



12 Tudalen

1. Rhowch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhowch eich enw yn y lle a ddarparwyd ar y dde, plygwch ef a'i selio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.
3. Rhaid i'r atebion fod mewn llawysgrifen ddarllenadwy. Gall yr Arholwyr naill ai anwybyddu sgrïpt 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 thynnu 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 gwyliwr/gwylwyr.
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 amgylchiadau.

[illegible]

(See the other side for English version)

CYFENW:

ENW(AU) CYNTAF:

7	Number of Answer Books handed in	
6	Seat Number	
5	Examination Venue	LR 12
4	Date and Time of Examination	05/07/2023 10:00 AM
3	Module Code	ACCA4022
2	Title of Examination Paper	COMPUTER ARCHITECTURE
1	Student Number	2232921

(Gweler yr ochr arall am y fersiwn Cymraeg)

[illegible]

8. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

7. If more books than one are used, fasten them together using the tags available from the invigilator(s).

6. No part of this book is to be torn out; it must be handed in complete.

5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.

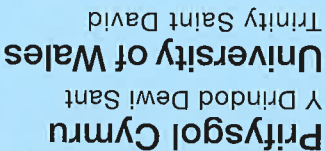
4. Write your answers in ink.

charged to the candidate.

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over, and seal down (using the label provided) to hide your name.

Instructions to Candidates

Examination Answer Books



Complete, fold and seal
(see note 2 below)

SURNAME: IRSHAD

FORENAME(S):

NIGHT

$$\begin{array}{r} 5 \ 1 \ 3 \ 6 \\ 10 \ 10 \ 10 \ 10 \\ \hline 5136 \end{array}$$

$$1010101110$$

$$_{(10)}^{(16)}(1010101110) = (5136)_{10}$$

$$\begin{array}{r} 290 \\ 8 \overline{) 290} \\ \underline{240} \\ 50 \\ 40 \\ \underline{10} \\ 0 \end{array}$$

$$_{(8)}^{(16)}(290) = (242)_{10}$$

$$_{(8)}^{(16)}(35136)$$

$$\begin{array}{r} 3 \ 5 \ 1 \ 3 \ 6 \\ 0 \ 11 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \ 10 \end{array}$$

$$_{(2)}^{(16)}(01110100101110) = (263)_{10}$$

$$\begin{array}{r} 263 \\ 2 \overline{) 263} \\ \underline{240} \\ 23 \\ 20 \\ \underline{3} \\ 0 \end{array}$$

$$_{(2)}^{(16)}(10000111)$$

$$_{(2)}^{(16)}(263) = (1010101110)_{2}$$

15	1	1	1	1
14	0	1	1	1
13	1	0	1	1
12	0	0	1	1
11	1	1	0	1
10	0	1	0	1
9	1	0	0	1
8	0	0	0	1
7	1	1	1	0
6	0	1	1	0
5	1	0	1	0
4	0	0	1	0
3	1	1	0	0
2	0	1	0	0
1	1	0	0	0
0	0	0	0	0

7	1	1	1
6	0	1	1
5	1	0	1
4	0	0	1
3	1	1	0
2	0	1	0
1	1	0	0
0	0	0	0

Use in personal computer, laptop, work station and signal processing

Instruction and data being stored in the same place

Controller have control on memory organization

Control unit retrieves instruction and data in the same place

So increase efficiency

that is more predictable it keep separate memory

data are accessed by and travel via separate buses

in the same place.

Instruction and data being transferred

different buses it

mean there are smaller chance to data corrupt.

