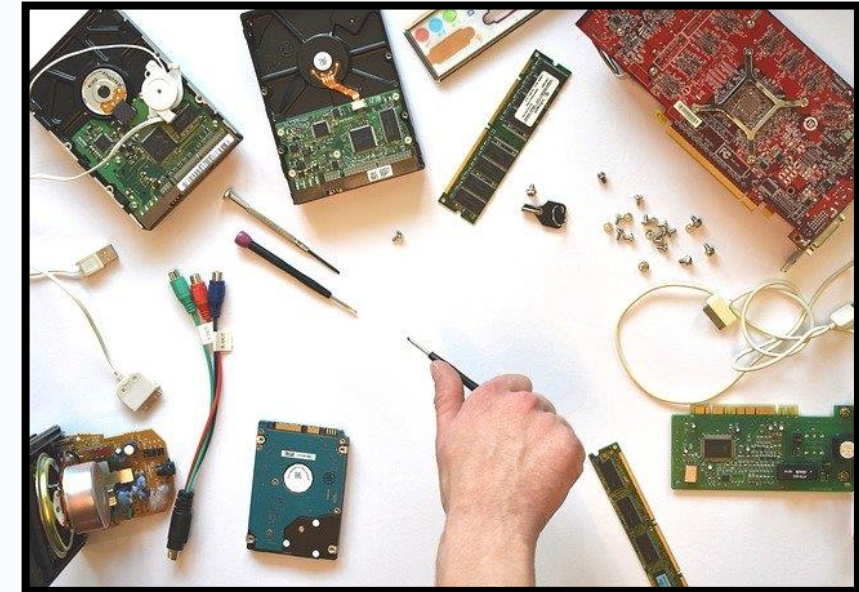


**NAME:**

# **Introductory Diploma in IT**

## **Summer Independent Learning**



## Welcome to IT @ New College!

In this document you will be completing several independent learning tasks designed to prepare you for some of the early topics of the Level 3 IT course at New College.

It is anticipated that completion of this whole document will take in the region of between 4-6 hours in total, including associated research. Most slides require some kind of input, so please read carefully. Sometimes there will be links signposting you to websites with relevant information, often these will be videos. However, it is important to remember that KS5 study requires you to begin developing your own research techniques, so you are strongly encouraged to read around each topic as widely as possible. There is a 'sources table' on the final slide of the compulsory tasks section and another one at the end of the optional section – please make use of these to show your research and referencing skills.

You will need to ensure that this work is ready for submission in your very first lesson at college in September. This can either be printed or sent to your teacher via email. Good luck and have a great summer!

## Contents

### ***Compulsory Tasks***

|                                |                |
|--------------------------------|----------------|
| 1.1 – Computer Hardware        | Slides 3 – 10  |
| 1.2 – Computer Components      | Slides 11 - 16 |
| 1.3 – Types of Computer System | Slides 17 - 23 |
| 1.5 – Communications Hardware  | Slides 24 - 28 |
| Employability Skills           | Slide 29       |
| Sources Table                  | Slide 30       |

### ***Additional Tasks***

|                                |                |
|--------------------------------|----------------|
| Computer Networks              | Slides 31 - 43 |
| Additional Tasks Sources Table | Slide 44       |

## What is a Computer?

A computer is simply a device that takes an input from a user, processes this input (this means to perform a calculation or change the data in some way) and then produce an output.

Computers are made up of both hardware and software. It is important that you understand the basic differences between hardware and software.

Watch the video below before completing the task on the right:

<https://www.youtube.com/watch?v=VzVSt6jxiqw>

Explain, using examples, the various *differences* between **HARDWARE** and **SOFTWARE**.

# 1.1 – Computer Hardware

Watch the video below. It contains useful information that will help you complete these tasks:

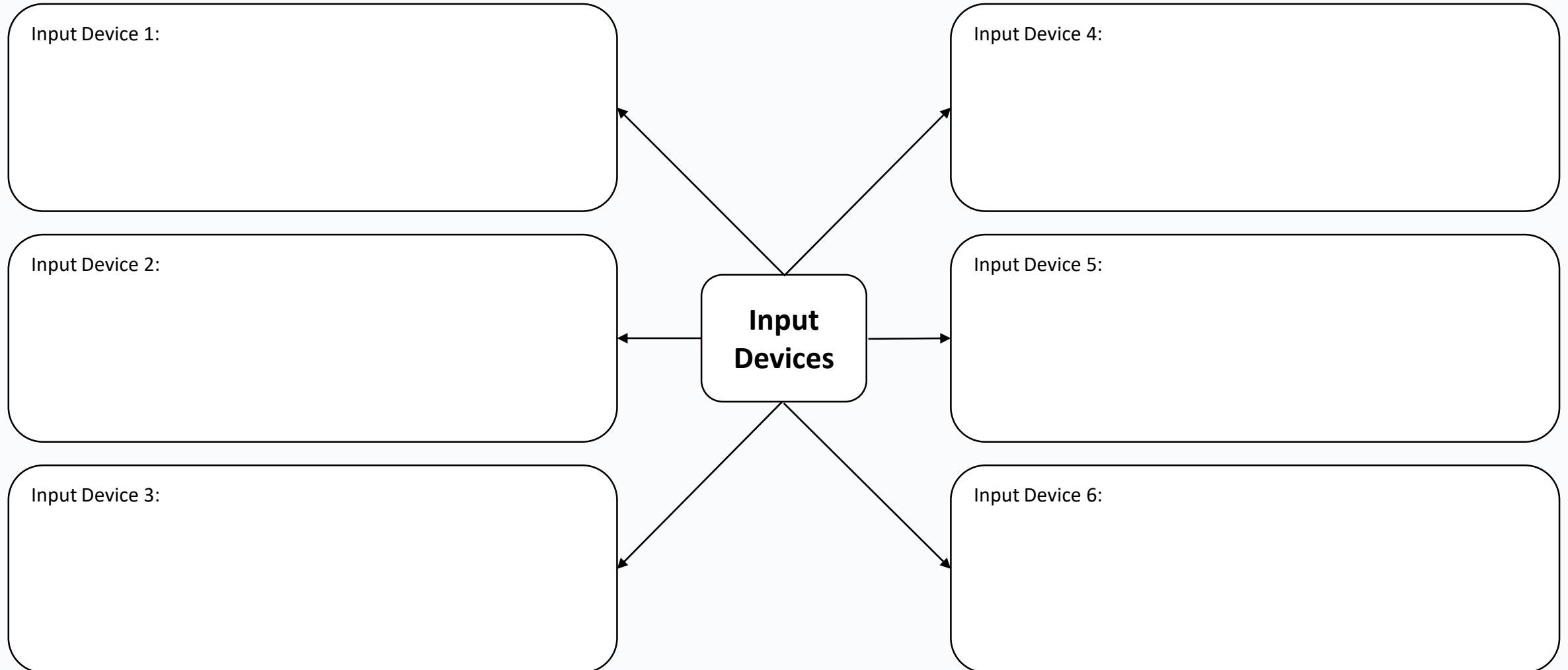
<https://www.youtube.com/watch?v=MMzdKTtUIFM>



The purpose of a computer can be represented very simply using the above diagram. Briefly explain, using an example, what happens in each of these three stages.

