Advantages and limitations

# Copper cable

|  | **Copper cable** is a type of wired transmission media. It uses electrical signals to transmit data. |
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| **Advantages** | **Limitations** |
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| * Copper cable is cheaper to buy and often cheaper to install than fibre optic cable. * Copper cable connections already exist through the UK home phone network and can be utilised for internet connectivity. * Acceptable transmission media option when used over short distances. * Wired connections are typically more stable than wireless connections. | * The signals in copper cable degenerate over long distances. * Data transfer is slower compared to fibre optic cable. * It is more prone to signal disturbances than fibre optic cable. * Wired connections are costly and timely to expand compared to wireless. |

# Fibre optic cable

|  | **Fibre optic cable** is a type of wired transmission media. It uses light pulses as signals to transmit data. |
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| **Advantages** | **Limitations** |
| --- | --- |
| * Performs well over long distances. * Data transfer is faster than with copper cable. * Less prone to signal disturbances than copper or wireless transmission. * Wired connections are typically more stable than wireless connections. | * Expensive initial set up, both to buy and install. * Wired connections are costly and timely to expand compared to wireless. |

# WiFi

|  | **WiFi** is a type of wireless transmission media. It uses radio frequencies to send signals. WiFi signals can transmit data up to 50 metres. WiFi is typically used to connect multiple devices to a network and/or the internet. |
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| **Advantages** | **Limitations** |
| --- | --- |
| * Data can be transmitted wirelessly up to 50 metres. * Multiple users can access the network with minimal configuration (typically a password). * Cheaper to expand the network and add more devices (compared to wired). * Increased mobility for users, devices can move around and stay connected to the network. * WiFi is cheaper to install than a wired connection. | * WiFi networks are more prone to hacking, particularly when used in public spaces. * The strength of the network connectivity is reduced as you move away from the access point. * WiFi is susceptible to interference and can cause reliability issues. * As more devices connect to a single wireless access point, the speed of individual connections decreases. This is because the connection is shared. |

# Bluetooth

|  | **Bluetooth** is another form of wireless transmission media. It also uses radio frequencies to transmit data. Bluetooth signals can transmit data up to 10 metres. Bluetooth is typically used to connect devices over a small area like a wireless mouse, keyboard, or speaker system to a computer. |
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| **Advantages** | **Limitations** |
| --- | --- |
| * Reduced interference from other wireless devices compared to WiFi. * Bluetooth devices are fairly low cost. * Bluetooth devices use less power than WiFi enabled devices. | * Data can only be transmitted up to 10 metres, much shorter than WiFi. * Bluetooth can be vulnerable to hacking because users often leave their connections exposed. * Bluetooth limits the number of devices that can be connected at any one time. * Bluetooth data transfer is much slower than WiFi. |

# Scenarios .

Read the scenarios carefully and decide which transmission media would be most suitable for the situation being described.

Underline your chosen transmission media.

1. **The chef goes live!**

A chef creates live, online content and would like to purchase a new headset so that they can listen to questions from their viewers whilst continuing to cook. The chef needs to be able to freely move around the kitchen whilst using the headset.

*What type of transmission media does the chef need?*

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1. **A local coffee shop**

A coffee shop owner has had requests from their customers for free access to the internet whilst they are in the shop. The owner already has an internet connection and would like to share this internet connection with their customers. The tables in the shop are regularly moved around and it is often very busy.

*What type of transmission media will the coffee shop owner need to use?*

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1. **The online gamer**

An online gamer requires a new mouse and keyboard. They want to be able to frequently change positions without having to worry about wires getting in the way and knocking things over.

*What type of transmission media should the online gamer look for when purchasing the keyboard and mouse?*

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1. **Print on demand**

A homeowner wants to purchase a printer that anyone in the household can print to. Their house has three floors. The printer will be placed in the entrance hall on the bottom floor and needs to be accessible from the top floor. They have just renovated the home and don’t want to install any new wiring to the building.

*What type of transmission media should the homeowner look for when purchasing the keyboard and mouse?*

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1. **TV studio**

A new TV studio is being designed. The studio will be producing news clips for an online streaming service. They will need to be able to send large video files at high speeds around the network for review and editing purposes. The network connection must be stable and secure. They are prepared to pay a large amount of money for the most effective solution.

*What type of transmission media should the TV studio use?*

Copper cable Fibre optic cable WiFi Bluetooth

1. **The bakery**

A small bakery has three desktop computers that they would like to connect together to allow the bakers to share recipes and send invoices to customers. The desktop computers are in a fixed location and are all quite close to each other. The bakery has a minimal budget for setting up this small network. They have a lot of old bakery equipment that could potentially interfere with a signal, and they would like the connection to be as stable as possible within their low budget.

*What type of transmission media should the bakery use?*

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# Explorer task .

Justify your choices for each scenario below.

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