



12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold the flap and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or refer the candidate to the invigilator. No marks will be 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	2022 2241804
2	Title of Examination Paper	Computer Architecture
3	Module Code	ACCA4022
4	Date and Time of Examination	22nd November 2023 10PM
5	Examination Venue	Quay Place
6	Seat Number	E1
7	Number of Answer Books handed in	

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Llyfr Atebion Arholiadau

12 Tudalen

Cyfarwyddiadau i Ymgeiswyr

1. Rhwch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhwch eich enw yn y lle a ddarparwyd ar y dde, pwygch e'f a'i selio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.

3. Rhaid i'r atebion fod mewn llawysgriften ddarlennadwy. Gall yr Arholwyr naill ai anwybyddu sgript annarllenadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
4. Ysgrifennwch eich atebion mewn inc.
5. Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnwch llinell drwyddynt.
6. Ni ddylid rhwgo unrhyw ran o'r llyfr. hwn; rhaid ei gyflwyno yn gyfan.
7. Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwyllwyr/gwyllwyr.
8. Rhaid dychwelyd pob llyfr. Ni chaniateir mynd â llyfrau atebion, wedi eu defnyddio neu heb eu defnyddio, allan o'r lleoliad arholi o dan unrhyw amgylchadau.

1	Rhif Myfyriwr	
2	Teitl y Papur Arholiad	
3	Cod y Modwl	
4	Dyddiad ac Amser yr Archoliad	
5	Lleoliad yr Arholiad	
6	Rhif Sedd	
7	Nifer y Llyfrau Atebion a gyflwynwyd	

(See the other side for English version)

[illegible]

CYFENW:

ENW(AU) CYNTAF:

Llenwch, plygwh a seliwh
(gweler nodyn 2 isod)

Source 10 = Division = Dest 10 = multiplication

Q1

A

$$(769)_{10} \rightarrow 2$$

1 384
0 192
0 96
0 48
0 24
0 12
0 6
0 3
1 1
1 0

1100000001 (2)

i

B

$$9A2_{(16)} \rightarrow 2$$

1001 1010 0010 (2)

9 A
1001

ii

A $87_{(10)} \rightarrow 8$

$$\begin{array}{r|l}
 87_{(10)} & 8 \\
 \hline
 7 & 10 \cdot 875 \times 8 \\
 2 & 1 \cdot 25 \times 8 \\
 1 & 0 \cdot 125 \times 8
 \end{array}$$

 $127_{(8)}$

M

b $509_{(10)} \rightarrow 8$

$$\begin{array}{|c|c|c|c|}
 \hline
 0101 & 1101 & 1001 & \\
 \hline
 \end{array}$$

$$\begin{array}{|c|c|c|c|}
 \hline
 010 & 111 & 011 & 001 \\
 \hline
 \end{array}$$

$$\begin{array}{|c|c|c|c|}
 \hline
 2 & 7 & 3 & 1 \\
 \hline
 \end{array}$$
 $273_{(8)}$

M

M

7

b Advantages

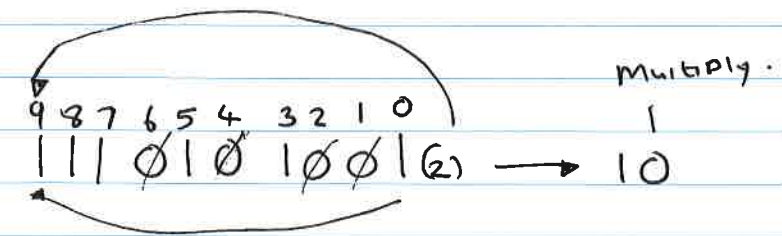
- Instructions and data all in one place
- Not Complex to implement
- more efficient

c Disadvantages.

Parallel
Non Parallel processing.
Not as quick as Harvard
only Suited to Certain tasks (Devices)

iii

A



$$\begin{array}{rcl}
 1 \times 2^9 & = & 512 \\
 1 \times 2^8 & = & 256 \\
 1 \times 2^7 & = & 128 \\
 1 \times 2^5 & = & 32 \\
 1 \times 2^3 & = & 8 \\
 1 \times 1 & = & 1
 \end{array}$$

937(10)

B

50E(16) → 10

Dest = multiply.

