



Highsted Knowledge Organiser

Computer Science: Networks – Year 8

What I need to know

- What is a computer network
- The advantages and disadvantages of networks
- The types of network
- The different network topologies
- The difference between peer-to-peer and client network

Key Vocabulary

- Computer network	- LAN	- WAN
- Bus	- Star	- Ring
- Mesh	- Ring	- Peer-to-peer
- Client-server model		

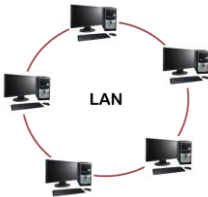
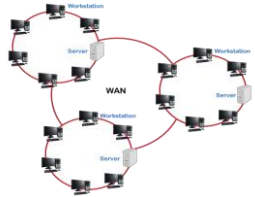
Student reference point

What is a computer network?

A computer network is when 2 or more computers or devices are linked together via wired or wireless connection.

What is a network topology?

A topology is a way to arrange devices to create a network.

Advantages of network	Disadvantages of network	LAN	WAN
<ul style="list-style-type: none"> - Sharing devices such as printers - Sharing of files between users - Instant communication via emails or messaging service - Data can be easily backed up on servers 	<ul style="list-style-type: none"> - Set up and maintenance cost can be expensive - Managing a network requires specialist people - If the main server breaks down, the whole system can be down - The system is prone to viruses and hacking 	 <p>LAN (Local Area Network) is a group of devices linked within a limited area (small area) such as a house, school or office.</p>	 <p>WAN (Wide Area Network) is a group of devices that extends over a large geographical area, such as between countries or states. It consists of a connection of LANS.</p>

Network Topologies

STAR: All devices are connected to a central hub/switch and each device can send and receive data with causing data collisions.

RING: All devices are connected in a circle. Data moves in one direction but is very slow to send data. If one device fails, the network fails as well.

BUS: Devices are connected to a backbone. It is a very slow network. Because data is sent in either direction, data collisions can happen.

MESH: All devices are connected to one another. Data is sent along the fastest route. Requires lots of connection.



Star



Ring

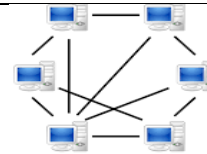


Bus



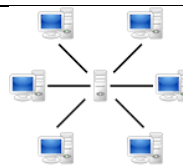
Mesh

Peer-to-Peer Network



All devices have equal responsibility of sharing and holding resources.

Client-Server Network



A central device provides the services and resources the workstations requests.

Challenge question

- Evaluate the benefits of the client-server model.

Suggested reading

- <https://www.bbc.co.uk/bitesize/guides/zvspfcw/revision/1>



Highsted Knowledge Organiser

Computer Science: Network hardware and the Internet – Year 8

What I need to know

- Network hardware
- Factors affecting network performance
- How the Internet works

Key Vocabulary

- Ethernet	- Wi-Fi	- Bluetooth
- NIC	- Switch	- Router
- Bandwidth	- Packets	-

Student reference point

Network Hardware

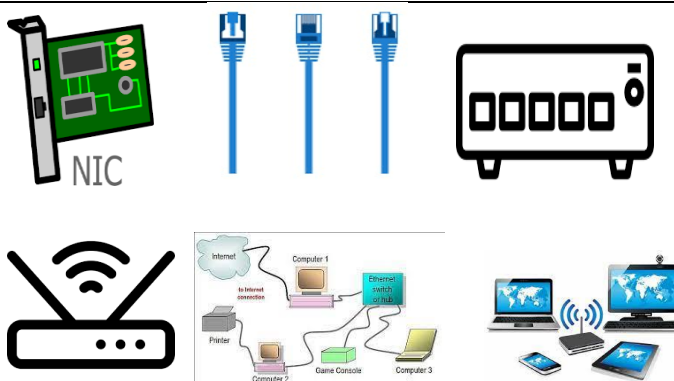
Network Interface Controller (NIC): a hardware component which acts as an adapter to connect devices to a network

Cables: Fibre, Ethernet, Coaxial cable providing data transmission over wired network

Wireless Access Point (WAP): connects to a router and in turn is used as a router to other devices. Created a wireless connection (Wi-Fi).

