



Computer Science Preparation – M2 – Final Exam

Communication Technology

Basic components of data communication are sender, receiver, information, medium, and a communication protocol. Communication means sending information from one place/device to another.

Component	Meaning	Example
Sender	The person/device that sends information	Phone sending a message
Receiver	The person/device receiving information	Friend receiving message
Information	The message being sent	Text, image, video
Medium	The path used to send information	WiFi, cable
Protocol	Rules for communication	Internet rules

Computer Networks

A **computer network** is a connection between two or more devices that exchange information and share resources. They can share data between them and work on the same thing from different locations

A computer network can be divided according to **network management** characteristics

We divide them into 3 types:

- **PAN** - Connection of computer equipment for personal use
- **LAN** - Connection of computers and devices in a near area
- **WAN** - Connection of computers that form a computer system together at a large distance

Networks can also be categorized **by** their **nature** as follows:

- **Client-server network** - This type of network depends on the server. The server receives requests from many different clients at the same time. One powerful server provides services to many clients.
- **Peer-to-peer (P2P) network** - A peer-to-peer network is a type of network where every computer can act as a receiver and a service provider at the same time. Every computer can share resources.

Communication Medium

The **communication medium** in a computer network connects the devices in the network together. It is used for sending information from the source (sender) to the destination (receiver). It can be both wired (cables) and wireless (no cables).

Wired medium:

- **UTP** – The wires are twisted together which helps guide the signal better. Found in homes as a telephone wire or as a LAN cable
- **Fiber Optic Cable** - uses light to transfer data and that is why it is faster than normal cables.
- **USB** – used to connect the computer with other devices. Can be used for transferring data

Wireless media connects two or more devices by using electromagnetic waves

For example:

- WiFi
- Bluetooth
- Infrared
- NFC

Network equipment or **computer networking** devices are electronic devices that are required for communication and interaction between devices on a computer network. We can divide them by type of use, and by connection (wired or wireless)

- **Router** – connects your network to the internet
- **Switch** – connects devices inside of a network
- **Wireless Access Point (WAP)** – connects wireless devices using a Wi-Fi signal. It can also extend the wireless network

Internet and its services

The **Internet** is the global system connecting computers and devices all over the world in one big network.

An **IP Address** is a unique address that identifies a device on the internet or a local network

IP address	Number of bits	Example
IPv4	32 bit	192.168.0.1
Ipv6	128 bit	2001:db8:0:1234:0:567:8:1

A **domain name** is a text name for an internet resource (computers, networks, and services). Easier to remember than an IP address.



Abstract Concepts

Computational thinking is a way to analyze problems and create solutions that humans or computers can follow.

It consists of 4 important components which are:

- **Decomposition** - Breaking a big problem into smaller parts.
- **Pattern Recognition** - Finding things that repeat or are similar.
- **Abstraction** - Choosing important information and ignoring unnecessary details.
- **Algorithm** - A step-by-step method to solve a problem.

Pseudocode

Pseudocode is a simple way to write instructions using human-readable steps before programming.

Example:

1.	START
2.	define name
3.	name = input("What is your name?")
4.	print("Hello," + name)
5.	END

Pseudocode elements

Element	What it Does	Example	Real-Life Meaning
START	Shows where the program begins	START	Begin a task
INPUT	Gets information from the user	name = INPUT("What...")	Asking someone for information
PROCESS	Performs a calculation or action	PROCESS area = a * a	Doing the work
PRINT	Shows information or the result	PRINT ("Area is," + area)	Giving an answer
IF	Checks if something is true	IF score >= 50	Making a choice
ELSE	Runs when the IF condition is false	ELSE	Another choice
END	Shows where the program finishes	END	Finish a task

Example:

Make a program that will calculate the area of a square.

- ask the user for the side(a) of square
- check if the side is more than 0,
 - if it is more than 0, calculate the area and show the result
 - if it is less than 0, show a message: "Side is less than 0, try again!"

PROGRAM squareArea:

1.	START
2.	define a
3.	a = input("What is the side of square?")
4.	IF (a > 0) THEN
5.	area = a * a
6.	print("Area of square is," + area)
7.	ELSE
8.	print("Side is less than 0, try again!")
9.	ENDIF
10.	END