~~5010~~~~5015₁₆ 40~~
~~$$\begin{array}{rcl}
 3 & 2 & 1 & 0 \\
 5 & 0 & 1 & 5 \\
 \hline
 & & & 16 \rightarrow 10
 \end{array}$$~~

~~$$\begin{array}{rcl}
 5 \times 16^3 & = & 20480 \\
 1 \times 16^2 & = & 256 \\
 5 \times 1 & = & 5
 \end{array}$$~~

~~20741(10)~~

Answer -

$$\begin{array}{rcl}
 5 & 0 & E \\
 5 & 0 & 14 \\
 \hline
 3 & 2 & 1 & 0 \\
 5 & 0 & 1 & 4 & 16
 \end{array}$$

$$\begin{array}{rcl}
 5 \times 16^3 & = & 20480 \\
 1 \times 16^2 & = & 256 \\
 0 \times 16^1 & = & 0 \\
 1 \times 16^0 & = & 16 \\
 4 \times 1 & = & 4
 \end{array}$$

20500(10)

IV

16 = Divi

A 4278₁₀ → 16

$$\begin{array}{r}
 4278_{10} \div 16 \\
 \underline{6 267 .375 \times 16} \\
 11 16 .6875 \times 16 \\
 \underline{0 1 .0625 \times 16} \\
 10 0 .
 \end{array}$$

10 0 11 6

A 0 B 6 (16)

B 670₁₀ → 16

670

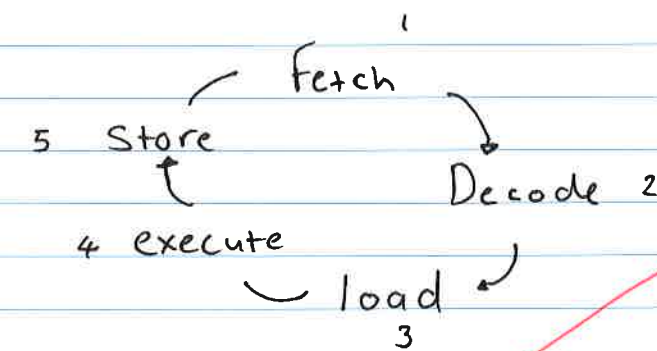
00011011000

1 B 8

1 B 8 (16)

Q6

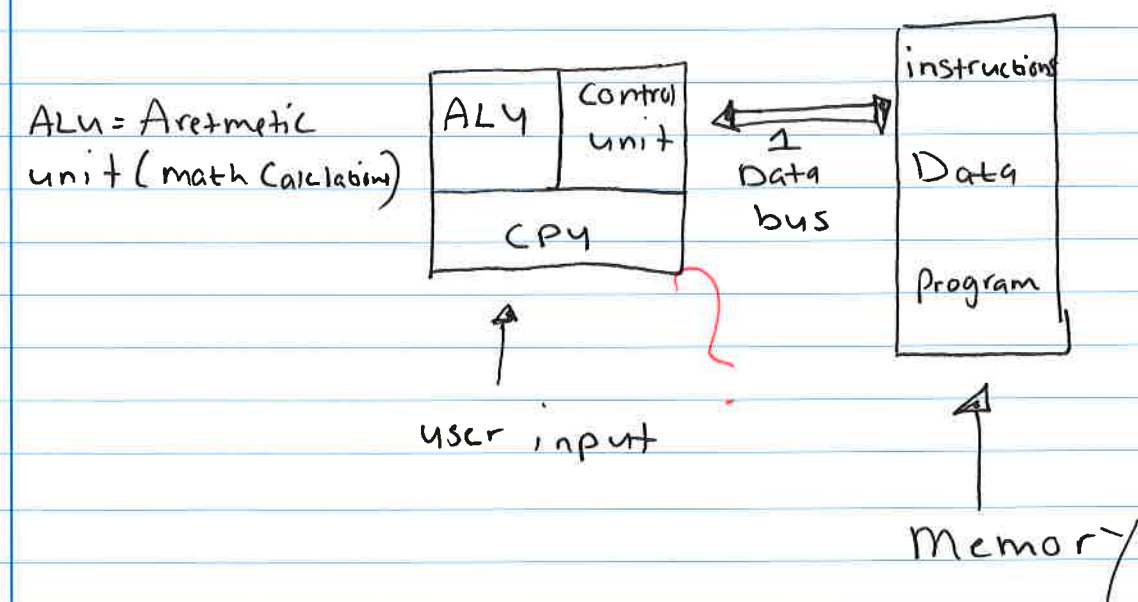
9)



