The questions on this worksheet have been taken from the OCR A-Level Computer Science Sample Paper

"3-a-day" A-Level Exam Practice (009)

Question 1

5   A processor contains a number of special registers.

Explain the need for the following registers.

(i)   Program Counter (PC)

....

....

....

.... [2]

(ii)   Memory Address Register (MAR)

....

....

....

.... [2]

(iii)   Memory Data Register (MDR)

....

....

....

.... [2]

Question 2

3   A computer uses a Von Neumann processor.

(a)   Describe the fetch-decode-execute cycle that this architecture uses.

Fetch ....

....

Decode ....

....

Execute ....

....
[3]

Question3

Describe a difference between an array and a linked list.

....

....

....

.... [2]

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Answer 1

5		(i)	-Is needed to store the address of the next instruction (to be processed) -Value is then sent to the MAR -After sending the value the PC is incremented/changed to address held in CIR if the operation is a Jump	2
		(ii)	-Contains the address of the instruction (to be accessed in memory)… - …address of instruction sent from PC - Contains the address of the data (to be accessed in memory)… - …address of data sent from CIR	2
		(iii)	-Contains the instruction which has been accessed from memory - Contains the data which has been accessed from memory - That is referenced by the MAR/Instruction sent to CIR - acts as a buffer	2

Answer 2

Question	Answer/Indicative content	Mark	Guidance
Q 3 a	• Fetch- The next instruction is fetched from main memory/address • Decode- The instruction is interpreted/translated/split into opcode and operand (in the CIR) • Execute- The appropriate instruction/opcode is carried out on the operand.	[3]	**Fetch they may describe the whole cycle** **Not translated in MDR**

Answer 3

• A linked list is a dynamic data structure (1) whereas an array is static (1). • An array can have any element accessed directly (i.e. random access) (1) whereas a linked list needs to be traversed until the desired element is found (1). • Contents of an array are stored contiguously in memory (1) whereas the contents of a linked list may not be (1).	2 AO1.2 (2)	Up to 2 marks for a valid description.