams Assessment: There will be a Teams Quiz based on the homework next lesson.*
***ENSURE YOU REVISE AND READ THE INFORMATION CAREFULLY!***

*Peer Assessment: You will be peer assessing the homework next lesson with another student.*
***ENSURE YOU HAVE YOUR HOMEWORK COMPLETED SO YOU CAN SWAP WITH ANOTHER PUPIL!***

**<u>Failure to submit homework on time will result in a 45-minute detention.</u>**

**If you lose your homework booklet you will be charged for a replacement and MUST catch-up on any incomplete homework.**

***Stuck? Got a question? Email your teacher.***

| | |
|---|---|
| **Mr Rifai *(Head of Computing)*** | **rifaim@turton.uk.com** |
| **Mr Iqbal** | iqbalb@turton.uk.com |
| **Mr Sykes** | sykesm@turton.uk.com |

# H/W 1: Computer Systems

*Due Date:*

1. **Identify three of each.**
2. **Describe their use (including inputs and outputs).**
3. **Explain who would use them in society.**

## Traditional Computer System

| System 1: |
| --- |
| **Use:** |
| **User:** |

| System 2: |
| --- |
| **Use:** |
| **User:** |

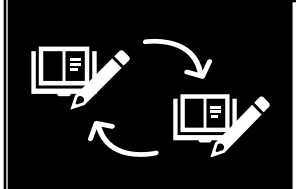
| System 3: |
| --- |
| **Use:** |
| **User:** |

## Embedded Computer System

| System 1: |
| --- |
| **Use:** |
| **User:** |

| System 2: |
| --- |
| **Use:** |
| **User:** |

| System 3: |
| --- |
| **Use:** |
| **User:** |



***WWW:***

***EBI:***

***Total:***

***____ / 10***

# H/W 2 : The *CPU*

*Due Date:*

**Task 1 – Match the internet components to their descriptions.**

| |
|---|
| 1. Clock |
| 2. Control Unit |
| 3. ALU |
| 4. Registers |
| 5. Buses |

| |
|---|
| 1. Fast memory locations |
| 2. Arithmetic Logic operations |
| 3. Connections between components |
| 4. Sends pulses between components |
| 5. Controls fetching and executing of instructions |

**Task 2 – Describe what happens in each stage of a CPU processing an Instruction. Challenge – which component is being used during each of these steps.**

| | |
|---|---|
| Fetch | |
| Decode | |
| Execute | |

**Task 3 – visit [www.currys.co.uk](http://www.currys.co.uk) and choose a laptop pick two laptops of your choice (one less than £250 and one more than £1000).**
**Compare: clock speed / cache / core (found in specification)**

| | **Clock** | **Cache** | **Core** |
|---|---|---|---|
| **Expensive laptop** | | | |
| **Cheap laptop** | | | |

***WWW:***

***EBI:***

***Total:***
***____ / 17***

# H/W 3 : Memory & Storage

*Due Date:*

**1. For each statement, select the appropriate hardware type (the first has been completed for you as an example:**

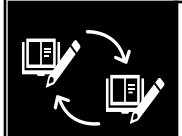
| | ROM | RAM | Magnetic | Optical | Solid State |
|---|---|---|---|---|---|
| Contains the bootstrap loader instructions. | X | | | | |
| Volatile hardware (loses its contents when powered off). | | | | | |
| Fragile hardware which is easily broken. | | | | | |
| Contains programs in use. | | | | | |
| Fastest form of permanent storage. | | | | | |
| Contains rapidly rotating platters. | | | | | |
| Uses light to read from and write to. | | | | | |
| Cannot be edited. | | | | | |

**2. For each scenario, state the most appropriate secondary storage type and <u>why</u> you think it is suitable.**

| **Camcorder filming landscape for a geography field trip.** |
|---|
| Storage type: |
| Reason: |

| **TV director, selling their latest series to the public.** |
|---|
| Storage type: |
| Reason: |

| **NHS storing all patient details on a centralised database.** |
|---|
| Storage type: |
| Reason: |



***WWW:***

***EBI:***

***Total:***
***____ / 20***

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# H/W 4- Software

Use your knowledge from the Computing lessons to complete all ten questions of the quiz below

**1** What is software?

- ○ The physical parts of the computer
- ○ The programs that run on a computer
- ○ The place where data is stored on a computer

