Key Stage 3 Computing

Student Name: ……………………………………………………………………………………………

Instructions

<table>
<tr>
<td>Do the work ONLINE https://senecalearning.com/en-GB/</td>
<td>**OR**

Work through this booklet and take photos of your work</td>
</tr>
</table>

You have already completed PART 1, 2 AND 3 on Doddle and so we move on!

Contents

PART 4 – Looking closely at a computer

REMEMBER: If you can do this ONLINE go to:

https://app.senecalearning.com/classroom/course/b89946c5-cfe7-42d6-ae51-9b4631a07589/section/e1a33139-7104-4a4f-b507-c2fcc5dcea7e/session

It is unit 3.1.1 called **Elements of a computer system**

READING - Elements of a computer system

Elements of Computer Systems

Computer systems are made of hardware and software which work together. Hardware are the physical components of the computer, such as:

Primary storage

- Primary storage is the memory in which the computer can store the data or instructions that are currently in use.
- The two main types of primary storage are:
  - Random Access Memory (RAM).
  - Read-Only Memory (ROM).

Secondary storage

- Secondary storage is the memory in which the computer can store the data or instructions which are NOT currently in use.
- Not all computer systems use secondary storage.
- The main types of secondary storage are:
  - Hard Disk Drive (HDD).
  - Solid State Drive (SSD).
  - Compact Disk (CD).
  - Flash (USB Drive).
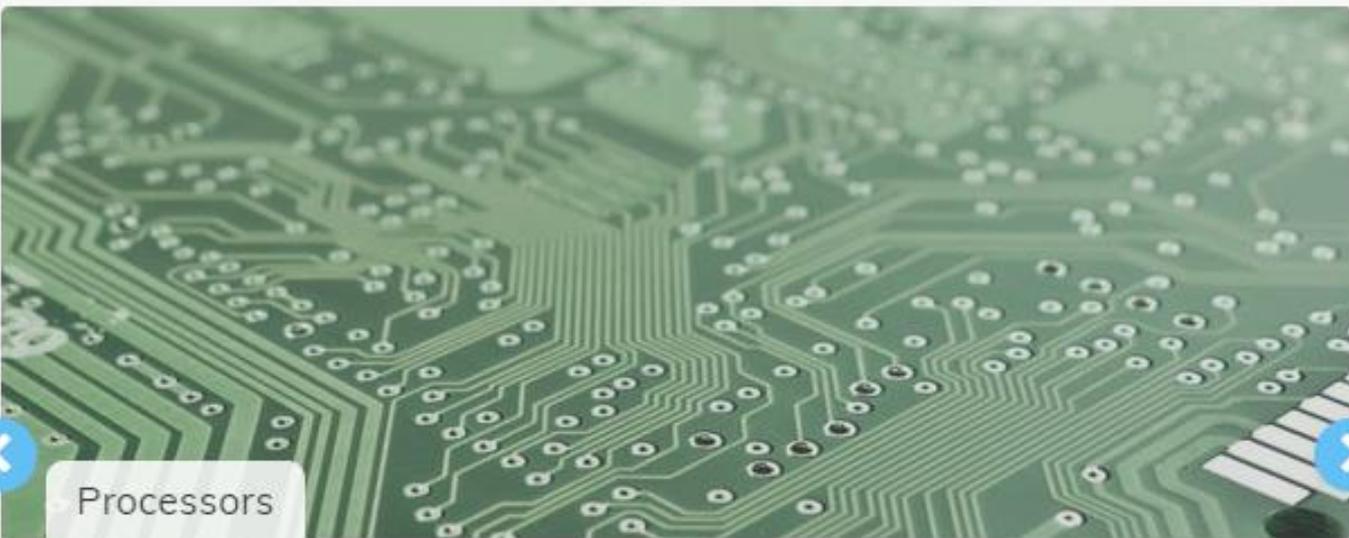
Processors

- A processor is a special component that processes data and instructions to control other components within the computer.
- The two main types of processor are:
  - Central Processing Unit (CPU).
  - Graphics Processing Unit (GPU).