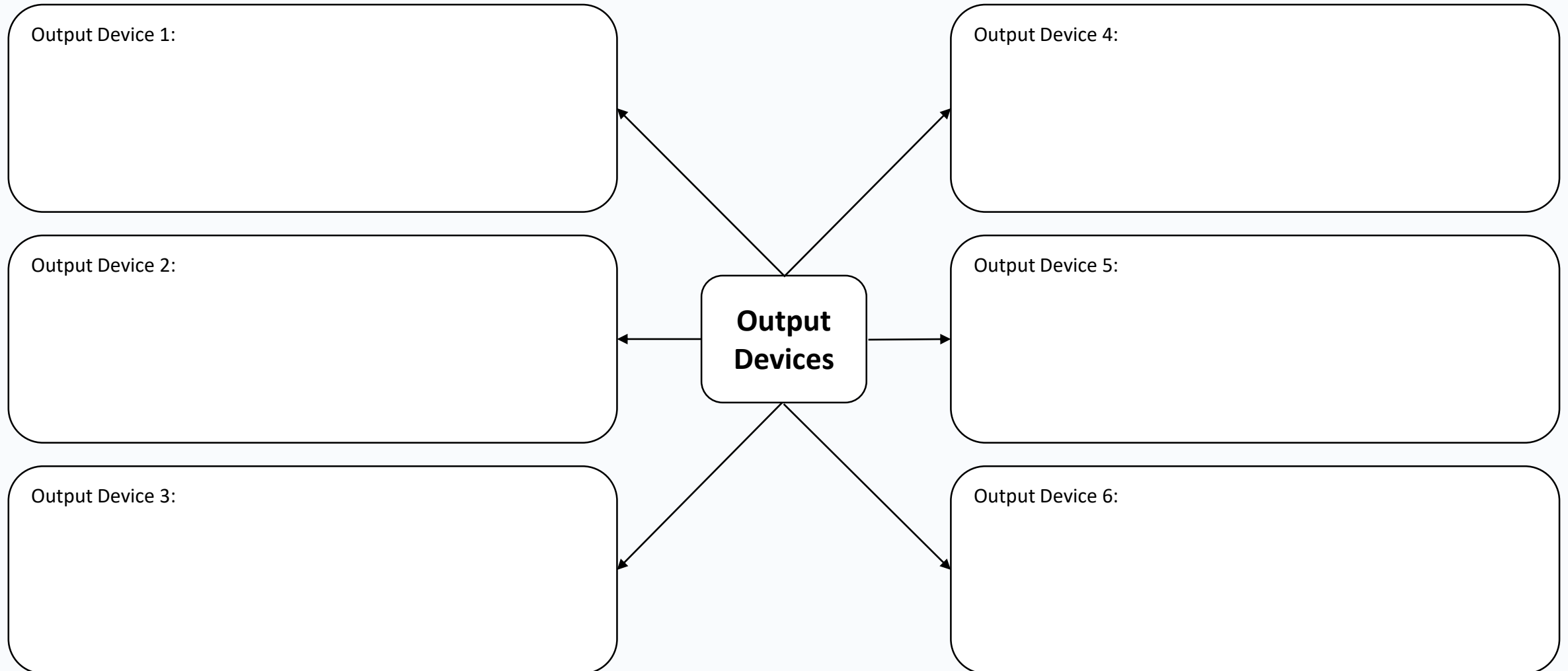
# 1.1 – Input Devices

Using the boxes below, identify and describe six different input devices of your choice.



# 1.1 - Output Devices

Using the boxes below, identify and describe six different output devices of your choice.



# 1.1 – Specialist Devices & Accessibility

Do some research into the various specialist hardware available for users with physical impairments. This mini-website is a useful starting point:

[https://www.teach-ict.com/as\\_a2\\_ict\\_new/ocr/AS\\_G061/312\\_software\\_hardware/specialist\\_hwsw/miniweb/index.htm](https://www.teach-ict.com/as_a2_ict_new/ocr/AS_G061/312_software_hardware/specialist_hwsw/miniweb/index.htm)

Explain, using examples, your understanding of the term '**accessibility**' when relating to computer systems.

On the next three pages, create a mini-presentation about '*specialist hardware for users with physical impairments*'. You need to cover devices for visually impaired users, devices for auditory impaired users and devices for motor impaired users. You should include information about the various specialised hardware available.

# 1.1 - Specialist Devices for Visually Impaired Users





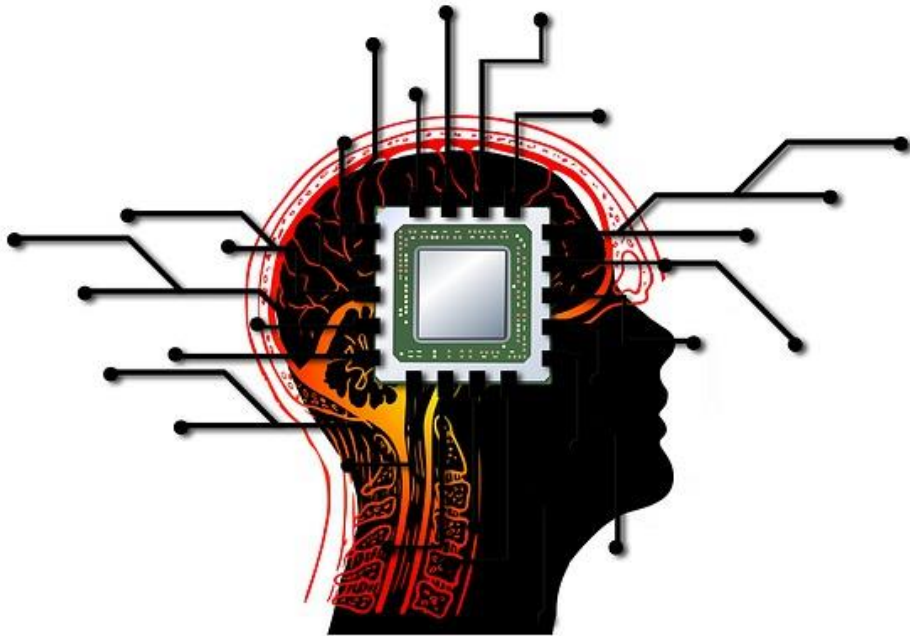
# 1.1 - Specialist Devices for Motor Impaired Users

# 1.2 Computer Components

Complete this table...

| Name of Component     | Explanation of Role of Component – <u>'What does it do?'</u> |
|-----------------------|--|
| CPU / Processor       |  |
| Heat Sink & Fan       |  |
| HDD / Hard Disk Drive |  |
| GPU / Graphics Card   |  |
| PSU / Power Supply    |  |
| RAM                   |  |
| Optical Drive         |  |