b)

- 1) = CPU fetches data as inputted by user
- 2) = CPU decodes the binary data.
- 3) = CPU loads and reads decoded binary data
- 4) CPU actions and executes data
- 5) CPU sends instruction to store data to hard drive or ram depending on task.

7) Von Neuman Architecture.



So in case of 1 hard drive failing there will be other intact copies available.

C- A disadvantage would be a Raid 1 would be costly as it would require multiple hard drives. It will also not be quick as Raid 0.

2

- 1 Ram = Memory ✓
- 2 Ethernet port = ~~input and output device~~ ^{communication}
- 3 Microphone = input device ✓
- 4 Flash drive = Storage device ✓
- 5 Gamepad = input ✓

3

5000 Tasks

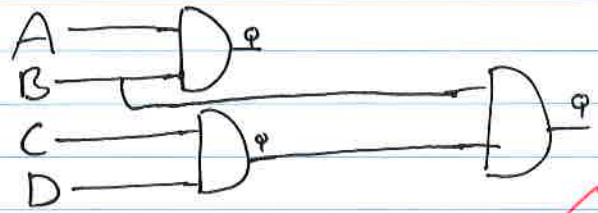
Dual Core = 2 cpus

$$5000 \div 2 \times 2500 \times 10^9$$

6.25 Nano Seconds

4

$$X = \overline{AB} + \underline{CD} + B \underline{C} \overline{D}$$



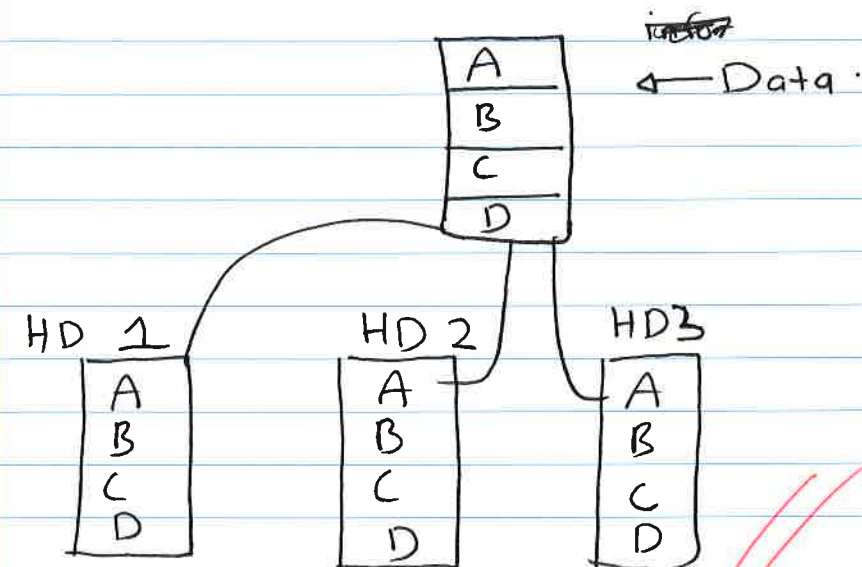
A

5x Raid is when information is stored on more than 2 hard drives

- It Can speed up the reading and writing process
- It offers Security as if 1 hard drive fails there will be a backup copy
- Data can be split or mirrored depending on requirements.

B

Raid 1 diagram



C

Raid 1 offers great Security and assurance as the data is mirrored (saved with more than 1 copy across multiple hard drives P.T.O.)