Input/Output (I/O) devices

- I/O devices allow users to input data into the computer, or receive a data output from the computer.
- Examples of common I/O devices are:
  - Keyboard.
  - Mouse.
  - Monitor.
  - Speakers.
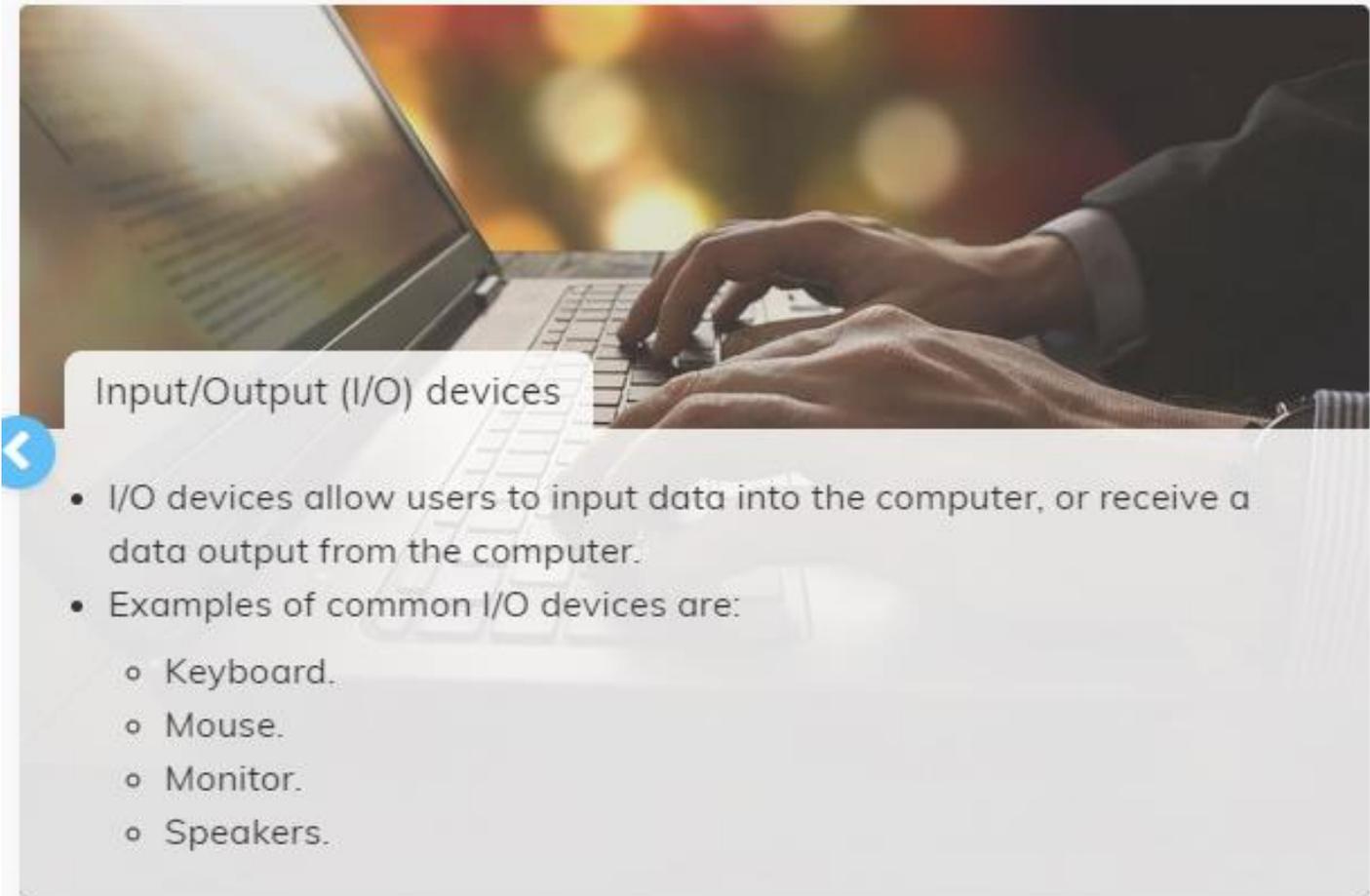
TASK

Name 3 common input or output devices:

1._____

2._____

3._____

Two types of computer storage:

_____ storage	The memory in which the computer can store the data or instructions which are NOT currently in use.
_____ storage	The memory in which the computer can store the data or instructions that are currently in use.

A _____ is a special component which processes ____ and instructions to control other components within the computer.

EXTENSION TASK

Some computers use HDDs and others use SSDs to store their applications and files. Can you find out the differences between an HDD and an SSD. Which is better? Why?

_____

_____

_____

_____

All computer systems have ROM. What does it stand for and what does it mean?

