Task 1

Identify the tasks performed by each piece of network hardware shown in the table below.

* Green indicates these are part of the specification and it’s a requirement to know how these work.
* Orange indicates that although these are not part of the specification, it’s worth knowing so you gain a wider understanding of the topic.
* Yellow indicates this is more of an extension activity.

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| **Rank** | **Network hardware** | **Purpose** |
|  | Switch | To connect all the devices together on a network. It’s an intelligent device which has the ability to store the addresses of the devices connected to it. The addresses they store are called MAC addresses, which is a way of uniquely identifying a device on a network. So when data is sent to a switch, it’s only redirected to the intended destination. |
|  | Router | To connect different networks together. It works by receiving data and inspecting it’s IP address. Once it determines who the data is intended for, it is then forwarded to the correct network. |
|  | Bridge | Used to join similar networks together such as a LAN and another LAN. |
|  | Gateway | Used to join different types of networks together such as a LAN (intranet) and a WAN (internet). For example, it allows a LAN to connect to the internet. |
|  | Transmission media | This is the technology used to transmit data from sender to receiver, usually in the form of a cable. The most common forms are ethernet cables and fibre optic cable, with the latter becoming more popular due to it’s speed and the distance it can travel. Other examples include copper cables such as coaxial cables which are used to connect satellite TV. |
|  | Hub | To connect all the devices together on a network. It’s designed not to filter any data so when data arrives, it’s sent to all the other devices on that network. This is why it’s often referred to as being ‘unintelligent’. |
|  | Server | A piece of hardware that can store and share your files; share a single internet connection between all your devices. |
|  | Wireless Access Point | Wireless Access Points can be added to your existing set up for improved WIFI coverage. It is becoming more and more common to install multiple of these in buildings where a single WIFI connection wouldn’t be able to serve an entire property. This is usually large buildings or buildings with large solid walls or where the wireless connection needs to pass through many objects to get where it needs to get to.  Access points work by connecting direct to your broadband router or network switch with a Ethernet or data cable. |
|  | NIC (Network Interface Controller) | All computers need a Network Interface Controller (NIC) to connect to a network. Modern computers all come with a built in NIC – but this wasn’t the case many years ago. Each NIC will be assigned unique identification number which cannot be changed or copied. This unique form of identification is called a MAC address. MAC stands for Media Access Control. It’s programmed into the NIC to ensure the data is directed to it’s intended location. |

Task 2

Grand Plaza is a new multi-billion pound shopping complex due to open in the local area. It includes: a large number of retail stores spanning across different sectors such as clothing/fashion, food and drink, banking, charities etc.

As part of the shopping complex, there are also additional places to visit. These include places of entertainment, such as a cinema, bowling alley, ice-rink etc.

Therefore, Grand Plaza would like to install a range of information points around the complex. These information points use touch-screen technology that allows customers to find out what shops are in the complex and how to find them.

The management would like to set up their network infrastructure so that:

* All stores have access the network and are able to store data in a centralised location which is then backed up each night.
* Hotspots are placed around the complex to allow shoppers to have access to free Wi-Fi.

**Identify the network hardware required by the shopping centre and justify your choice.**

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| **NIC** – All devices being used in each store and the head office will need to have the ability to access a network.  **Switch** – To allow the network to be created, this will also ensure that the data goes to the intended location, this will be crucial when customers and staff are trying to access the network.  **Router/Gateway**– To connect to other networks such as the internet.  **Wireless Access Point** – Customers will want access to the internet and the shopping centre will provide a router for that. However, in order to get complete coverage across the entire complex as the distance covered by the router wouldn’t cover the whole site, the shopping centre will need to install various access points to allow customers to access the free Wi-Fi on offer.  **Server** – A computer that has the ability store all the files used by staff across all stores within the complex. It means larger stores will allow their employees to log into different machine on site and access the same resources.  **Transmission media** – Ethernet cables may be used to connect devices to the network from store to store. However for access to the internet, they could opt for a fibre optic connection which will allow data to transmit faster and longer across the network. This would work well for customers who want to access the Wi-Fi. |