# 1.2 - The CPU

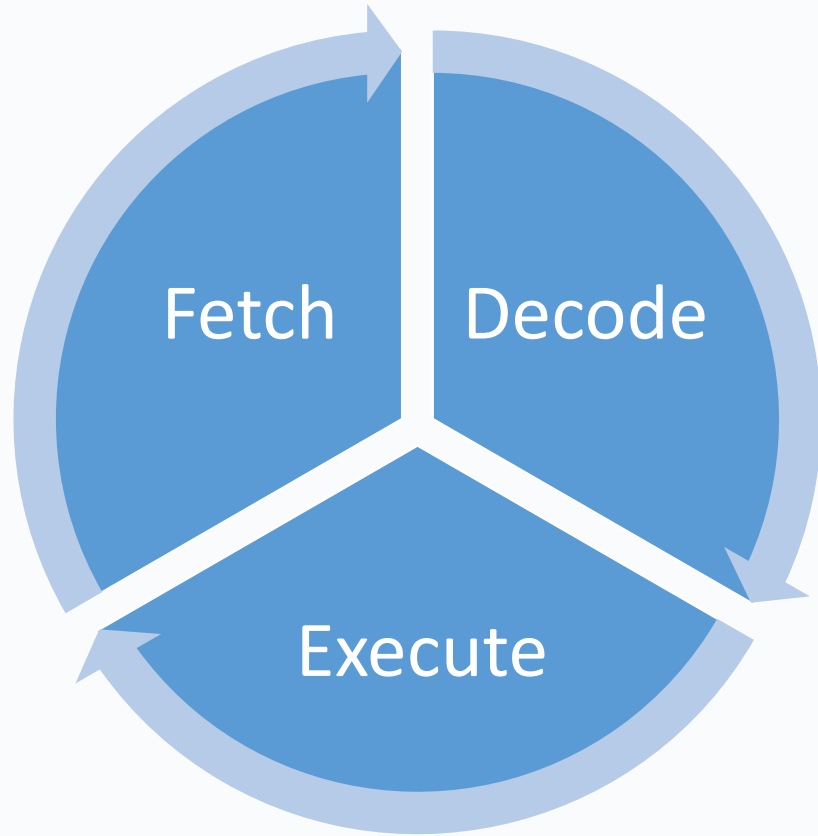


Watch the video below about the CPU – this will be useful when completing the next few tasks:

<https://www.youtube.com/watch?v=DvgJZvVyJfA>

# 1.2 – The CPU: FDE Cycle

It is important to realise that the CPU follows the 'fetch-decode-execute' cycle. Do some research into the FDE cycle and briefly explain what happens in each stage below.



|                |  |
|----------------|--|
| <b>Fetch</b>   |  |
| <b>Decode</b>  |  |
| <b>Execute</b> |  |

Visit the mini-website here for more information about the FDE cycle:

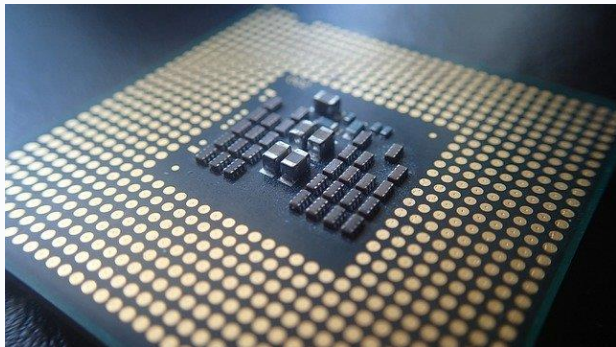
[http://teach-ict.com/gcse\\_computing/ocr/212\\_computing\\_hardware/cpu/miniweb/pg3.php](http://teach-ict.com/gcse_computing/ocr/212_computing_hardware/cpu/miniweb/pg3.php)

# 1.2 – The CPU: Performance Factors

There are three main factors that determine the performance of a CPU. These are as follows:

- Clock speed
- Number of cores
- Cache size

In the table on the right, explain how each of these three factors affects the performance of a CPU.



Visit the website link here for more information about these three CPU performance factors:

<https://www.bbc.co.uk/bitesize/guides/z7qqmsg/revision/5>

|                     |  |
|---------------------|--|
| <b>Clock Speed</b>  |  |
| <b>No. of Cores</b> |  |
| <b>Cache Size</b>   |  |



# 1.2 – Memory: The Need for Virtual Memory



<https://www.youtube.com/watch?v=qr6IPzYW1eY>

Watch the above video about ‘virtual memory’ and then, in your own words, explain the following:

- Why is ‘virtual memory’ needed?
- How does ‘virtual memory’ work?
- What are the benefits and limitations of ‘virtual memory’?

**Why is ‘virtual memory’ needed?**

**How does ‘virtual memory’ work?**

**What are the benefits and limitations of ‘virtual memory’?**



# 1.3 – Types of Computer System

- We have looked at the components of a computer, but they can be put together with different specifications and features to become more **specialised systems**.

**How many types of computer system can you list below?**



# 1.3 – PCs Vs Servers

| Desktop/Server Systems   | Definitions: What is...?    | Where is it Used, and Who By? |
|--|-----------------------------|-------------------------------|
| <p>Help:<br/><a href="https://youtu.be/ByI1PHMcPJQ">https://youtu.be/ByI1PHMcPJQ</a></p> <p>Servers and desktop machines share similar hardware, so how are they different?</p> <p>Simple guide:<br/><a href="https://www.csnews.com/1-3typesofcomputersystem">https://www.csnews.com/1-3typesofcomputersystem</a></p> | <p><b>A Desktop PC:</b></p> | <p><b>Desktop PC:</b></p>     |
|  | <p><b>A Server:</b></p>     | <p><b>Server:</b></p>         |

# 1.3 – Smartphones Vs Tablets

- Many of us have a smartphone and a tablet, but which is best?
  - You decide!
- For the next exercise read these two articles, then on the next slide present your case for which is the *best*, **and why!**

## Article 1:

[https://www.pcworld.com/article/247387/5\\_ways\\_tablets\\_are\\_better\\_than\\_laptops\\_or\\_smartphones.html](https://www.pcworld.com/article/247387/5_ways_tablets_are_better_than_laptops_or_smartphones.html)

## Article 2:

[https://www.pcworld.com/article/247388/5\\_ways\\_smartphones\\_are\\_better\\_than\\_laptops\\_or\\_tablets.html](https://www.pcworld.com/article/247388/5_ways_smartphones_are_better_than_laptops_or_tablets.html)

# 1.3 – Smartphones Vs Tablets

| Smartphone         | Features                      | Benefits                                   | Limitations                            | Your overall score (Out of 10)          |
|--------------------|-------------------------------|--|--|---|
| Add an image here! | List as many as you can here! | What does a Smartphone do especially well? | What does a Smartphone struggle to do? | What would you give it <b>and why</b> ? |

Clues: Remember a system included hardware and software, what can you find out about...

Hardware, battery, screen, OS software, application software (apps), uses, cost, size, weight, portability, and any other features of your choice.

# 1.3 – Smartphones Vs Tablets

| Tablet             | Features                      | Benefits                               | Limitations                        | Your overall score (Out of 10)         |
|--------------------|-------------------------------|--|------------------------------------|--|
| Add an image here! | List as many as you can here! | What does a tablet do especially well? | What does a tablet struggle to do? | What would you give it <b>and why?</b> |

Clues: Remember a system included hardware and software, what can you find out about...

Hardware, battery, screen, OS software, application software (apps), uses, cost, size, weight, portability, and any other features of your choice.