_____

_____

_____

_____

PART 5 – How a computer system works

REMEMBER: If you can do this ONLINE go to:

https://app.senecalearning.com/classroom/course/b89946c5-cfe7-42d6-ae51-9b4631a07589/section/4ae5878f-820b-462c-a20c-6388bca38289/session

It is unit 3.1.2 called **Central Processing Unit**

READING – Central Processing Unit
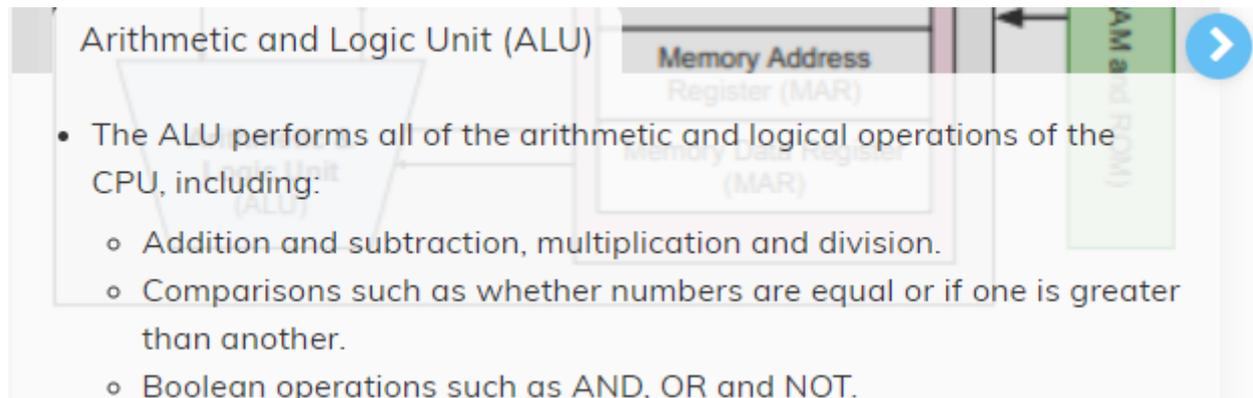
Arithmetic and Logic Unit (ALU)

- The ALU performs all of the arithmetic and logical operations of the CPU, including:
  - Addition and subtraction, multiplication and division.
  - Comparisons such as whether numbers are equal or if one is greater than another.
  - Boolean operations such as AND, OR and NOT.
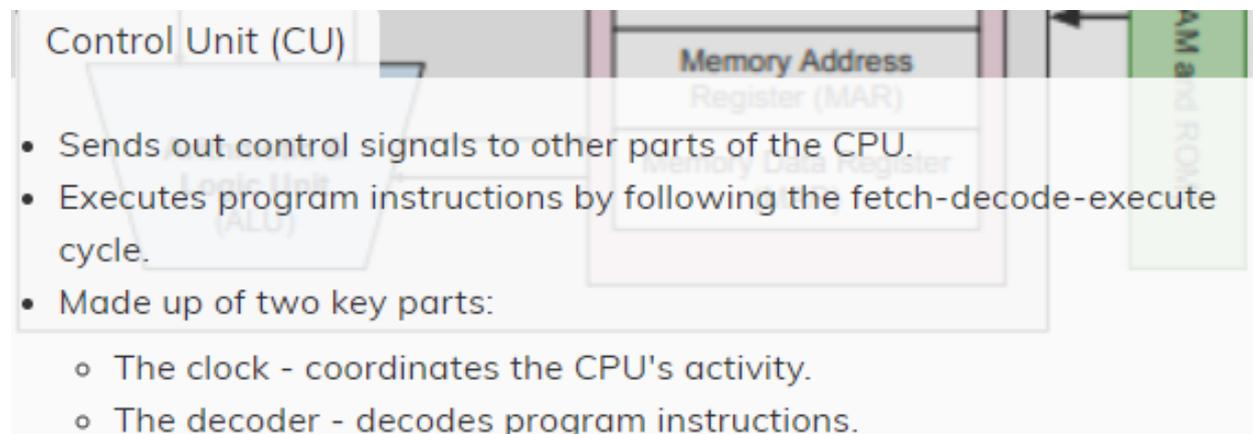
Control Unit (CU)

