**Information & Technology**

**Unit 1**

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**Outcome 2: Networking**

**Student Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Teacher:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Class: \_\_\_\_\_\_\_\_\_**

*Chapter 2 (pg 45-86)*

**![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\M1YV5DHK\MC900413638[1].wmf]()Networks**

What is a network?

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Draw a diagram of how computer communications are created through the transmission of data between a sending device and a receiving device.

List the Advantages and disadvantages of a network in the table below:

|  |  |
| --- | --- |
| **Advantages** | **Disadvantages** |
|  |  |

![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\M1YV5DHK\MC900413638[1].wmf]()Using your knowledge fill in the table below. You will need to make a few brief bullet point notes under each heading to explain what they are.

|  |  |
| --- | --- |
| **Local Area Network (LAN)** | **Wide Area Network (WAN)** |
| *Explanation:* | *Explanation:* |
| **Peer-to-peer Network** | **Internet peer-to-peer** |
| **Client/server Network** |  |

**![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\M1YV5DHK\MC900413638[1].wmf]()Let’s Draw!**

Draw a diagram below to explain the type of topology stated. You also need to explain each one.

 **Bus Topology Star Topology**

**![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\YU9JASV8\MC900053962[1].wmf]()Intranets**

Explanation:

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Advantages:

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Disadvantage:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:

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Advantages:

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Disadvantage:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

An **Intranet** is an internal network within an organisation that uses Internet and web technologies. An Intranet allows restricted access to company information and support employees working in groups.

Explain the Intranet that is used here at school? What is it used for?

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What do you think is the main benefit to having an Intranet? When responding, you should relate it to the School Intranet.

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**Network Communications standards**

A network standard defines guidelines that specify the way computers access the medium to which they are attached, the types of media used, the speed at which data flows and the physical technology used.

Using the boxes below explain each of the network communication standards listed.

|  |
| --- |
| *The most common and widely used network standards are Ethernet and TCP/IP.*  |
| **Ethernet** | **TCP/IP****(Transmission control protocol/Internet protocol)** |
|  |  |

|  |
| --- |
| **Other network Protocols** |
| ***Wireless application protocol*** | ***The 802.11 standard*** |
|  |  |

**![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\M1YV5DHK\MC900413638[1].wmf]()Sending and receiving devices**

Sending and receiving devices initiate or accept the transmission of data, instructions and information. Examples include notebook computers, desktop computers, midrange servers and mainframe computers.

Mobile devices are usually small enough to fit in a pocket and store programs and data permanently on special memory inside the system unit or on a flash memory card.

|  |  |
| --- | --- |
| **Smart Phones** | **Personal digital assistants** |
| *Explanation**Limitations* | *Explanation**Limitations* |
| **Netbook** | **Other mobile devices** |
| *Explanation**Limitations* | *Hand-held computers*Communicate wirelessly with other computes and devices, and many have miniature or specialised keyboards. E.g. used for people recording information like couriers who deliver parcels.*Portable media players*Store, organise and play digital media such as music files, video clips, movies and photographs*Navigation systems (GPS)*Consists of one or more Earth-based receivers that accept and analyse signals sent by satellites to determine the receiver’s geographic location. The issue with GPS is that some drivers will rely on the instructions given and perform illegal or dangerous acts.*Digital cameras*Allows photographs to be taken and stored digitally on a memory card.  |

**Communication Devices (Network Hardware)**

A communication device is any type of hardware capable of transmitting data, instructions or information between a sending device and a receiving device.

There are 5 communication devices you should know about. They are:

* Modems
* Network interface cards (NIC)
* Wireless Access Points (WAP)
* Switches
* ![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\N53B58LI\MC900056306[1].wmf]()Routers

***Modems***

What do they do?

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What about when a digital line is available?

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*Examples include: ADSL, ADSL 2+ and broadband cable modems*

***Network interface cards***

NIC’s are the communications device that enables a computer that does not have in-built network capability to communicate with a network.

Why are they needed?

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What are the three functions of an NIC?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Wireless Access Points, Switches and Routers***

You are to draw a simple diagram to explain what a wireless access point, switch and router are. You then need to explain in writing what the diagrams are trying to demonstrate.

 **Wireless Access Point (WAP) Switches & Routers**



*Explanation*:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Explanation*:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Wired and wireless communication technologies**

An important aspect of communications is the **channel**, which is the communications path between two devices i.e. from one computer to another device (computer, laptop, Ipad). A communications channel consists of one or more **transmission media**

**Transmission media** consists of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are 2 types of transmission media. These are physical transmission media (also known as wired) or wireless transmission media

**Physical Transmission Media**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Explanation** | **Media** | **Data transfer rate** | **Cost****(inexpensive or expensive)** | **Reliability****(low, fair or high)** |
| *Twisted Cable Pair* |  |  |  |  |
| *Coaxial cable* |  |  |  |  |
| *Fibre-optic cable* |  |  |  |  |

**Wireless Transmission Media**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Explanation** | **Media** | **Data transfer rate** | **Cost****(inexpensive or expensive)** | **Reliability****(low, fair or high)** |
| *Broadcast radio* |  |  |  |  |
| *Cellular radio* |  |  |  |  |
| *Microwaves* |  |  |  |  |
| *Communications Satellite* |  |  |  |  |
| *Infra-red* |  |  |  |  |

**Network Software**

Network software is the program that connects computers into a LAN (Local Area Network) or a WAN (Wide Area Network). It defines the protocol between two machines. It enables machines in the network to connect and communicate with one another and share information.

