



Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the box
2. Enter your name in the space provided to the right of the box and seal down (using the label provided) to hide your name
3. The answers must be legibly written. The Examiners can elect to mark or not mark answers charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

1	Student Number	2503086
2	Title of Examination Paper	Computer architecture and operating Systems
3	Module Code	ACCA4022
4	Date and Time of Examination	2.00pm 10/05/2026
5	Examination Venue	310
6	Seat Number	17
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
All questions	
Answered	
1	30
2	21
3	17
4	07
Total	75

(3/35)

(1/4)

1a Computers language is processed in binary without these Computers would understand instructions given

1b i

256	128	64	32	16	8	4	2	1
1	1	1	1	0	1	0	1	

$$245_{10}$$

$$= 11110101_2$$

1b ii 512₁₀ 512 256 64 32 16 8 4 2 1

512	256	64	32	16	8	4	2	1
1	0	0	0	0	0	0	0	0

$$512_{10} = 100000000_2$$

c i

512	256	128	64	32	16	8	4	2	1
		1	1	0	1	0	1	0	1

$$128 + 64 + 16 + 4 + 1 = 213_{10}$$

c ii 101011001 - 256 + 64 + 16 + 8 + 1 = 345₁₀

$$d \quad 111010101011 = EAB$$

1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

10 11 13 14 15
↑ ↑ ↑ ↑ ↑

$$\begin{array}{r} 8 \ 4 \ 2 \ 1 \\ 1 \ 1 \ 1 \ 0 = 14 \\ 1 \ 0 \ 1 \ 0 = 10 \\ 1 \ 0 \ 1 \ 1 = 11 \\ 1 \ 0 \ 0 \ 1 = 9 \\ 1 \ 1 \ 1 \ 1 = 15 \\ 0 \ 0 \ 1 \ 0 = 2 \end{array}$$

$$d2 \quad 1001 \ 1111 \ 0010 = 9F2$$

$$e \quad C3 = 211_{10} \quad \begin{array}{r} 8 \ 4 \ 2 \ 1 \\ 1 \ 1 \ 0 \ 1 \end{array} = 13 \times 16^1 = 208 \\ 3 \times 16^0 = 3 \quad 208 + 3 = 211$$

$$ii \quad 66 = 102_{10} \quad \begin{array}{r} 6 \times 16^1 = 96 \\ 6 \times 16^0 = 6 \end{array} \quad 96 + 6 = 102$$

F 3 bit number $2^3 = 8$ - 8 values can be represented

$$1 \text{ byte} = 8 \text{ bits}$$

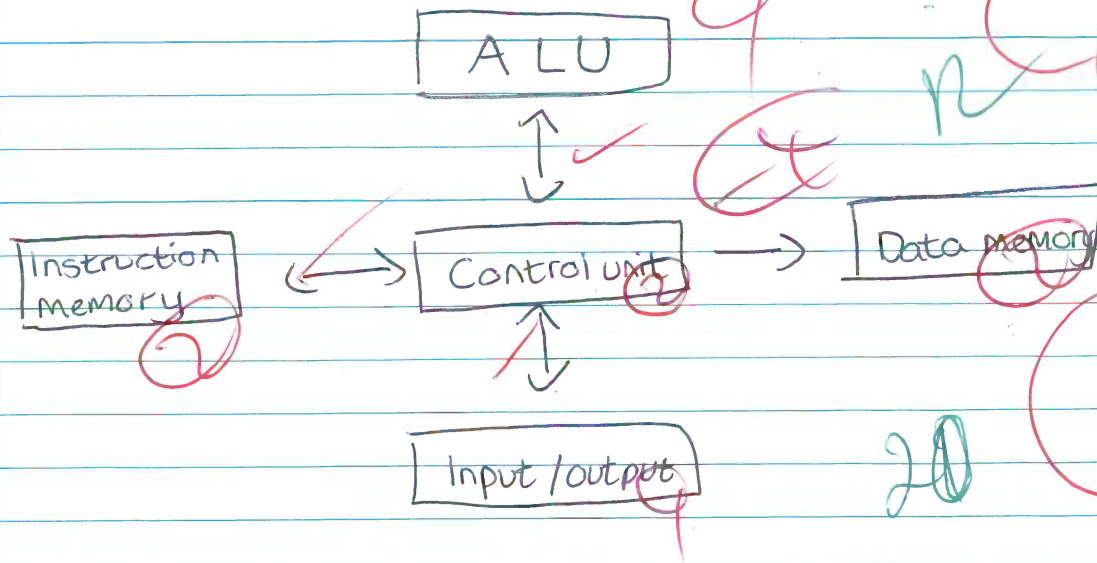
$$3.6 \text{ seconds}$$

$$36 \text{ MB}$$

$$36 \times 8 = 288 \text{ mb/s} \\ \frac{288}{80} = 3.6$$

2

a



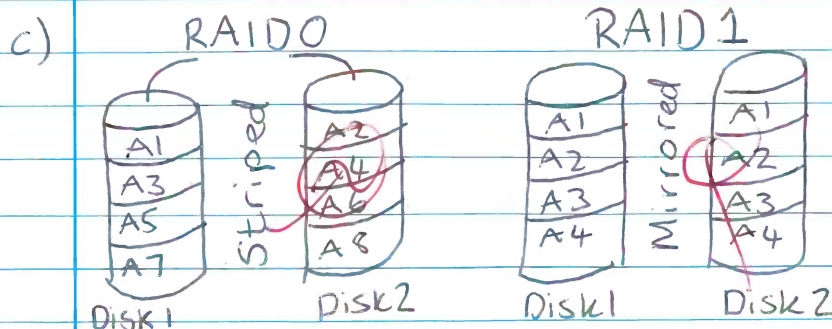
b Cache memory holds frequently used data