**2** What are the two main types of software?

- ○ Systems software and applications software
- ○ Input software and output software
- ○ Data software and processing software

**3** What is hardware?

- ○ The programs that run on a computer
- ○ The physical parts of the computer
- ○ A programming language

**4** What does systems software do?

- ○ Helps run and maintain the computer
- ○ Performs everyday tasks on the computer
- ○ Programs the computer

**5** What is the biggest part of systems software?

- ○ The drivers
- ○ The utilities
- ○ The operating system

| | WWW: | EBI: | Total: ____ / 5 |
|---|---|---|---|

# H/W 5- Software

*Due Date:*

**6** Which of the following are tasks that the operating system would perform?

- ○ Word processing
- ○ Managing the use of memory
- ○ Playing music

**7** What is a user interface?

- ○ A hardware device used to store data
- ○ A way of interacting with a computer or device
- ○ Part of the CPU

**8** What is applications software?

- ○ Software used to do everyday tasks on the computer
- ○ Software that helps run and maintain the computer
- ○ Software that programs the computer

**9** Which of these is an example of applications software?

- ○ Anti-virus
- ○ Word processor
- ○ Printer driver

**10** What is general purpose software?

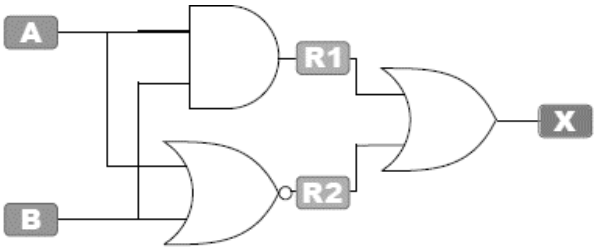
- ○ Software that carries specific tasks
- ○ The operating system
- ○ Software that carries out lots of different tasks

| ***WWW:*** | ***EBI:*** | ***Peer assessed by:*** |
|---|---|---|
| | | |

# H/W 6: Logic Gates – Truth Tables

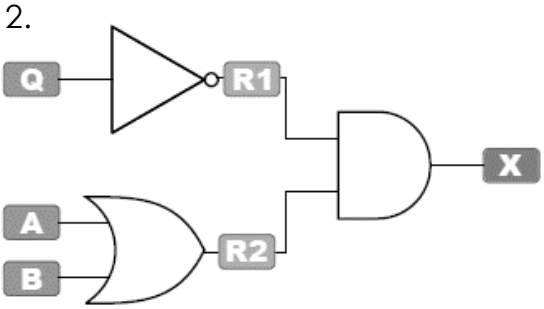
*Due Date:*

1.




| A | B | R1 | R2 | X |
|---|---|---|---|---|
| 0 | 0 | | | |
| 0 | 1 | | | |
| 1 | 0 | | | |
| 1 | 1 | | | |

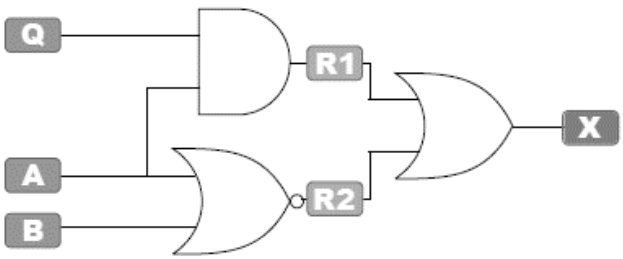
2.




| Q | A | B | R1 | R2 | X |
|---|---|---|---|---|---|
| 0 | 0 | 0 | | | |
| 0 | 0 | 1 | | | |
| 0 | 1 | 0 | | | |
| 1 | 0 | 1 | | | |
| 1 | 1 | 0 | | | |
| 0 | 1 | 1 | | | |
| 1 | 1 | 1 | | | |

## ***Challenge***

3.




| Q | A | B | R1 | R2 | X |
|---|---|---|---|---|---|
| | 1 | 1 | 1 | | |
| | 1 | 0 | 1 | | |
| | 1 | 1 | 0 | | |
| | 0 | 1 | 0 | | |
| | 1 | 0 | 0 | | |
| | 0 | 1 | 0 | | |
| | 0 | 0 | 0 | | |

| *WWW:* | *EBI:* | ***Total:*** ***____ / 54*** |
|---|---|---|

# H/W 7 : Binary – Denary Conversions

Due Date:

| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
|---|---|---|---|---|---|---|---|