- Sends out control signals to other parts of the CPU.
- Executes program instructions by following the fetch-decode-execute cycle.
- Made up of two key parts:
  - The clock - coordinates the CPU's activity.
  - The decoder - decodes program instructions.
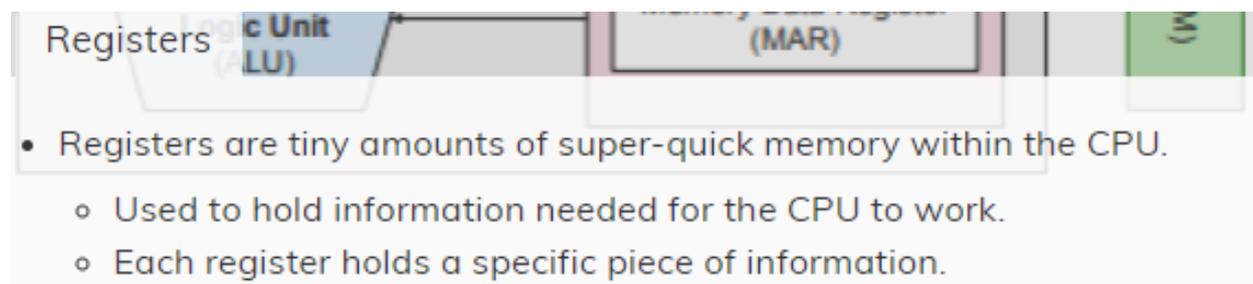
Registers

- Registers are tiny amounts of super-quick memory within the CPU.
  - Used to hold information needed for the CPU to work.
 - Each register holds a specific piece of information.

TASK

Components of Central Processing Unit

Arithmetic and Logic Unit	*Performs CPU operations such as comparisons and Boolean operations.*
Control Unit	*Made up of two key parts: the clock and the decoder.*
_____	*Tiny amounts of super-quick memory within the CPU.*
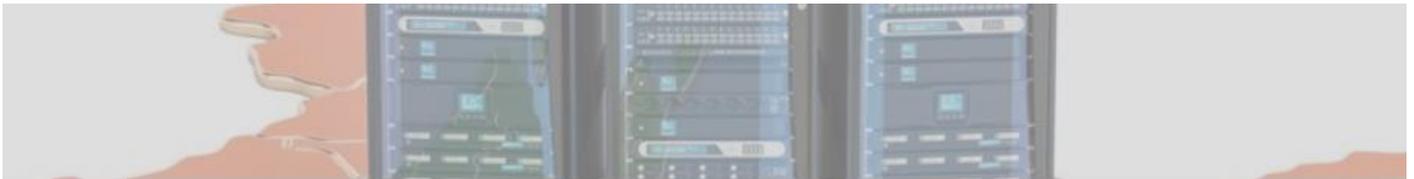
Data or instructions that are currently in use will be kept in the _____ storage. The two main categories of this kind of storage are _____ Access Memory and _____-Only Memory.

Modern CPUs are based on the Von Neumann architecture. What does CPU stand for?
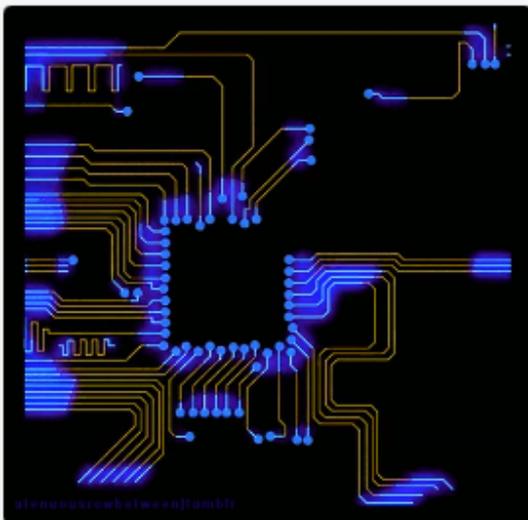
Central Processing Unit