input

output

3

Memory: integrated device

4

CPU

5

communication device

6

Storage device

7

input

8

input

question three

time required to complete 10000 instructions

clock frequency of 3.8 GHz

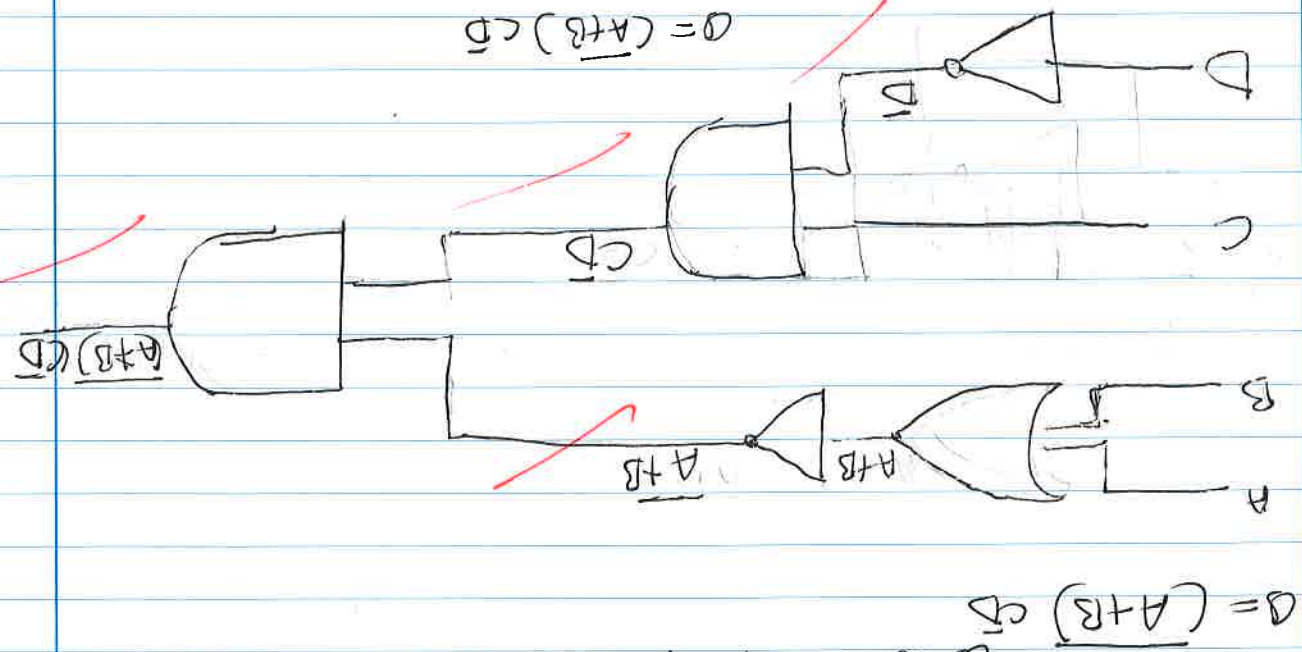
1 GHz = $1 \times 10^9 \text{ Hz}$

clock frequency = $3.8 \times 10^9 \text{ Hz}$

$$\text{time required to complete task} = \frac{1 \times 10000}{3.8 \times 10^9} = 2631.57$$

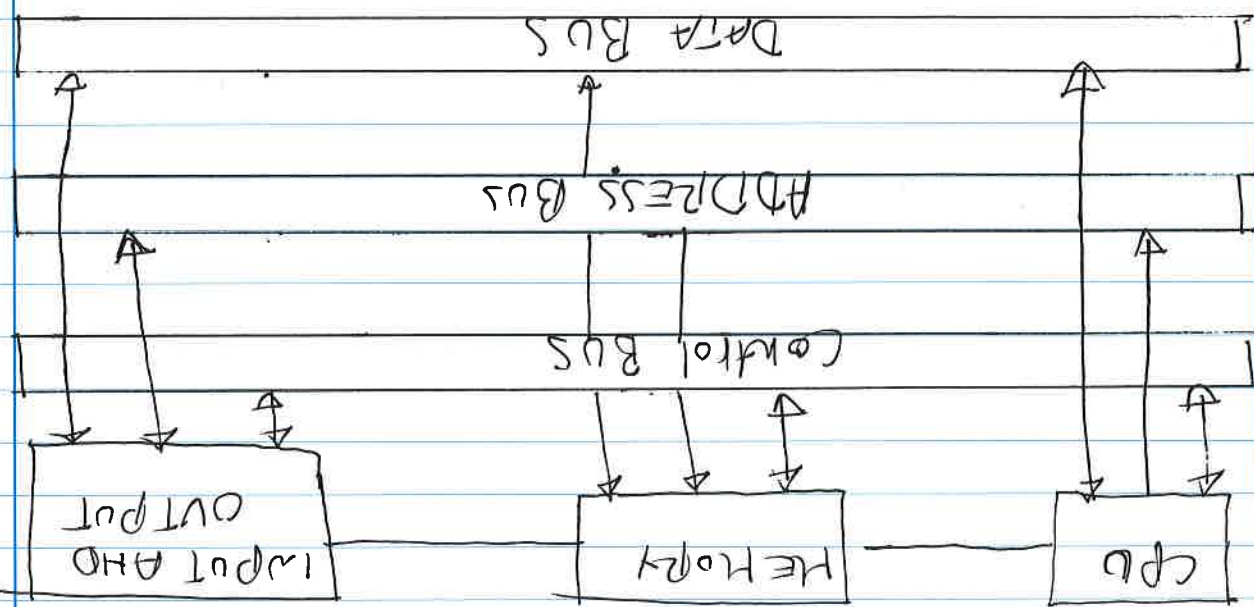
$$2631.57 \times 10^{-9} \text{ second} = 2631.57 \text{ ns}$$