# 1.3 – Smartphones Vs Tablets

**After considering the evidence – your winner is the...**

**Because...**

# 1.3 – Other Types of Computer Systems

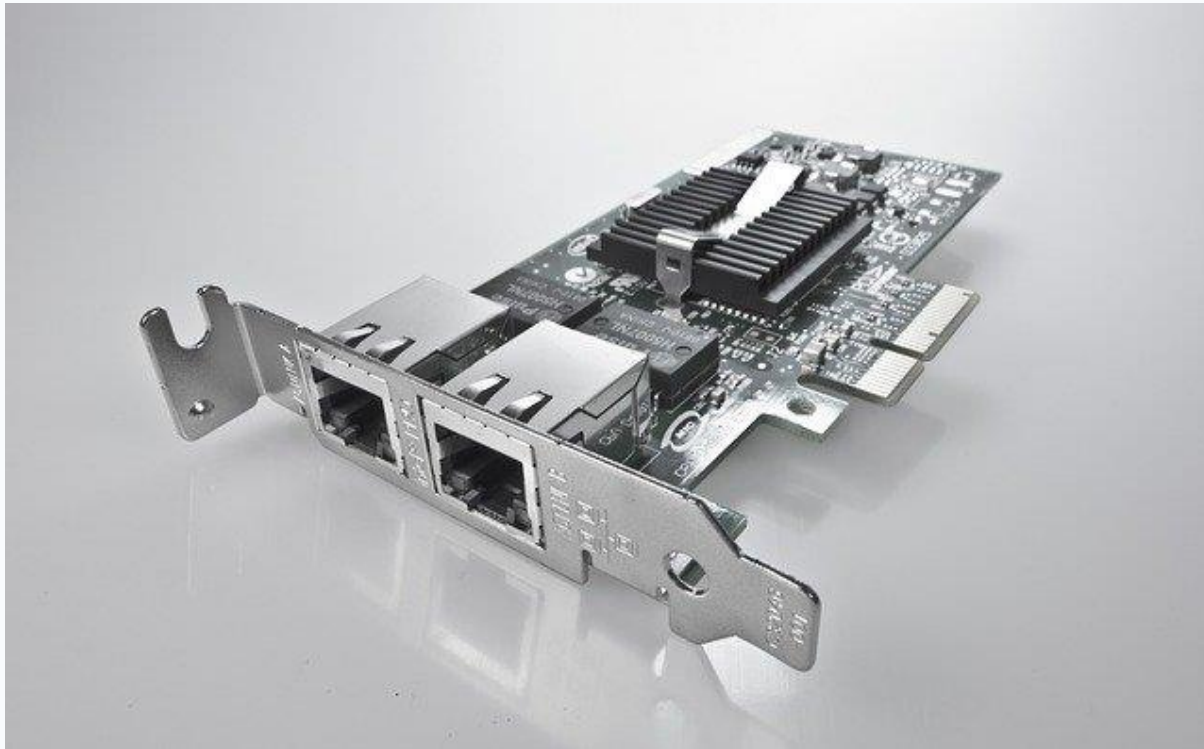
- We will look at the following in more detail when you start the course with us, but what can you find out about:

| Embedded Systems | Mainframe Systems | Quantum Systems |
|------------------|-------------------|-----------------|
|                  |                   |                 |

**Help!**

<https://www.csnewbs.com/1-3typesofcomputersystem>

# 1.5 – Communications Hardware



## What is it?

- *Name of hardware*

## What does it do?

- *Explanation*



# 1.5 – Communications Hardware



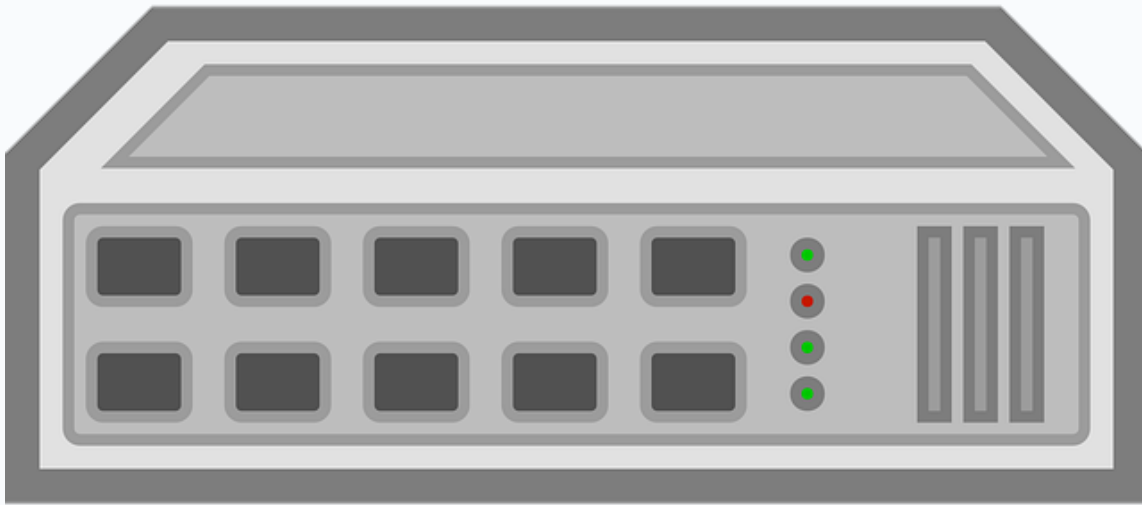
## What is it?

- *Name of hardware*

## What does it do?

- *Explanation*

# 1.5 – Communications Hardware



## What is it?

- *Name of hardware*

## What does it do?

- *Explanation*



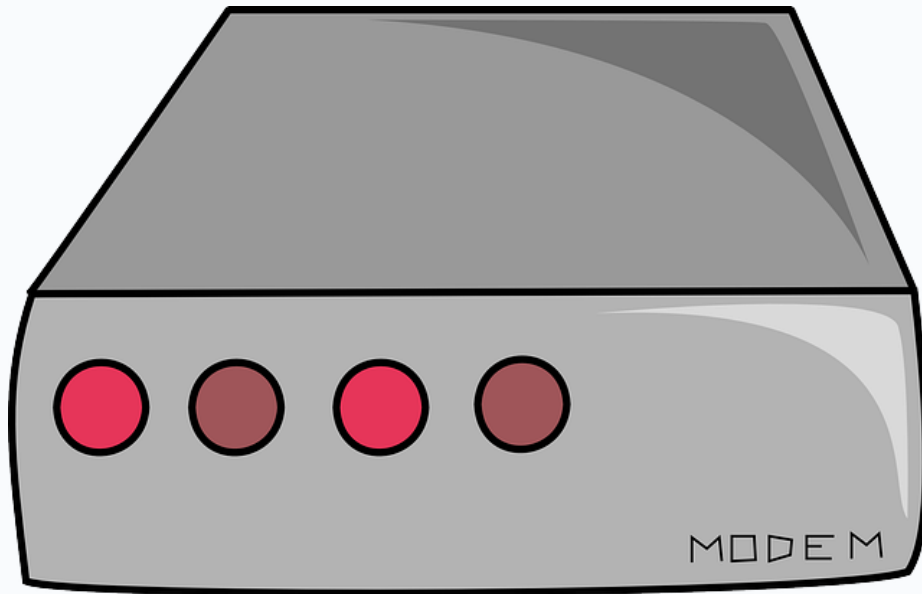
## What is it?

- *Name of hardware*

## What does it do?

- *Explanation*

# 1.5 – Communications Hardware



## What is it?

- *Name of hardware*

## What does it do?

- *Explanation*

## IT Technician

### Person Specification:

Successful applicants will need to demonstrate the following:

- Experience of IT maintenance
- Organisational skills
- Good administration skills
- Problem solving skills
- Knowledge of networking protocols
- Good work ethic
- Good punctuality
- Good numeracy skills
- Excellent communication skills
- Excellent team working skills
- Ability to take initiative
- Possible leadership experience if looking to progress to senior role

Salary £25k / 37.5 hours per week

What are 'transferable skills'? <https://www.reed.co.uk/career-advice/what-are-transferable-skills/>

| Transferable Skills / Personal Qualities Needed for this Job | <u>WHY</u> are these transferable skills so important in IT jobs? |
|--|---|
|  |   |

Above (left) is part of a job advert for an IT Technician. It is outlining some of the transferable skills and personal qualities that the company is looking for in that role. In the table above (right), list the transferable skills / personal qualities needed and explain why these are so important in the IT industry, especially in the role of an IT Technician (someone who repairs & maintains computer systems for other people).



# Additional Content

The following pages contain some additional tasks relating to computer networks. Although this section is not compulsory, it is strongly recommended that you complete these additional tasks in order to develop and enhance your knowledge of this important topic.