1. **13**

2. **26**

3. **98**

4. **138**

5. **245**

6. **01100110**

7. **01111010**

8. **01100001**

9. **11111010**

10. **11111111**

## Challenge

11. **324**

12. **Convert 31 using a 5 bit binary digit.**

13. **101110011**

14. **0110.**

15. **Describe one advantage and one disadvantage of binary for a programmer.**

| WWW: | EBI: | Total: ____ / 30 |
|---|---|---|

# H/W 8 : Binary Addition

*Due Date:*

1. **0110 + 0110**

2. **11101 + 11001**

3. **11011 + 01101**

4. **110111 + 011101**

5. **101110 + 011010**

6. **1110111 + 0100111**

7. **11001101 + 00111011**

8. **01101111 + 01111001**

## *Challenge*

9. **11011 + 101101**

10. **101111 + 01110111**

| *WWW:* | *EBI:* | *Total:* ____ / 20 |
|---|---|---|

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# H/W 9 : *Hexadecimal Conversions*

*Due Date:*

1. **B2 to binary.**

2. **AA to binary.**

3. **to binary.**

4. **3A to binary.**

5. **7E to binary.**

6. **11110110 to hex.**

7. **00111101 to hex.**

8. **01101110 to hex.**

9. **01110110 to hex.**

10. **11111111 to hex.**

## *Challenge*

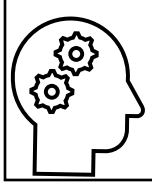
11. **123 to hex.**

12. **201 to hex.**

13. **6A to denary.**

14. **BB to denary.**

15. **Give two reasons why programmers would use hex instead of binary.**



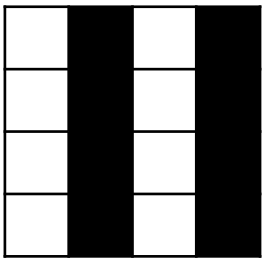
| *WWW:* | *EBI:* | ***Total:*** ***____ / 30*** |
|---|---|---|

**H/W 10:**

# Images

*Due Date:*

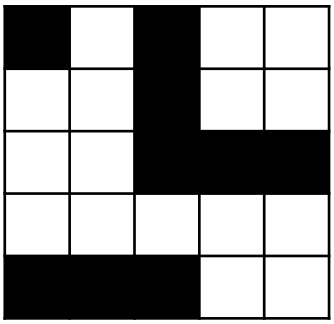
For each image:
1. State the bit pattern.
2. State the resolution.
3. RLE each image and identify how many bits it has compressed by.



Bit pattern

Resolution

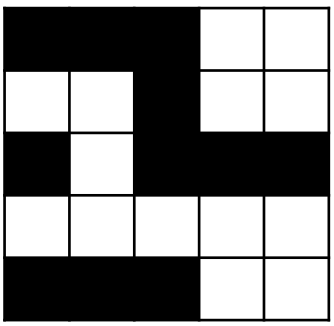
RLE



Bit pattern

Resolution

RLE



Bit pattern

Resolution

RLE

| ***WWW:*** | ***EBI:*** | ***Peer assessed by:*** |
|---|---|---|
| | | |

**H/W 11:**

# Characters

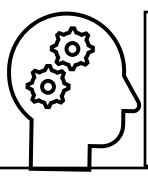
*Due Date:*

| | Char. | ASCII Code | Binary |
|---|---|---|---|
| 1. | F | 70 | |
| 2. | A | 65 | |
| 3. | G | 71 | |
| 4. | d | 100 | |
| 5. | y | 121 | |
| 6. | ? | | 01111111 |
| 7. | n | | 01101110 |
| 8. | V | | 01010110 |
| 9. | e | | 01100101 |
| 10. | | | 01000010 |

## ***Challenge***

Convert the follow Unicode values (in hex) to binary (4 bits).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11. | 😃 | 1F603 | 1 = | F = | 6 = | 0 = | 3 = |
| 12. | 😍 | 1F60D | 1 = | F = | 6 = | 0 = | D = |
| 13. | 😶‍🌫️ | 1F637 | 1 = | F = | 6 = | 3 = | 7 = |



| ***WWW:*** | ***EBI:*** | ***Total Score:*** / ***25*** |
|---|---|---|

# H/W 12: Knowledge Organiser Snapshot

## Revise

**CPU**
A piece of hardware that processes instructions.

**CPU –Fetch** – Fetches an instruction from an address in memory.

**Decode** – Uses the ALU to perform any calculations.

**Execute** – Carries out the instruction.

| | |
|---|---|
| Computer system | Device which contains hardware and software. |
| Hardware | Physical components. |
| Software | Programs on a computer. |
| Inputs | A device which sends data in. |
| Outputs | A device which receives data coming out of the computer. |
| Processes | Actions |