Question Four



Inputs	A	B	C	D	$A+B$	$A+B \text{ CD}$	$(A+B) \text{ CD}$
1	1	1	1	1	1	1	1
2	1	1	1	0	1	0	0
3	1	1	0	1	1	0	0
4	1	1	0	0	1	0	0
5	1	0	1	1	1	0	0
6	1	0	1	0	1	0	0
7	1	0	0	1	1	0	0
8	1	0	0	0	1	0	0
9	0	1	1	1	1	0	0
10	0	1	1	0	1	0	0
11	0	1	0	1	1	0	0
12	0	1	0	0	1	0	0
13	0	0	1	1	0	0	0
14	0	0	1	0	0	0	0
15	0	0	0	1	0	0	0
16	0	0	0	0	0	0	0

Question 7



Bus system

VON NEUMANN

- Based in stored computer concept programs
- Instruction and data stored in same place
- Processor use of two cycle clock to execute a instruction
- Instruction fetch and data transfer can perform the same time
- It uses two buses it make development more expensive difficult
- Unit its much less Development require

6

Buses:-

Is a subsystem that connects

and transfer data between them.

THAT MAIN Buses:

ADDRESS BUS, CONTROL BUS, DATA BUS

its combine the function is Data bus to carry

information. ADDRESS BUS determine where it

should be sent or read from. Control Bus

determine its operation.

ADDRESS BUS:- use to set which memory

address a CPU component is linked for

read/write operation.

DATA BUS:- use to exchange data between

memory address and CPU when read/write

operation is carried out

CONTROL BUS:- use to transfer command code

and return status signal between CPU and

external device

12

(5)

RAID

REDUNDANT ARRAY OF INDEPENDENT DISKS.

Additional disks in form of cache

can improve system performance

we have array of disks operated independently

There are many disks with multiple I/O request

can handled if the data required is on separate

disk

single I/O operation can handled ^{parallel} data request

if the ^{is} required data distributed across

disks

BENEFITS

PREVENT DATA

CAN IMPLEMENTED ON SOFTWARE OR HARDWARE

SERVER MAKE USE OF RAID technology.

COMMON CHARACTERISTIC OF ALL RAID

SET OF DISK ^{physical} drives.

operating system view these separate disks

as a single logic disk

REDUNDANT CAPACITY can use for parity

information.

Parity information can hold data recovery

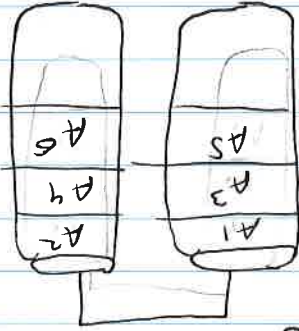
if case disk failure.

- RAID 0:
 - Divide data into block units & write them across a number of disks
 - As data placed multiple disk it called

Striping

- Spanning: in another term because the single logical disk is all physical disk drive

Advantages RAID 0



DISADVANTAGE

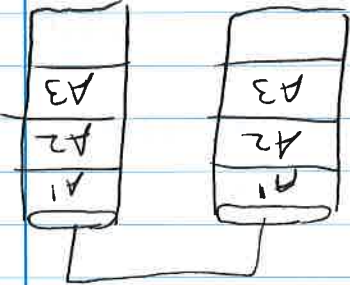
- Not a true RAID its not a fault tolerance
- data being lost in one disk will lost from all disks
- Doesn't recovery data

RAID 1

Duplication of data it called High Reliability

Disadvantage:-

- Requirement to implement minimum 2 disks
- Cost of storage



Advantage

- Because of automatic duplicate data it easy to recover data from other disk in case one disk failure.

RAID 2: this configuration use striping across

disks with some storing disks ERROR CHECK

AND correction (ECC) information.

Disadvantage:-

- Doesn't have any advantage over RAID 3
- No longer use

RAID 3: this configuration use Parity disk

to store the information generated by RAID

controller is with striping instead of data

DISADVANTAGE: Doesn't perform well when

have work with numerous data requested.

Advantage: access in parallel • high rate transfer