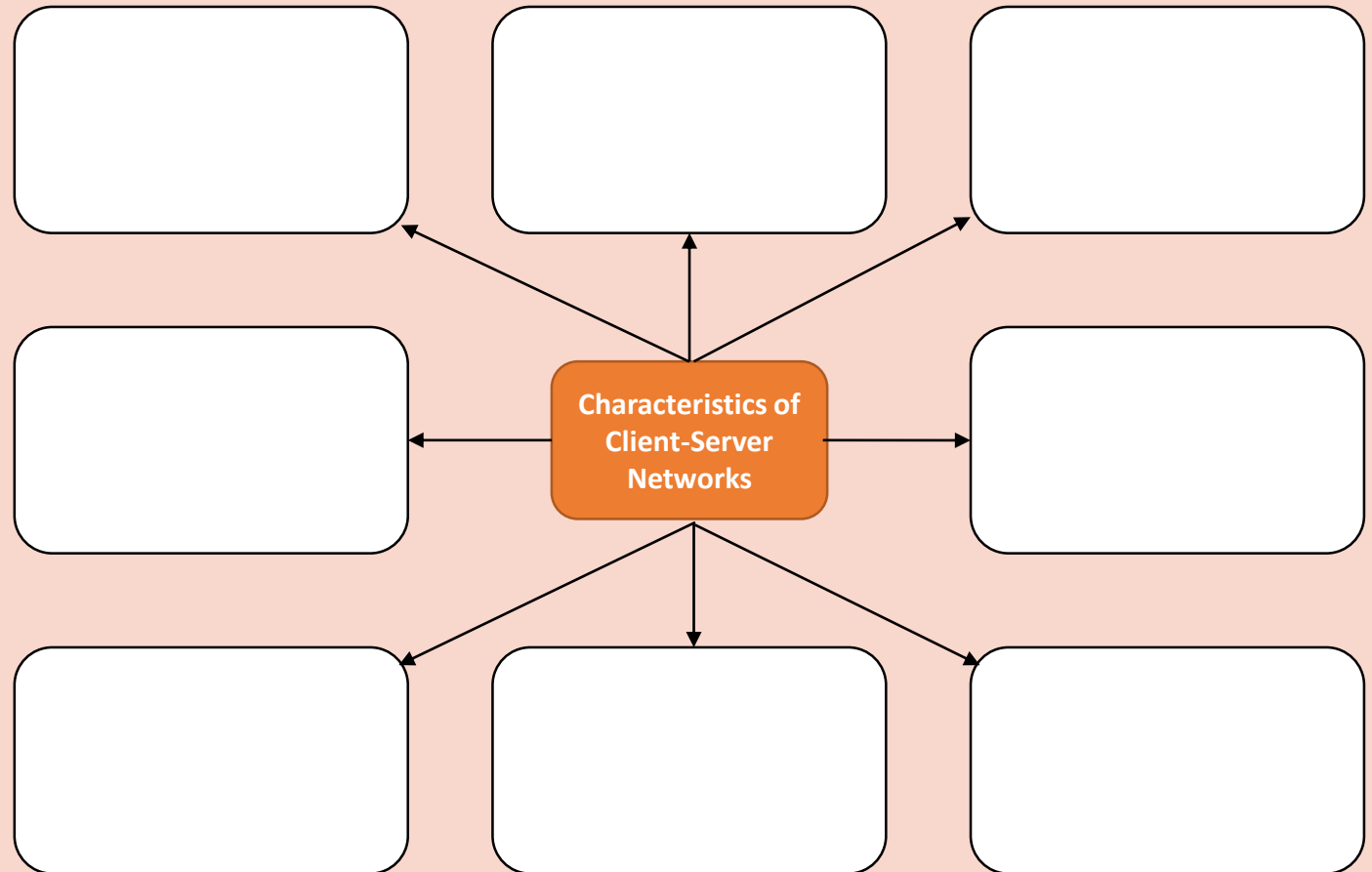




Write a definition of a 'client-server' network

Draw a diagram to represent a 'client-server' network

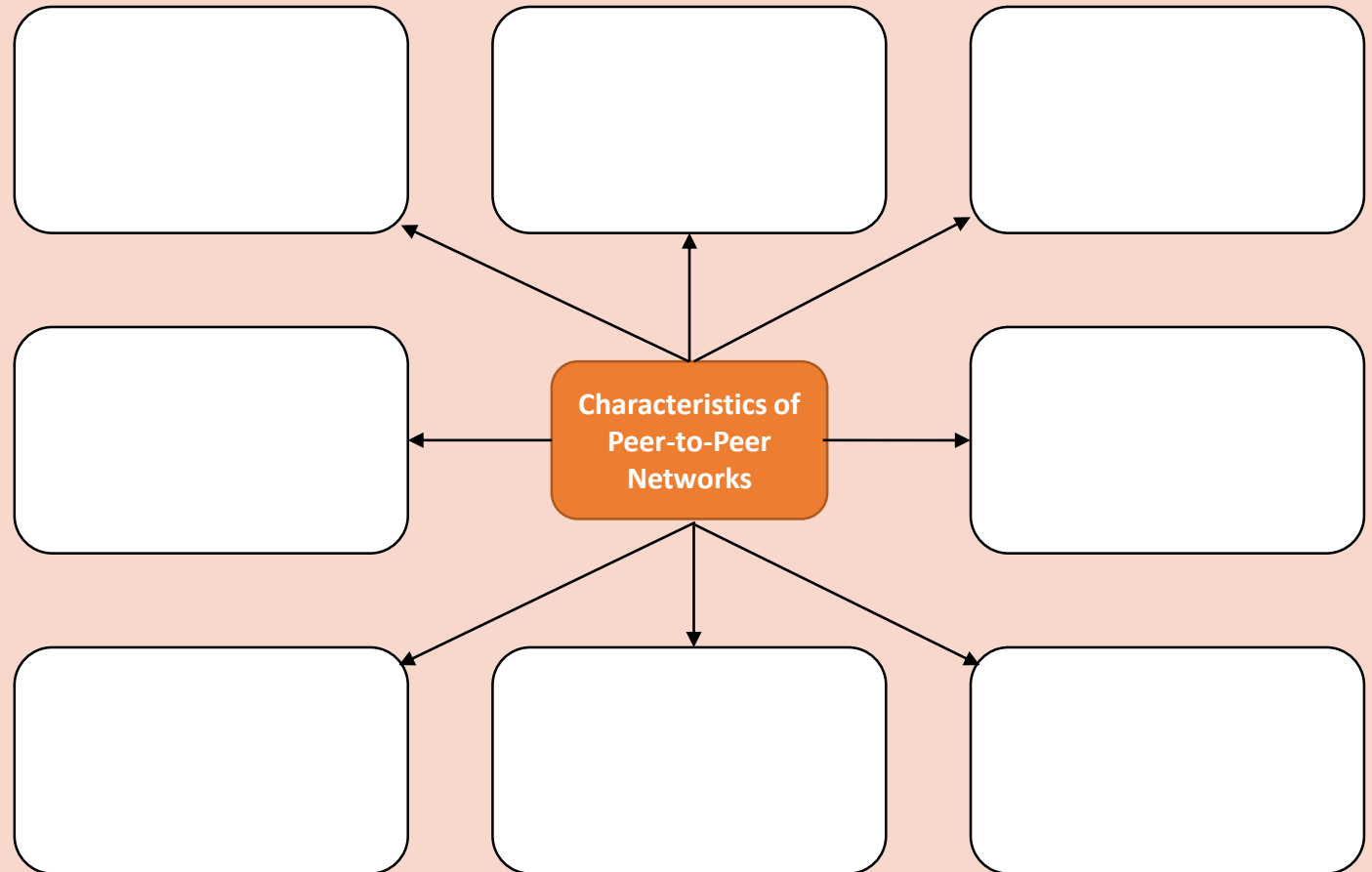
Complete the diagram below by explaining various characteristics of 'client-server' networks.



