Chhetri Academy

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GCSE COMPUTER SCIENCE

3.1

Edexcel 1CP2 | Specification point 3.1.1

The von Neumann stored program concept and the role of main memory (RAM), CPU (control unit, arithmetic...

Untiered

Past paper question booklet

6	2015-2023	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

2 A biologist uses application software to help him in his work.

For example, the biologist uses spreadsheet software to model the behaviour of bee colonies.

(a) Identify **two other** types of application software and give an example of how the biologist could use them in his work.

(4)

Type 1 .....

Use

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Type 2 .....

Use

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Software may be classified as open source or proprietary.

(b) State **four** features of open source software licensing.

(4)

1 .....

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2 .....

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3 .....

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4 .....

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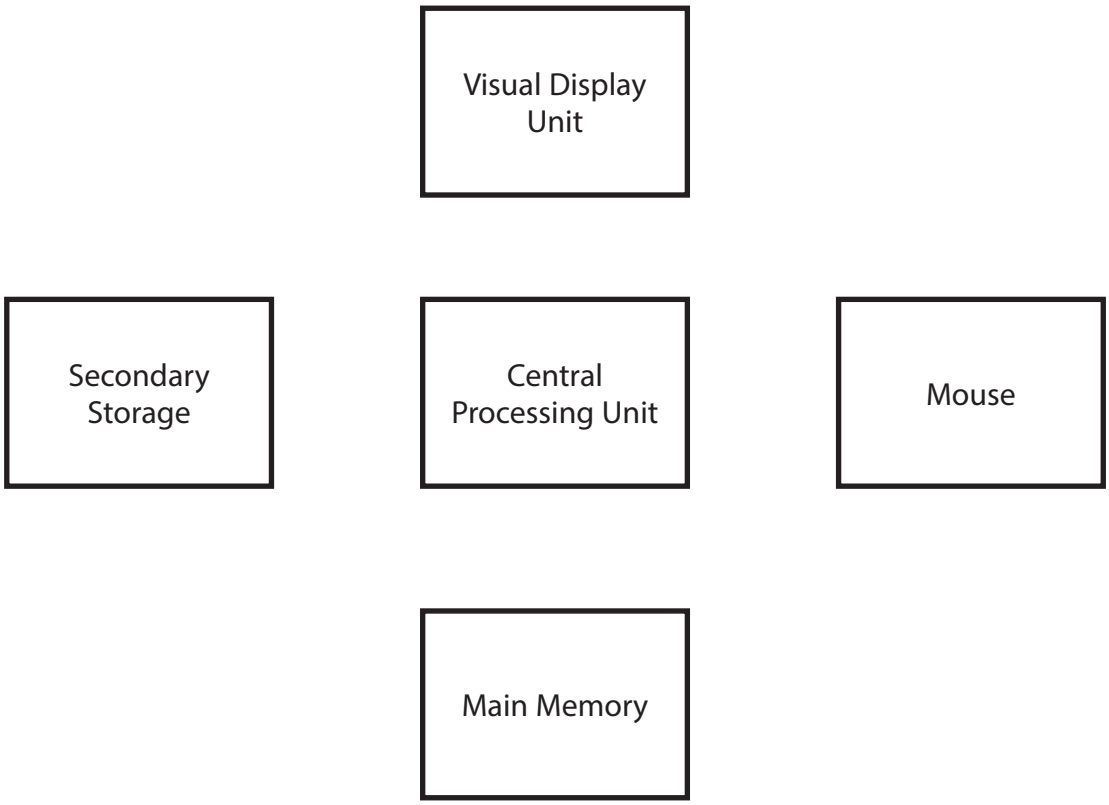
(c) Complete the diagram by adding **six** arrows to indicate the input and output relationships between the devices.

(3)



The microprocessor inside a computing device is made up of several individual components. These components work together to implement the fetch-decode-execute cycle in the device.

(d) Identify **one** component and its function in the fetch-decode-execute cycle.

(2)

Component

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Function

.....

(e) Explain how the operating system manages processes on a computer with a single microprocessor.

(3)

The biologist collects data on a single bee colony each day. This includes the amount of available food, the number of bees in the colony, the amount of honey produced, the hours of sunshine, and the hours of rain. The biologist could use software to model the behaviour of the colony.

(f) Give **two** examples of how software could be used in this situation to model the real world.

(2)

1

2

(Total for Question 2 = 18 marks)

4 Manuel is interested in understanding the relationship between hardware and software.

(a) Describe what is meant by the term 'stored program concept'.

(2)

(b) Computing machines can take many forms and can be based on various models.

(i) Describe what is meant by the term 'virtual machine'.

(2)

(ii) Explain the difference between the sequential and parallel computational models.

(4)

(c) Manuel is writing a program to help pupils with their maths revision.

Here is some pseudocode for an algorithm that calculates the area of a circle, with radius of 5 units. It uses a subprogram.

```
calcCircleArea ()

PROCEDURE calcCircleArea ()
BEGIN PROCEDURE
    SET area TO Pi * 5 * 5
    SEND area TO DISPLAY
END PROCEDURE
```

Manuel wants to change the pseudocode so that the area of any circle can be calculated using `calcCircleArea`.

(i) Write the changed pseudocode in the box below.

