(40)

Name_

49 /51

CIE Computer Science

CHAPTER 3 – Hardware

~~Platters tracks sectors electromagnet~~

~~NAND NOR~~

1)

Six components of a computer system and **six** descriptions are shown.

Draw a line to match each component with the most suitable description.

Component	Description
Arithmetic Logic Unit (ALU)	Used to connect together the internal components of the CPU.
Buses	Used to carry out calculations on data.
Control Unit (CU)	Used to temporarily hold data and instructions during processing.
Immediate Access Store (IAS)	Used to allow interaction with the computer.
Input/Output	Used to hold data and instructions before they are processed.
Registers	Used to manage the flow of data through the CPU.

5/ [5]

2)

Kelvin correctly answers an examination question about the Von Neumann model.

Eight different terms have been removed from his answer.

Complete the sentences in Kelvin's answer, using the list given.

Not all items in the list need to be used.

- accumulator (ACC)
- address bus
- arithmetic logic unit (ALU)
- control unit (CU)
- data bus
- executed
- fetches
- immediate access store (IAS)
- memory address register (MAR)
- memory data register (MDR)
- program counter (PC)
- saved
- transmits

The central processing unit (CPU) ..... fetches .....

the data and instructions needed and stores them in the

..... IAS ..... to wait to be processed.

The ..... PC ..... holds the address of the next

instruction. This address is sent to the ..... MAR .....

The data from this address is sent to the ..... MDR .....

The instruction can then be decoded and ..... executed .....

Any calculations that are carried out on the data are done by the

..... ALU ..... . During calculations, the data is temporarily

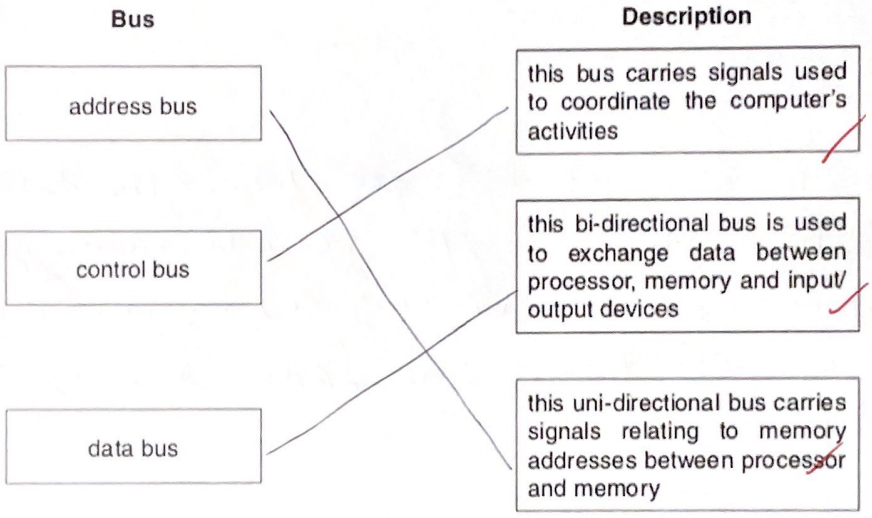
held in a register called the ..... ACC ..... .

8 [8]

3) One of the key features of von Neumann computer architecture is the use of buses.

Three buses and three descriptions are shown below.

Draw a line to connect each bus to its correct description.



2

[2]

4)
a)

The Fetch - Decode - Execute cycle takes place in 3 steps. The first step is **Fetching the instruction.** Explain the first step using the words:

- **CPU**
- **Address bus**
- **Register**

① Inside CPU, PC fetches the data needed, storing in ZAS. PC holds address of next instruction.
② Address sent to MAR (register) by address bus.
③ After data fetched from RAM, sent by data bus to MDR. [4]

b) Step 2 is **Decoding the instruction,** explain this step using the words:

- **CPU**
- **CU**
- **Instruction Set**

① MDR then sends the data into the CU (which is inside the CPU) where there is the CIR (current instruction register on CU)
② Using an instruction set, the CPU will decode the machine language (binary) in its instruction set into actions it can perform. [4]
③ Meanwhile CU sends any calculations / logic action to ALU by control bus.

Each action is correlated to machine code and this is shown by the instruction set

c) Step 3 is **Executing the instruction,** explain this step using the words:

- **CPU**
- **ALU**

① CU sends any calculations / logical actions to ALU by control bus.
② ALU performs any calculations on data, storing them temporarily in a register called the ACC. [3]
③ Calculated data sent back to CU, and executed by the CPU, possibly causing an output to be given.

5)

Robert has a mobile device that uses RAM, ROM and an SSD.

(a) State what the RAM, ROM and SSD are used for.

RAM ... Contains data / instructions needed while the device is running (volatile) ...

ROM ... Contains data or instructions needed to boot-up the device (non-volatile) ...

SSD ... To store long-term data like photos (non-volatile) ... 3/ [3]

(b) Give **two** reasons why an SSD, rather than a HDD, is used in the mobile device.

Reason 1 ... SSD is ~~faster~~ smaller, so more portable with mobile device ↳ and compact ...

Reason 2 ... SSD ~~can store data~~ faster than HDD in terms of speeds of data transmissions ... 2 [2]

6)

Five descriptions of different input or output devices are given in the table.

Complete the table by stating the **name** of each input or output device.

Description	Name of device
This is an input device that works by shining a light onto the surface of a document. The light source is automatically moved across the document and the reflected light is captured by mirrors and lenses.	2D scanner ✓
This is an input device where a laser or a light source is moved across an object. The width, height and depth of the object are measured to allow a model to be created.	3D scanner ✓
This is a large input device that is usually fixed to a wall. A user can calibrate the device to make sure the sensors align with a projected image. The user can use either their finger or a special pen to make selections.	Interactive whiteboard ✓
This is an output device that uses many small mirrors to reflect light towards a lens. This will display an image.	(2D) Projector ✓
This is an output device that creates an object by building layer upon layer of material.	3D Printer ✓

Type! DLP

4/[5]

7)

The law company wants to purchase a new file server.

The company can purchase a server with either solid state storage or magnetic storage. After discussion, it decides to purchase a file server with magnetic storage.

Explain why the company chose magnetic storage rather than solid state storage.

~~Magnetic~~ Traditionally, people have more trust in magnetic storage, as it is the storage used for a long time. Magnetic storage is also longer-lasting, and can process many instructions and data for many years. Magnetic storage is sufficiently fast - although not as fast as solid state.

3

[4]

8)

(c) Alessandro also uses off-line storage to store his data.

Three examples of off-line storage are Blu-ray, CD and DVD.

Six statements are given about off-line storage.

Tick (✓) to show if each statement applies to **Blu-ray**, **CD**, or **DVD**.

Some statements apply to more than one example of off-line storage.

Statement	Blu-ray (✓)	CD (✓)	DVD (✓)
A type of optical storage	✓	✓	✓
Has the largest storage capacity	✓		
Can be dual layer			✓
Read using a red laser			✓
Has the smallest storage capacity		✓	
Stores data in a spiral track	✓	✓	✓

[6]

9)

Tammy is buying a new computer that has an LED display.

(a) **Five** statements about LED displays are given.

Tick (✓) to show if each statement is **True** or **False**.

Statement	True (✓)	False (✓)
It is a flat panel display	✓	
It creates images using red, green and blue diodes	✓	
It is not very energy efficient and gives off heat		✓
It can be used in mobile devices such as smartphones and tablets	✓	
It is a front-lit display		✓

[5]