Write a definition of a 'peer-to-peer' network

Draw a diagram to represent a 'peer-to-peer' network

Complete the diagram below by explaining various characteristics of 'peer-to-peer' networks.



# Ring Network Topology

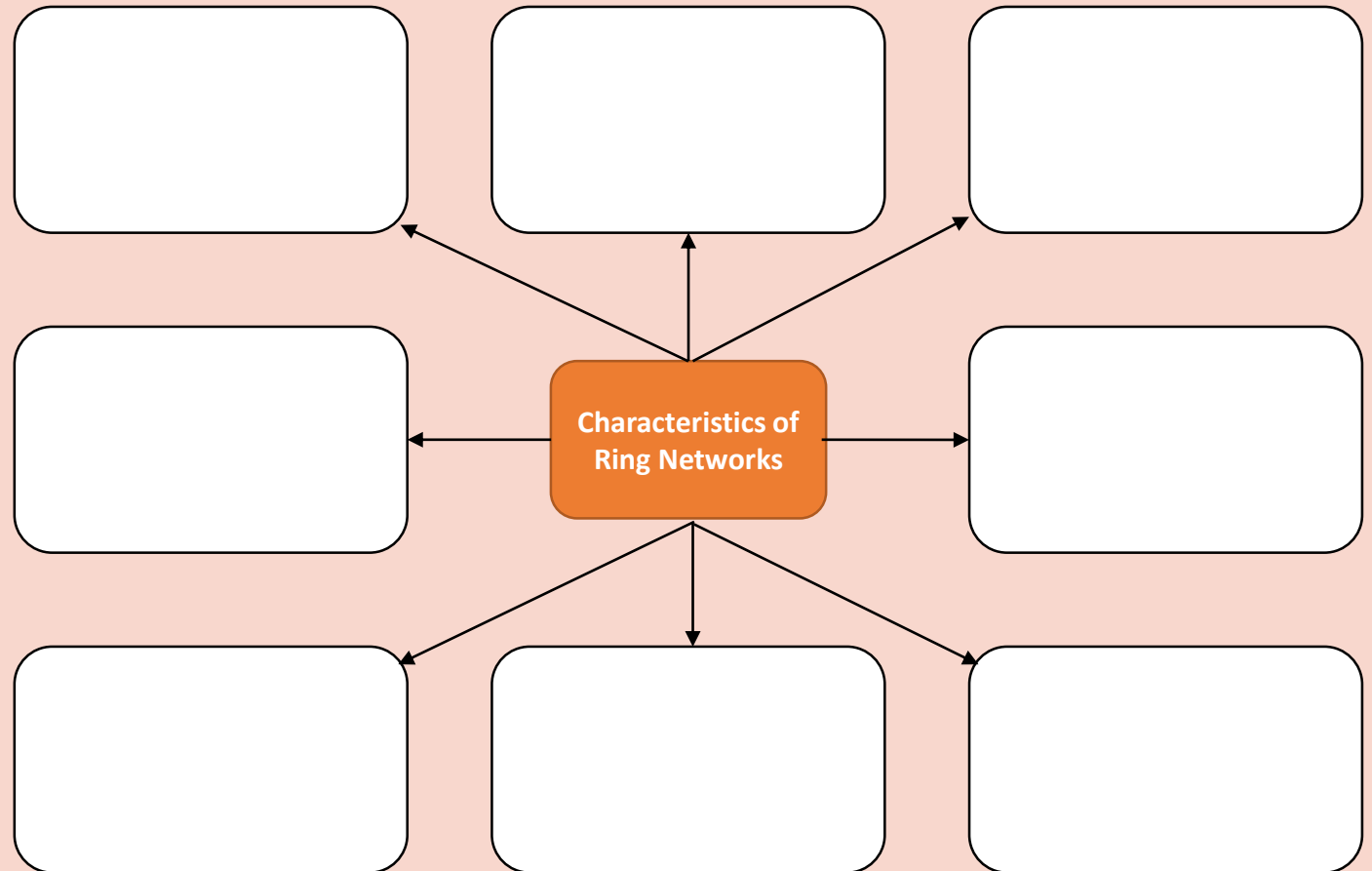
Write an explanation of a 'ring' network topology

Blank area for writing an explanation of a 'ring' network topology.

Draw a diagram to represent a 'ring' network topology

Blank area for drawing a diagram to represent a 'ring' network topology.

Complete the diagram below by explaining various characteristics of 'ring' networks.



# Star Network Topology

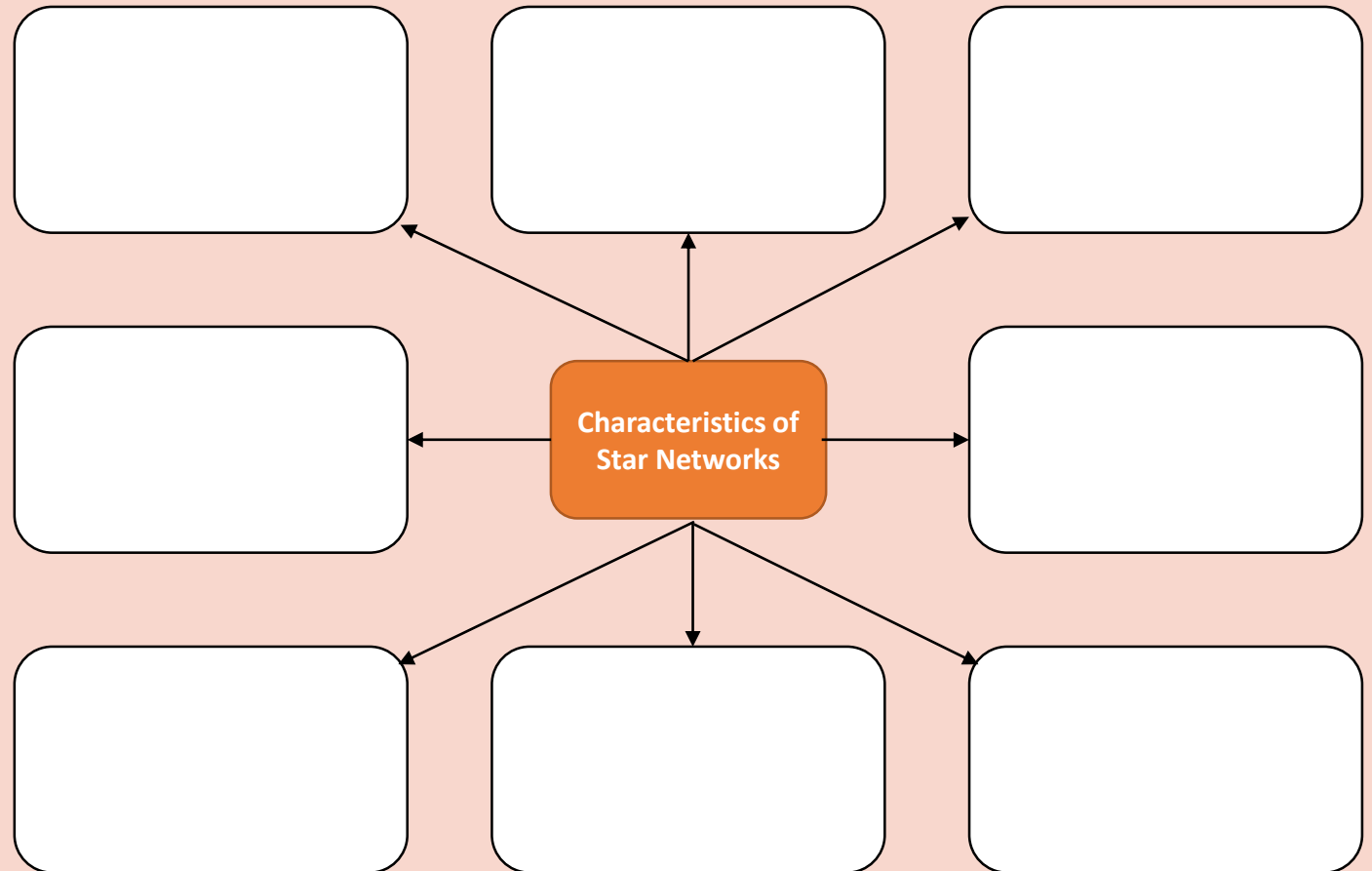
Write an explanation of a 'star' network topology