Central Programming Unit

Control Processing Unit

Computer Processing Unit

Registers that have a predetermined purpose in the central processing unit are known as special purpose registers.
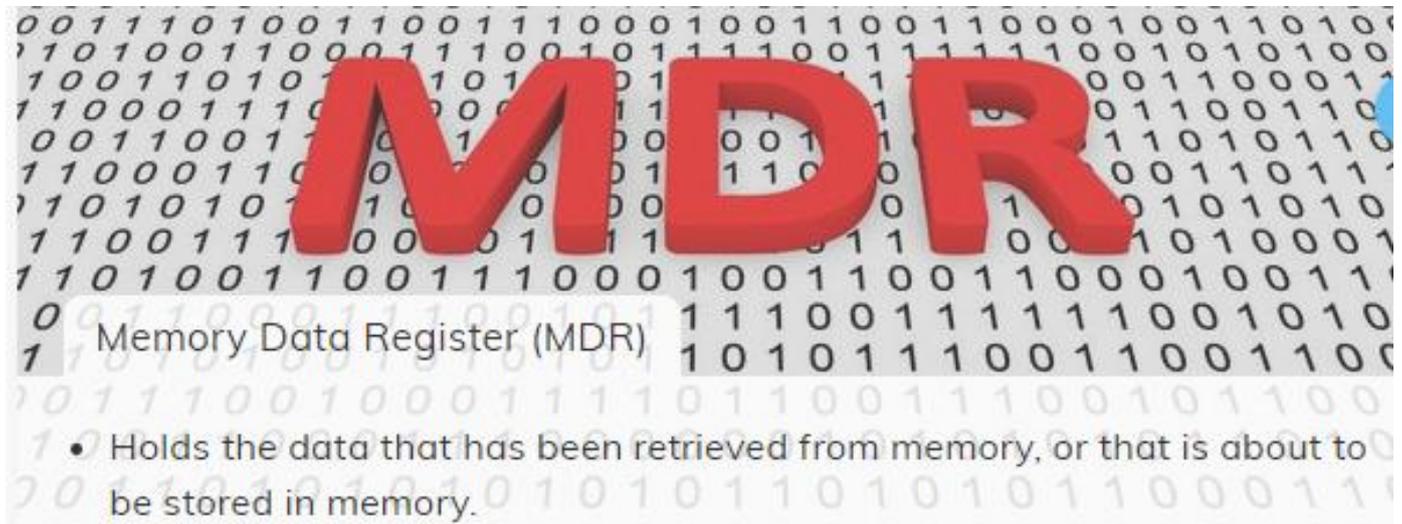
Memory Data Register (MDR)

- Holds the data that has been retrieved from memory, or that is about to be stored in memory.
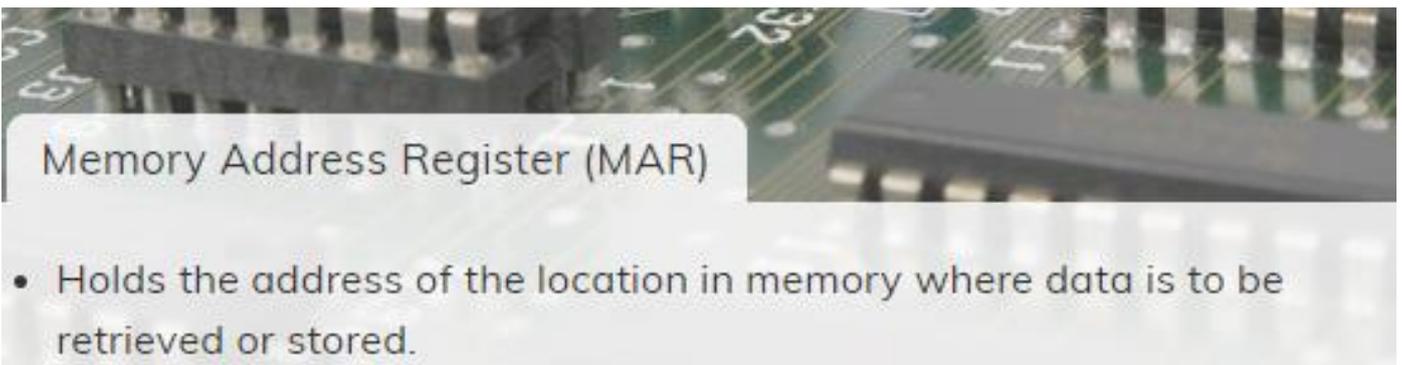
Memory Address Register (MAR)

- Holds the address of the location in memory where data is to be retrieved or stored.

Accumulator (ACC)

- Holds the result of calculations and operations performed by the arithmetic logic unit (ALU).
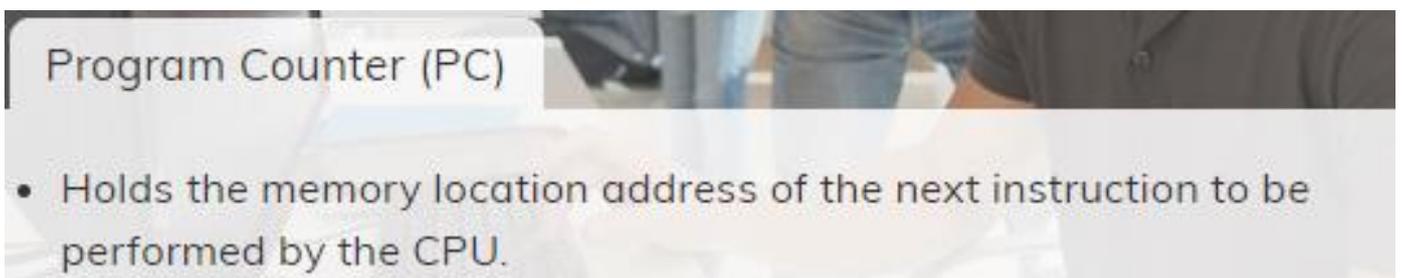
Program Counter (PC)

- Holds the memory location address of the next instruction to be performed by the CPU.