## Answer

**What re the factors affecting a CPU's performance?**

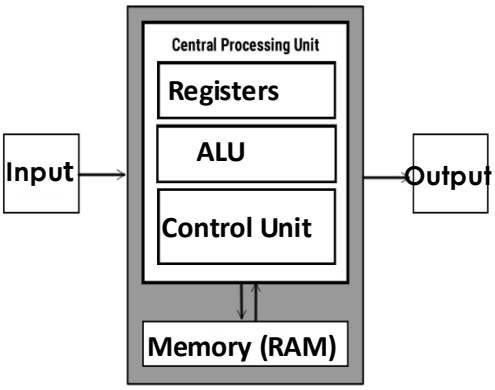
## Tick the correct boxes below:

| | Example | Fast? | Large? | Durable? | Cheap? |
|---|---|---|---|---|---|
| Magnetic | Hard drive | | | | |
| Optical | Disk | | | | |
| Solid State | Pen drive Solid State drive | | | | |

## Review

## Answer

**Von Neumann Architecture**
Complete the following diagram using the words given.




| Component | Function |
|---|---|
| | Carries out all the arithmetic (+- * /) and logic (AND, OR NOT, >, < <=, >=) operations. |
| | Controls and manages the fetch and executing. |
| | Connections between components |
| | Small, fast memory locations in the CPU. |
| | Device which vibrates continually and controls the speed the data is passed through the buses around the CPU. |

# H/W 13 - Hardware and Software

Read the information below. You will be quizzed next lesson!

**Software**
Programs on a computer.

**Operating System**
Manages all hardware and software on the computer via user interface.

**Tasks**
- Coordinates input / output devices.
- Manages CPU timings.
- Security
- File management

**Utility Programs**
Programs that maintain the computer and ensure they are running smoothly.

**Examples**
Disk defragmentation – Sorting files into order within computer's memory.
Compression – Reducing the size of files.
Antivirus/Firewall – Protecting against unauthorised access.

**Types of software**

Systems Software – Software that manages the running of the computer.

Applications Software – Software that performs specific tasks.

**Applications Software**

| Off the Shelf | Bespoke |
|---|---|
| Made for the public.<br>Made in mass.<br>Cheaper.<br>Doesn't always cater for user's specific needs. | Created for a specific user.<br>Tailored to that user's needs.<br>Expensive.<br>Time consuming (takes time to build software) |
| **Proprietary** | **Open Source** |
| Software owned by a company.<br>Source code kept secret. | Software available to everyone.<br>Source code shared. |

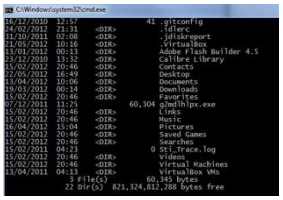
**User Interfaces**

**GUI**
**Graphical User**

Uses icons and graphics to communicate.
WIMP – Windows, icons, menus, pointers.

Simple for less advanced users.
Takes up more storage in memory / slower.

**Command Line**



Uses commands to communicate with user.

Faster / takes up less space in storage.

Must know the commands to be able to communicate with it.

**Natural Language**


Uses the user's speech to communicate.

Very simple – no technical skills needed.

Not always reliable due / interface can't always understand user's demands.

# Help Tools for Theme 1

## Binary Conversion Tool

| *128* | *64* | *32* | *16* | *8* | *4* | *2* | *1* |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

## Binary Addition Rules

0 + 0 = 0
0 + 1 = 1
1 + 0 = 1
1 + 1 = 0 carry 1
1 + 0 +1 = 0 carry 1
0 +1 + 1 = 0 carry 1
1 + 1 + 1 = 1 carry 1
0 + 0 + 1 = 1

## Hexadecimal Conversion Tool

| *8* | *4* | *2* | *1* |
|---|---|---|---|
| | | | |

| *8* | *4* | *2* | *1* |
|---|---|---|---|
| | | | |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 10 | 11 | 12 | 13 | 14 | 15 |