Blank area for writing an explanation of a 'star' network topology.

Draw a diagram to represent a 'star' network topology

Blank area for drawing a diagram to represent a 'star' network topology.

Complete the diagram below by explaining various characteristics of 'star' networks.



# Tree Network Topology

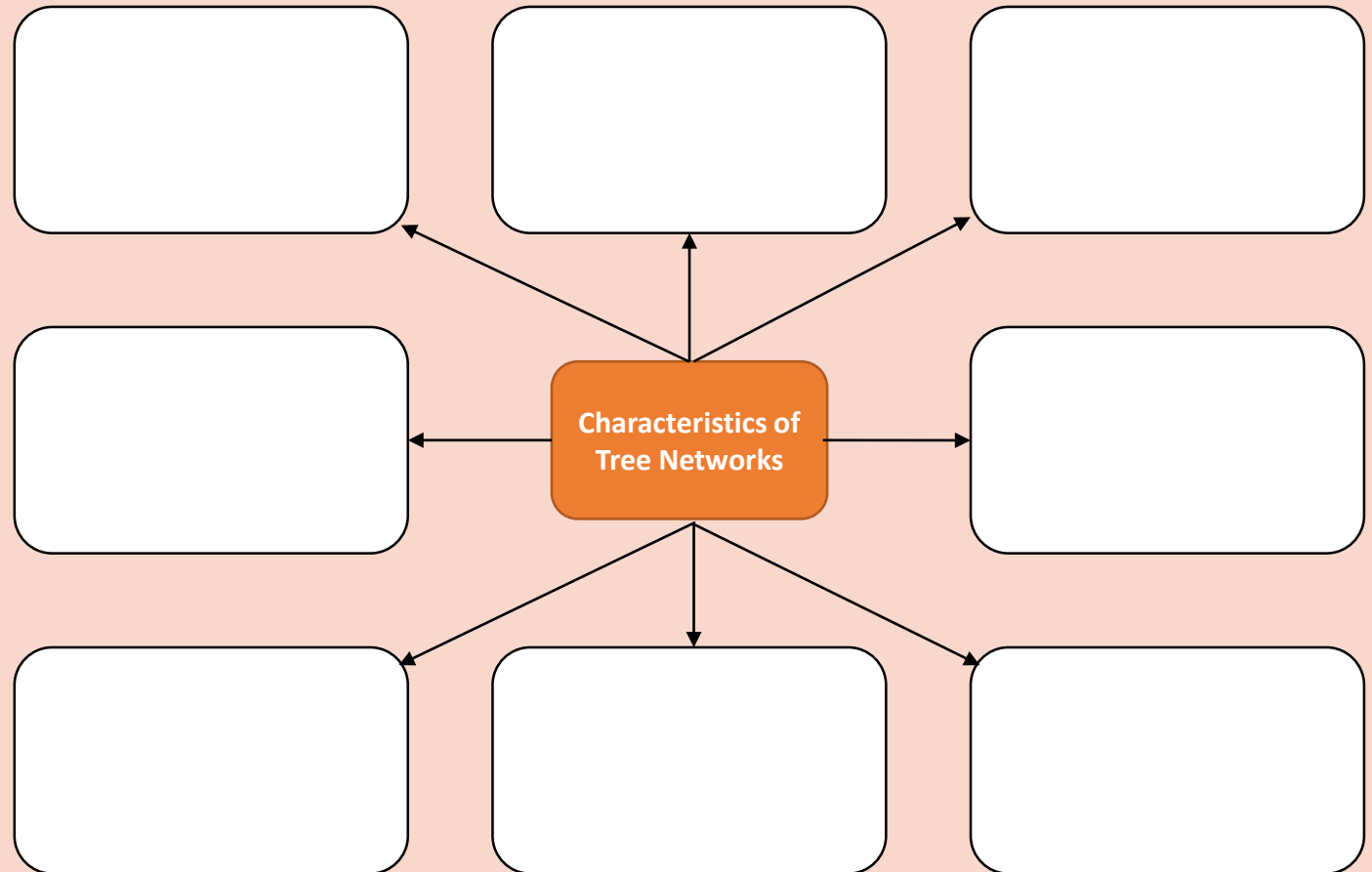
Write an explanation of a 'tree' network topology

Blank area for writing an explanation of a 'tree' network topology.

Draw a diagram to represent a 'tree' network topology

Blank area for drawing a diagram to represent a 'tree' network topology.

Complete the diagram below by explaining various characteristics of 'tree' networks.