Factors Affecting CPU Performance

Not all Central Processing Units (CPUs) will execute code at the same speed. Some processors will be faster than others depending on the following factors:

Cache memory

- Cache memory is a small amount of very fast memory inside the CPU.
- In comparison to the cache, accessing the Random Access Memory (RAM) is a very slow operation.
- By storing frequently accessed data and instructions in cache memory we can avoid the process of accessing the RAM.

Clock speed

- The CPU's clock sends a pulse at fixed intervals to trigger the next stage of the fetch, decode, execute (FDE) cycle.
- The higher the clock speed, the more pulses are sent per second, so more instructions can be executed in the same amount of time.

Cores

```
                        Main memory

      Core one                              Core two

           CU              Cache                 CU

          ALU                                   ALU
```
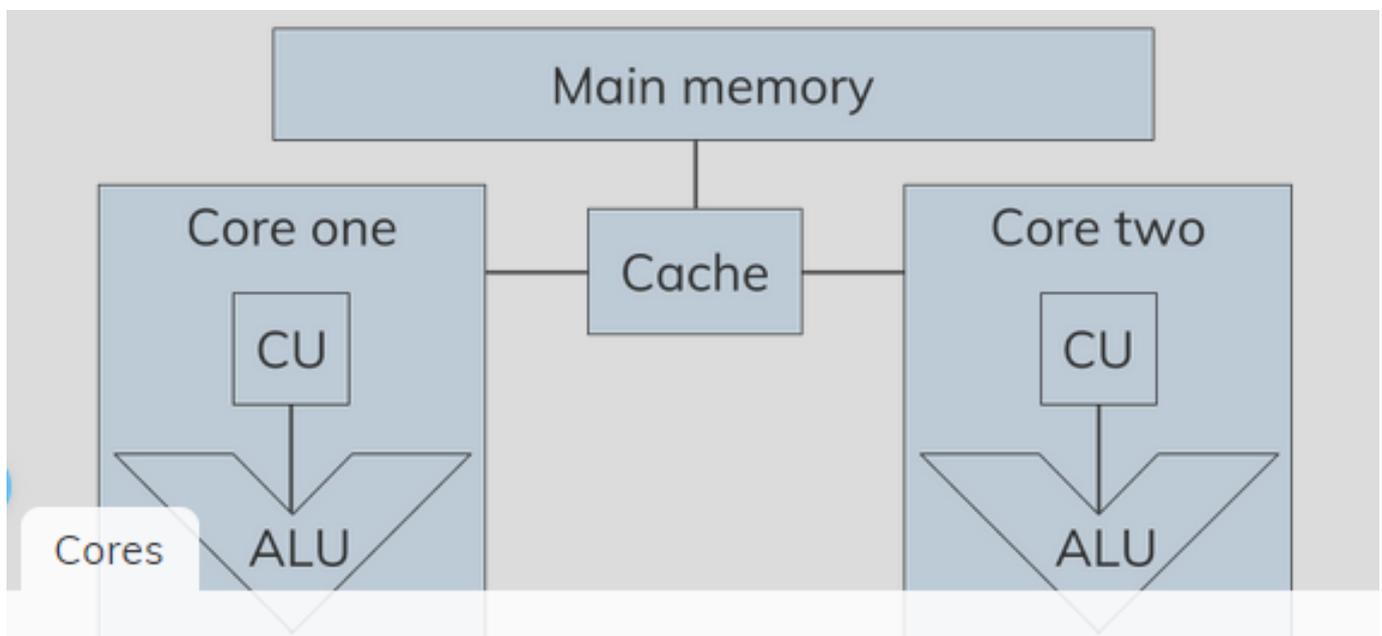
- Each core of a CPU is capable of processing instructions independently.
- Each core has its own Control Unit (CU) and Arithmetic and Logic Unit (ALU), but the cores share access to cache and main memory.
- Multiple cores allows a CPU to process multiple instructions at the same time.