The most common network software (and what we need to know) are:

* **TCP/IP** - This is a protocol that defines the way in which data is transmitted in a secure manner between networks. It forms the basis for the Internet.
* **FTP** **(File Transfer Protocol)** – is an Internet standard that allows you to upload and download files to and from a web server.

**Network Security**

When creating a network security is paramount. Security threats can be either accidental, deliberate or even a power surge. As a network manager it is your job to make sure that these threats are minimised.

|  |
| --- |
| **Accidental Threats** |
| *Define* | *Example* |
| **Deliberate Threats** |
| *Define* | *Examples* |
| **Power Surge** |
| *Define*  | *Examples* |

**![C:\Documents and Settings\fihl\Local Settings\Temporary Internet Files\Content.IE5\M1YV5DHK\MC900413638[1].wmf]()Security to minimise/prevent threats from occurring**

***Usernames and passwords***

A **username** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A **password** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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What are the rules to follow when creating a password?

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***Firewalls***

A firewall is a general term that refers to hardware and/or software that restricts access to data and information on a network

So what’s its purpose?

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***Wireless Security***

What is ‘wardriving’?

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How do you avoid unauthorised network access on your Wi-Fi network?

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**Activity**

Read the article *“Identity theft we should be worried”*

from <http://mashable.com/2011/01/29/identity-theft-infographic/>

1. What is the percentage of Americans that have their identities stolen? What does it usually cost them?
2. What is the cost to businesses worldwide as a result of identity theft?
3. What are the most common methods of stealing your identity?
4. List some ways that you can prevent/minimise the chance of your identity being stolen?
5. Explain why security is an important factor for a business? You must justify your response.

**CASE STUDY – NETWORKS**

(Case study produced by Janet Bane)

Sid Shifty is the owner and manager of Shifty Autos. In addition to himself as the manager, he also employs two sales people and a mechanic. Currently the office runs the following information system:

Sid stores all the sales data on his personal computer which is located in a corner of the main showroom. The computer is about five years old, and it seems to be working OK, although sometimes it is a little slow to boot up in the mornings. It is running Windows XP, has 512 MB of DDR memory, a 56 Kb modem and a 40GB hard drive and a 1.7GHz Pentium M processor.

Sid doesn’t know much about computers. When he first purchased the computer, it had 12 months anti-virus protection, however he hasn’t paid the bill to upgrade it since. He figures that he has never had a virus, so he doesn’t need it. Sid has internet and email access on his computer.

Sid also has his own printer attached to this computer – he prints out monthly sales figures and other important financial and legal documents. He also uses it to print out contracts with customers, which may contain confidential information regarding names, addresses and income. Any unwanted printouts just go straight into the bin.

The office is shared between Sid and the two sales people. There is one computer and printer which both the sales people share. The data which is on this computer relates to the repair side of the business – when customers come in to have their vehicles serviced or repaired, one of the salespeople enter the details onto the computer, and an invoice is generated when the job is complete. Any of the sales staff can log into this computer by typing in the same user name (staff) and password (shifty).

If they want to look up any information relating to sales (past or present), they have to go through Sid, who is often taking a “long lunch” at the pub with his mates. Sometimes sales are lost because the salespeople are not able to access the required data quickly and efficiently and customers just walk away. Any emails for the sales team are downloaded, printed and distributed by Sid. He doesn’t want the sales people having their own email or internet access because he thinks they will just use it to waste time chatting to their friends, or surfing the net when they should be working. (Sid is a little old fashioned in this regard). If they need to reply to an email, they have to write it down, give it to Sid and he types and sends it.

A couple of months ago, one of Sid’s friends, Dan Dodgy, had a fire in his caryard which destroyed all his customer records. Sid doesn’t want the same thing to happen to him, so he has decided that once a month he will make a copy of all the data on his computer. The backup CD will then be stored in the drawer of his desk.

The caryard is patrolled by a friendly Labrador dog when it is closed. Should any burglar get past this highly trained “attack machine”, there is a standard lock on the front door of the office and a fake camera (made of a tin can) which looks as if it might be some sort of recording device. Sid doesn’t have any specific security devices on his computers – he figures the cars in his yard are more valuable.

Sid has employed you to

1. **Analyse** (point out) out the **flaws/problems** in his current system (you need to comment on each paragraph – sometimes there will be more than one problem per paragraph!)
2. **Suggest** the best method of solving each of the problems identified. **Justify** your reasons.