# Mesh Network Topology

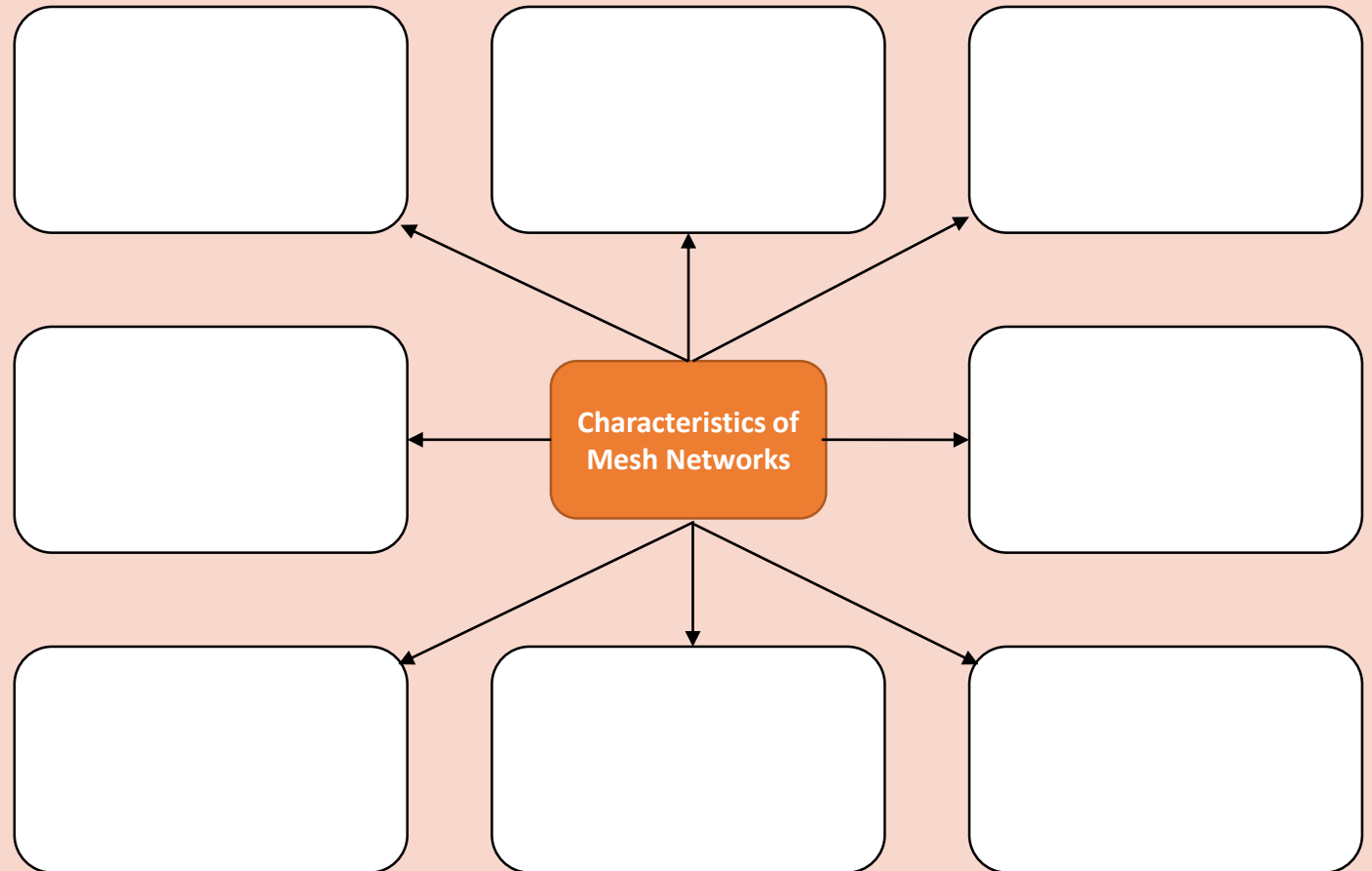
Write an explanation of a 'mesh' network topology

Blank area for writing an explanation of a 'mesh' network topology.

Draw a diagram to represent a 'mesh' network topology

Blank area for drawing a diagram to represent a 'mesh' network topology.

Complete the diagram below by explaining various characteristics of 'mesh' networks.

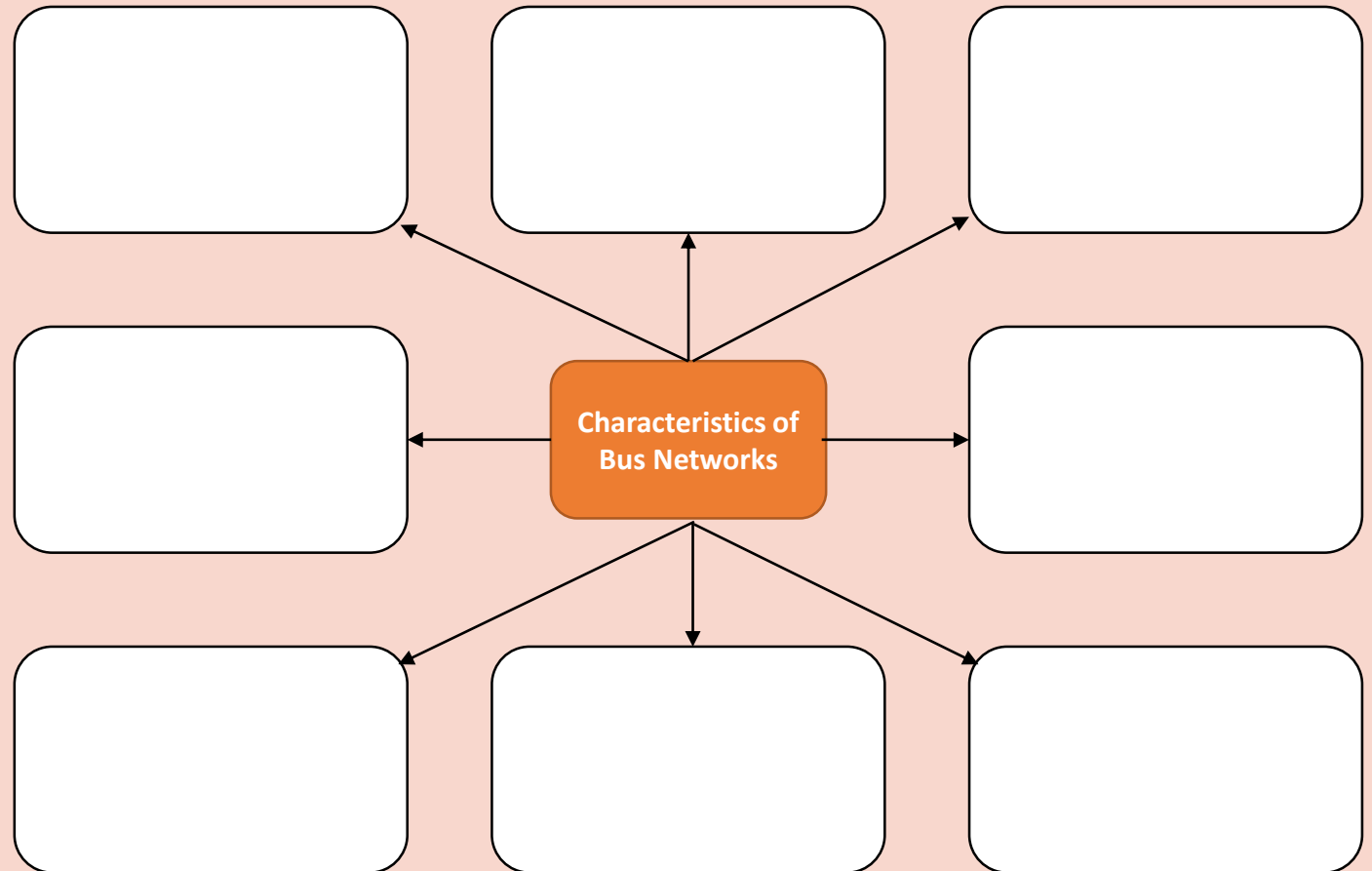


# Bus Network Topology

Write an explanation of a 'bus' network topology

Draw a diagram to represent a 'bus' network topology

Complete the diagram below by explaining various characteristics of 'bus' networks.



Write a definition and explanation for 'network protocols'.

| Network Protocol  | Definition & Explanation of Use |
|-------------------|---------------------------------|
| TCP               |                                 |
| IP                |                                 |
| SMTP              |                                 |
| DHCP              |                                 |
| HTTP/HTTPS        |                                 |
| FTP               |                                 |
| UDP               |                                 |
| RFID              |                                 |
| Bluetooth         |                                 |
| 3G/4G/5G Cellular |                                 |



# Types of Networks - LANs, WLANs, WANs, & MANs

Explanation of a 'LAN'

Explanation of a  
'WLAN'

Explanation of a 'WAN'

Explanation of a 'MAN'



| Network Security Feature                           | Explanation of Security Feature | Pros and Cons of Security Feature |
|--|---------------------------------|-----------------------------------|
| Anti-Virus Software                                |                                 |                                   |
| Backups  |                                 |                                   |
| Levels of Authorisation/Network Access Permissions |                                 |                                   |
| Firewall   |                                 |                                   |
| Physical Security<br>(Locks/Alarms/CCTV etc.)      |                                 |                                   |
| Two-Factor Authentication                          |                                 |                                   |
| Biometrics   |                                 |                                   |