(3)

Manuel is writing a binary search routine to search for an individual pupil in a list of all pupil numbers.

Here is the list of pupil numbers.

837, 1529, 1683, 2245, 3901, 3921, 4524

(ii) Complete the table showing the pupil numbers visited and the associated sublists when using a binary search to locate the pupil number 1683.

(5)

Pupil number visited	**Sublist**

Manuel is working on logic for an exclusive OR operator, often known as XOR. This logical operator can be implemented using AND, OR, and NOT.

(iii) Complete this truth table to show Q.

(3)

A	B	R = A OR B	S = NOT (A AND B)	Q = R AND S
0	0			
0	1			
1	0			
1	1			

(Total for Question 4 = 19 marks)

4 A company is developing a computer for use in schools.

(a) All computers have a CPU, memory and storage.

(i) Identify the type of physical storage that uses electronic circuits.

(1)

- ☒ **A** Solid state
- ☒ **B** The cloud
- ☒ **C** Magnetic
- ☒ **D** Optical

(ii) State what ROM and RAM store.

(2)

ROM

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RAM

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.....

(iii) John von Neumann proposed the concept of a stored program.

State the **two** items he proposed to store in main memory.

(2)

1 .....

2 .....

(iv) Identify the part of the CPU that sends signals to the other components.

(1)

- ☒ **A** Arithmetic logic unit
- ☒ **B** Control unit
- ☒ **C** Register
- ☒ **D** Bus

(b) The computer needs an operating system and utility software.

(i) The operating system controls the scheduling of processes.

Describe how the operating system uses scheduling to allocate processor time.

(2)

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(ii) Identify the function of utility software.

(1)

☒ **A** Repairing secondary storage

☒ **B** Formatting cache memory

☒ **C** Converting files

☒ **D** Translating programs

(Total for Question 4 = 9 marks)

5 (a) Identify **one** component common to all computers.

(1)

- ☒ **A** Disk drive
- ☒ **B** Graphics card
- ☒ **C** Processor
- ☒ **D** Screen

(b) State **two** components of the CPU.

(2)

1 .....

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2 .....

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(c) Describe how the CPU and main memory work together.

(4)

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(d) Compare the use of a compiler with the use of an interpreter to translate code.

(6)

(Total for Question 5 = 13 marks)

2 Computers

(a) Some low-level programming languages use mnemonics.

(i) State the purpose of a mnemonic.

(1)

.....

.....

(ii) State the type of low-level programming language that uses mnemonics.

(1)

.....

(iii) Mnemonics are one characteristic of some low-level languages.
Describe **one other** characteristic of a low-level language.

(2)

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.....

(iv) State the name of the high-level programming language translator that executes a line of code immediately after translating it.

(1)

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(b) State the **two** items held in RAM according to the von Neumann architecture.

(2)

1 .....

2 .....

(c) Data can be stored in different ways.

(i) Describe how data is stored on optical media.

(2)

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(ii) State the type of secondary storage that stores data as electric charges.

(1)

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(d) An embedded computer system is part of a larger machine.

State **two** characteristics of embedded systems that make them different from general purpose computers.

(2)

1 .....

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2 .....

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(e) Identify **two** reasons for using data compression.

(2)

- ☒ **A** Reduces data transfer times
- ☒ **B** Reduces disk fragmentation
- ☒ **C** Reduces required storage space
- ☒ **D** Reduces the chance of data being hacked
- ☒ **E** Reduces the need for error detection and correction

(f) Robust software must be free from vulnerabilities before it is released to users. Programming bugs are one type of vulnerability.

State **two other** types of vulnerability.

(2)

1 .....

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2 .....

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(g) Some users are given administrator privileges.

Explain **one** way an operating system allows an administrator to manage users.

(2)

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(Total for Question 2 = 18 marks)

1 Computers

(a) The CPU contains a number of components.

(i) Complete the table with the correct bus for each role.

(3)

Bus	Role
	Carries a read signal to main memory.
	Carries the memory location of a piece of data.
	Carries an instruction from main memory to the CPU.

(ii) Identify the component inside the CPU that stores data.

(1)

☒ **A** Arithmetic logic unit

☒ **B** Clock

☒ **C** Main memory

☒ **D** Register

(b) Algorithms can be written in a high-level language.

(i) State what high-level code is translated to.

(1)

.....

(ii) State **two** methods of source code translation.

(2)

1 .....

2 .....

(c) Identify the feature of an optical disc that allows data to be read.

(1)

- ☒ **A** It is magnetic
- ☒ **B** It is portable
- ☒ **C** It is reflective
- ☒ **D** It is volatile

(d) Define the term 'embedded system'.

(1)

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(e) A code review is carried out by a programmer or an automated system.

Both methods cost money.

Complete the table with **one other disadvantage** for each method.

(2)

Method of code review	Disadvantage
By a programmer	
By an automated system	

(f) Identify the purpose of defragmentation software.

(1)

- ☒ **A** Compressing data
- ☒ **B** Encrypting data
- ☒ **C** Organising data
- ☒ **D** Protecting data

(g) One function of an operating system is to manage processes.

(i) Describe **one** way the operating system makes sure each process can use the CPU.

(2)

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(ii) Give **one other** function of an operating system.

(1)

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(Total for Question 1 = 15 marks)