TASK

Cache memory

Factors affecting CPU speed

Clock speed

Number of [ ]
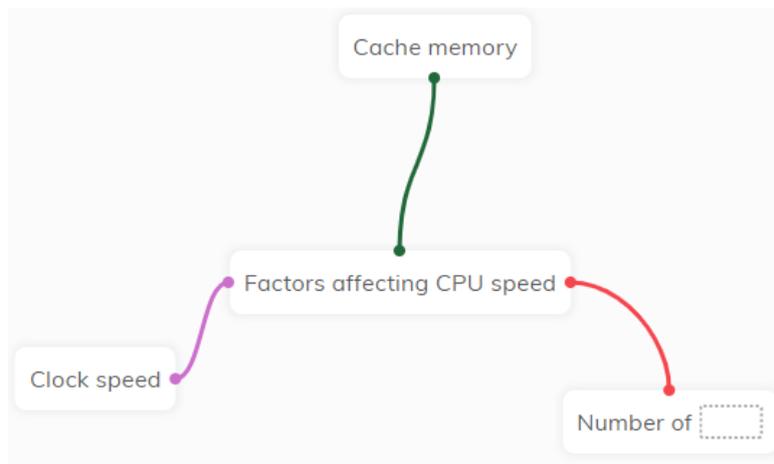
Key parts of Control Units in CPUs:

The _____	Coordinates the CPU's activity.
The _____	Decodes program instructions.

Components of Central Processing Unit

Arithmetic and _____ Unit	Performs CPU operations such as comparisons and Boolean operations.
_____	Tiny amounts of super-quick memory within the CPU.
_____ Unit	Made up of two key parts: the clock and the decoder.

Highlight the correct answer!

What is the purpose of the program counter?

To hold the memory location address of the next instruction

To count how many times the CPU is accessed

To record how long the program has been running for

Circle the correct answer.

Which of the following will increase CPU performance?

More / Less cores

More / Less cache memory

Higher / Lower clock speed

EXTENSION TASK

Find out about the **Fetch-Execute Cycle** in a computer system. Could you explain what it in a simple way?

_____

_____

_____

_____

_____

PART 6 – Networks

It is unit 5.1.1 called **The Internet – Networks**

READING – Parts of a network

Computer networks are where several computers are connected together. Connections can be through wires, ethernet cables or wirelessly with radio waves.

The internet as a network

- Any device which accesses the Internet becomes part of a network.

Networks of computers

- Networks are often but do not have to be, part of the Internet.
- Computers on a network can share devices such as printers.

Nodes and hubs

- Each computer on the network is called a node.
- Different parts of the network are sometimes connected in one place - the hub.

The network server

- Resources and programs can be stored or run on a special computer - the network server.

TASK

What is the word that describes each computer on the network?

Answer: _____

The internet is a network, and any device becomes a part of a network when it connects to the _____

READING – Geographical Kinds of Networks

Networks can be described by the geographical area that they cover.

Local area network (LAN)

- A LAN is a collection of computers connected over a small geographical area.
- These are typically found in homes, schools, universities, and small companies.
- The LAN is set up and maintained by the organisation that uses it.

Wide area network (WAN)

- A WAN is a collection of computers connected over a large geographical area.
- WANs are used by multinational organisations that have international offices they need to connect to.
- A WAN is usually rented from a large telecommunications company because WANs are expensive to set up.
- One example of a WAN that you use is the Internet. The Internet is the largest WAN in the world.

TASK

A wide area network is a collection of _____ connected over a large geographical area.

Where would a local area network (LAN) typically be found?

1. [ ]
2. [ ]
3. Small offices

What are the three ways in which connections through computer networks can be made?

With w[ ]

With ethernet cables

W[ ]

A local _____ network is a collection of computers connected over a _____ geographical area.

PART 7 – The Internet

READING – What is the Internet?

The Internet is a worldwide collection of computer networks (a network of networks).

Packet switching

- Packet switching is the process by which data is transmitted on the Internet.
- Data is split into small 'packets' which are then sent out across the network.
- Routers are essential to the internet because they pass the data packets between the interconnected networks.

Internet traffic

- There are a lot of different types of traffic on the Internet.
- Each type of traffic corresponds to a different type of application. For example:
  - World Wide Web (WWW) traffic.
  - Email traffic.
  - Multiplayer game traffic.
  - Video streaming traffic.

Internet Protocol (IP)

- The Internet Protocol (IP) is a set of rules that make sure that devices can work together on the Internet.
- Every computer is assigned an IP address that is used to send and receive data from other devices.

TASK

What is the Internet Protocol (IP)?

