



F10.2 Network hardware and connections

Networks · GCSE · OCR J277 1.3.1, AQA 8525 3.5, Edexcel 1CP2 4.1.4 ·

about 15 min

Name _____

Class _____

Date _____

What this lesson is about

NICs, switches, routers and access points; copper, fibre and wireless; Wi-Fi, Ethernet and Bluetooth.

- The hardware
- Transmission media
- Wired and wireless
- How a switch learns

Questions

6 marks in all

- Which device connects different networks together, such as a LAN to the internet? [1 mark]
 - ☐ A Router
 - ☐ B Switch
 - ☐ C NIC
 - ☐ D Wireless access point
- How does a switch decide where to send a frame? [1 mark]
 - ☐ A It reads the destination MAC address
 - ☐ B It reads the destination IP address
 - ☐ C It sends it to every device
 - ☐ D It asks the router
- What does a wireless access point do? [1 mark]
 - ☐ A Lets devices connect to a wired network by radio
 - ☐ B Connects a LAN to the internet
 - ☐ C Gives each device a MAC address
 - ☐ D Encrypts files on a server
- Which is an advantage of fibre optic cable over copper? [1 mark]
 - ☐ A It carries data further without interference
 - ☐ B It is cheaper
 - ☐ C It is easier to bend
 - ☐ D It carries electrical signals
- Why must Wi-Fi be encrypted? [1 mark]
 - ☐ A Its signals can be picked up by anyone in range
 - ☐ B Encryption makes it faster
 - ☐ C Wi-Fi cannot work without it
 - ☐ D It stops interference

6. What does this program print?

[1 mark]

```
table = {}
for port, src in [(1, "AA"), (3, "CC"), (2, "AA")]:
    table[src] = port
print(table)
```

The task: a learning switch

Complete the switch. For each frame in `frames`, learn which port its source is on. Then print `frame to <destination>: port <n>` if the destination is known, or `frame to <destination>: every port` if not. At the end, print `learned <n> addresses`.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

# (port it came in on, source MAC, destination MAC)
frames = [
    (1, "AA-01", "BB-02"),
    (2, "BB-02", "AA-01"),
    (3, "CC-03", "AA-01"),
    (1, "AA-01", "CC-03"),
    (4, "DD-04", "BB-02"),
]
table = {}
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f10-2-network-hardware-and-connections/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. A hub is an older device that sends every frame out of every port. Count how many frames a hub would have sent to the wrong device.
2. Add a frame from a device that has moved to a different port. What should the switch do?

3. A school is building a new sports hall 400 m away. Recommend copper, fibre or wireless for the link, with two reasons.