Registers are usually integrated directly within the CPU and hold data currently being used by the ALU

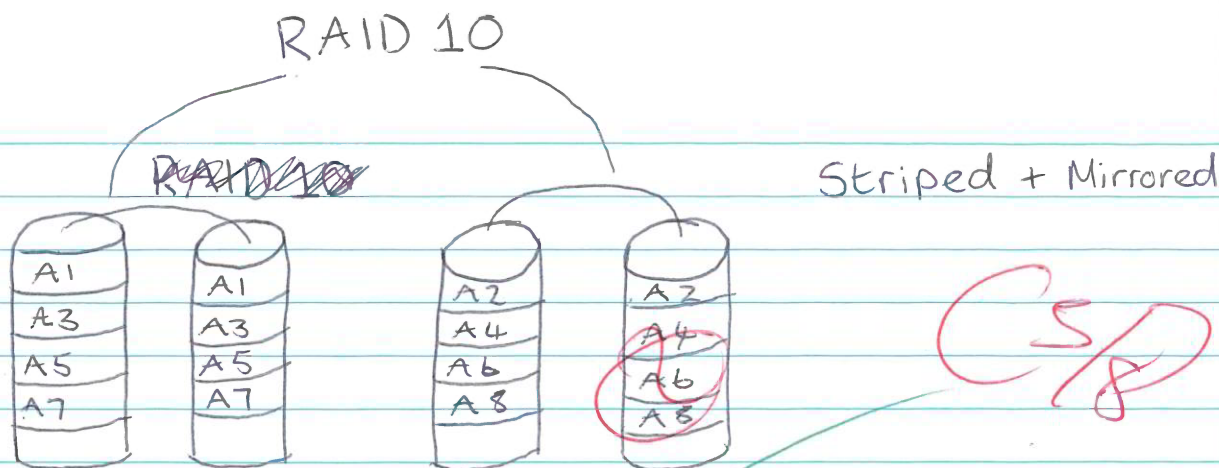
Both enhance CPU operation by reducing the need for slower memory accesses

3a) Secondary memory is a memory source that is permanent
HDD is a hard drive with physical moving parts
SSD is faster as it requires no moving parts and is less likely to fail

b RAID 0 - Striped + fast
RAID 1 - Mirrored + reliable
RAID 10 - Striped + Mirrored



3 c)



d) RAID 0 - Very fast

- Disadvantage is if 1 disk fails all memory/data is lost

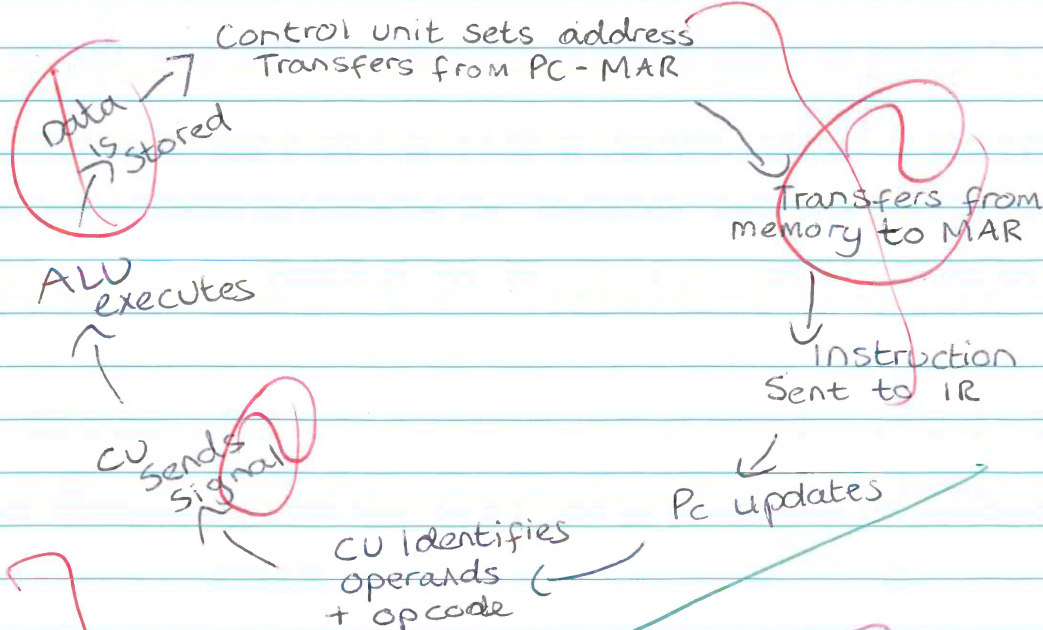
RAID 1 - Reliable as has a copy of data

- Slower read + write times + can only utilise 50% of storage

RAID 10 - Both fast and reliable

- Expensive as need a minimum of 4 disks

4 a



4b

PC - Hold address for next instruction

MAR - Holds memory address

MDR - Temporarily holds data

IR - Holds instruction

ACC - Stores Immediate results

C2/9