A set of rules that tell users how to set up their own Internet connection

A set of rules that control which applications have access to the Internet

A set of rules that make sure that devices can work together on the Internet

Circle the INCORRECT word in this sentence:

The Internet is a worldwide collection of computer components.

Packet switching

Data is split into small _____ which are then sent out across the network to nearby _____

READING – The WWW

The World Wide Web

- The World Wide Web is all the web pages that can be accessed on the Internet.

Invention of the World Wide Web

- The World Wide Web was created in 1989.
- The World Wide Web was invented by Tim Berners-Lee.
  - Tim Berners-Lee is an English computer scientist.

TASK

When was the World Wide Web invented?

In the 1990s
In the late 1960s
In the 2000s
In the 1980s

1 The [_____] was invented in 1989.

2 It was invented by Tim [_____]

3 Tim Berners-Lee is a [_____] from England.

EXTENSION TASK

When you visit a website, the address begins with either http or https. Can you find out what this stands for and what the difference is between each one?

_____

_____

_____

_____

_____

OTHER OPTIONAL STUFF

Easy Wordsearch

```
x n o d e l c w w a n g t o p
y x i b f p z l g m c o i y r
g e a z e n q a b f e t r i o
w g u y m v n n c i t j w n t
h u b d u h q z r j h x o t o
s w i t c h i n g c e j r e c
c e z y r h w w n r d l r o
k y u l m h n y d a n g d n l
n t r s e w p a c k e t w e f
a a s e j a e w x t t r i t a
g x k r u z t k s w a i d v m
y w z v r t r n e b b q e m r
m n q e h l o h o m n o w s f
b l e r j n k k p v v j e k x
z o j o w z v o s j v t b d c
```

worldwideweb   switching   ethernet   protocol

packet   node   hub   server

lan   wan   internet

Tough Wordsearch

```
Q A N G W Y S X I H I K S R E G I S T E R P S L V V C N R T
K F T U O U T P U T R Z X N E R V B H H Z J T E A F B Z O A
J V L J D E A Q L Z E I S C K K X G Z T I U N N M H S R M T
F L V E L Z N E Z I X T P H G N Q Q Q Y L Q D L Z L P N U C
W O P L J V O N N E U M A N N Y T R J T X H V O K I N O G Z
N N R I R T C S G W H B J R F P V O B G O V K G F P R P Z Z
D N C W V I O L T E D E I N P U T M U A N I V R L W Y K K Z
I S N Q M I R Z Q A Z V L B X P I R Y H B C N A E U Z N I G
C S I F S K E T T A Z U N M M I C R G Y B O U P H X N K J P
V C B O W E Y Q K Z D Y F W D C S K Z S J E I H U Q F T I W
Z Z H P W Y V C R H P N L C G E P U R K Y K X I Z E Q M R A
I C N Z J B P R O G R A M C O U N T E R X S F C S O O E F L
G Y R B H O J N D Z S O L I D S T A T E C W M S R M L H E X
X H X N I A R V A F G O C O M P A C T D I S C F G V G M I Q
N L L U Y R A P P R I M A R Y C D P W J E A D L B S O T H B
I F H W A D M E K K G K I P P W U P K M Q V Z A Y E L G C D
V C T E A P W Z S U S E O U Q C D B P R O C E S S O R N I V
D C F G E U A C O M P O N E N T A H K B V J D H M W B C G T
D N T P G A G A P B S L I A Y P N Q B O U X N D O J W P F V
B F V Y X U L L V K A R D H Q N C D Z T J R V R L P X U E D
O F F Z S T D U G R P V O P R M Z P L M C R Q I N P A V Q U
D V T N P V O X K R O O B B X E M P H A Z B H V X K K D D X
X T F S E C O N D A R Y V T P S G L D W C L N E P S R L T V
G T L U A M O U S E T D Q B H M A M O N I T O R V C Z P R
L O G Q K K Z L I C I O U H A R D W A R E I A V K H A E Z Z
Y O G Q E S E T J R H J F G N J D Y W K M E U W N B C M M T
C H W F R O H S F C A C C U M U L A T O R Q Q C J U H Q W M
N F L P S F W P F H D Y U B F X C T J B C Y H T P I E G S T
Y N B B M F J H Q C Q M W D H X H A R D D I S K T D H L W M
N F L W V N C O N T R O L U N I T P C C O O M A A C R U Z K
```

programcounter	accumulator	controlunit	compactdisc
flashdrive	vonneumann	solidstate	secondary
component	processor	keyboard	hardware
graphics	register	harddisk	speakers
output	monitor	primary	input
mouse	cache	core	alu
cpu	rom	ram	