Switch: Connects devices in a LAN

Router: Connects network in a WAN



Network Performance

Bandwidth: the amount of data that can be sent during transmission, the higher the bandwidth, the more data can be transferred.

Number of users: more users on a network at one time less bandwidth, less likely the network will cope efficiently

Transmission media: a wired connection will provide a higher bandwidth and better connection as a wireless connection

Latency: the time it takes for a transmission to take place. The lower the latency the quicker the transmission.

The Internet

The Internet is an interconnected network that uses the internet protocol to communicate with devices all around the world, using satellites, computers.

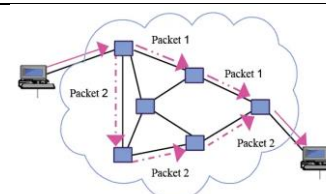


How data travel over the Internet

Data travel over the Internet in packets.

The message is broken in chunks at the sender's device and given a sequence number.

The packets travel to the destination by finding the fastest route on the Internet. Once all packets have reached the destination, they are re-ordered in the correct sequence.



Challenge question

- Explain the structure of a web address.

Suggested reading

- <https://www.bbc.co.uk/bitesize/guides/zvspfcw/revision/4>
- <https://www.bbc.co.uk/bitesize/guides/znxxh39/revision/2>
- <https://www.bbc.co.uk/bitesize/topics/zs7s4wx/articles/z3tbgk7>



Highsted Knowledge Organiser

Computer Science: Microbit Programming – Year 8 – Term 6

What I need to know

- What is a microbit
- How can a microbit be programmed
- Write algorithms to be programmed on a microbit
- To test and debug microbit code

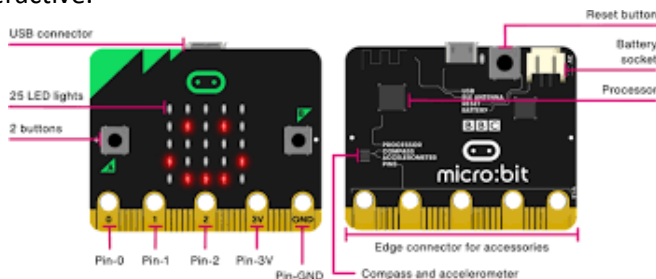
Key Vocabulary

- Algorithm	- Program	- Sequence
- Selection	- Condition	- Iteration
- Variable	- LED	- Loop
- Simulator	- Editor	

Student reference point

What is a microbit?

A microbit is a pocket-sized computer that introduces you to programming. It has an LED light display, buttons, sensors and many input/output features that, when programmed, makes it interactive.



The 3 key programming concepts

1. Sequence

A sequence is a set of code that is run/executed in order

2. Selection

A set of codes that employs decisions between multiple choices (makes decision)

3. Iteration

A set of codes that is repeated over a number of times.

Microbit Blocks

Basic

- show number
- show leds
- show icon
- show string "Hello!"
- clear screen
- forever
- on start

Logic

Conditionals

- if true then
- if true then else

Comparison

- =
- <
- " = "

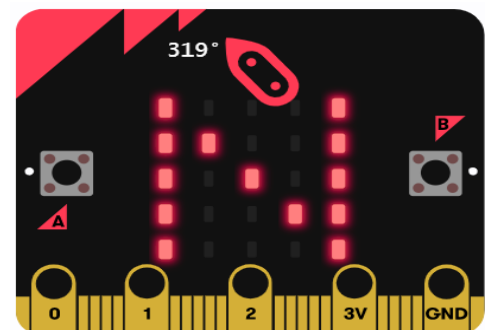
Loops

- repeat 4 times
- while false
- for index from 0 to 4

Example

```

forever
  set bearing to compass heading (°)
  if bearing < 45 or bearing > 315 then
    show string "N"
  else
    show string ""
  
```



Challenge question

- Create a program to detect the speed of an object falling.

Suggested reading

- <https://microbit.org/projects/make-it-code-it/>