



1.1.1 Processor Components

1 The CPU is made up of various components.

(a) The processor has various registers that are used when a program is executed.

(i) State what is meant by the term 'register'.

[2 marks]

- Small temporary storage/memory location
- ... inside the CPU
- ... used for a specific purpose.
- Faster access speed than RAM / secondary storage.

(b) There are three different buses inside a computer.

(i) State what is meant by the term 'bus'.

[2 marks]

- A set of microscopic parallel wires
- ... that connect components inside the CPU/computer.
- They carry signals between the components.

(ii) Name the three buses and describe what each is used for.

[6 marks]

- Address bus
- ... carries the memory address of where data is being read from/written to
- Data bus
- ... carries data between components/registers
- Control bus
- ... carries control signals from the control unit





(iii) Name two signals that might be sent on the control bus and what each is used for.

[4 marks]

- **Bus request**
 - ... indicates that a component is requesting use of the data bus.
 - **Bus grant**
 - ... indicates a component has been granted access to the data bus.
 - **Memory write**
 - ... causes data on the data bus to be written into memory.
 - **Memory read**
 - ... causes data from memory to be placed on the data bus.
 - **Clock**
 - ... used to synchronise the operations in the CPU.
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2 Describe the purpose of each of the following components of a CPU.

(a) ALU

[2 marks]

- **The ALU carries out arithmetic calculations.**
- **Carries out logical decisions.**
- **Acts as a conduit through which all I/O to the computer is carried out.**

(b) Control Unit

[3 marks]

- **Decodes instructions.**
 - **Sends control signals to coordinate movement of data through the processor/execute instructions.**
 - **Controls buses.**
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- 3 Figure 1 shows some of the components inside a computer that are connected together. Some of the names have been omitted and replaced with numbers.

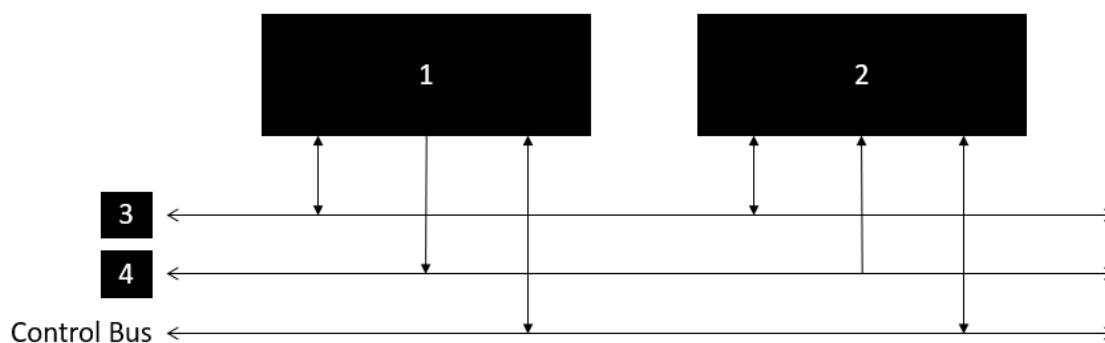


Figure 1

- (a) Complete the table by writing the component number from Figure 1 that corresponds with the component name in the table.

Component Name	Component Number (1-4)
Address Bus	4
Data Bus	3
Processor	1
Main Memory	2

[2 marks]





4 A processor needs to fetch data from main memory which is located in memory location 46.

(a) Explain how the following are used in the process:

(i) Memory Address Register

- Stores the memory location (46) of the data to be fetched

(ii) Address Bus

- Transfers the memory location to main memory to access the data

(iii) Data Bus

- Transfers the data at the memory location to the CPU

(iv) Memory Data Register

- Stores the data returned from the memory location in main memory

[4 marks]

5 The Von Neumann architecture uses a Control Unit and an Arithmetic Logic Unit.

(a) State the register in which the Arithmetic Logic Unit stores its results.

[1 mark]

- Accumulator

(b) Tick the stage of the fetch, decode, execute cycle in which the register in part (a) would receive a value from the Arithmetic Logic Unit.

Stage	Tick one
Fetch	
Decode	
Execute	✓

[2 marks]

