Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024-25

Class:	SE	Semester:	III
Course Code:		Course Name:	DLCA.

Name of Student:	Archita Deepak Gupta
Roll No. :	19
Assignment No.:	01
Title of Assignment:	Number System & logic circuits.
Date of Submission:	06/8/24.
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Demonstrated knowledge	5	3
Legibility	3	3
Completeness and timely submission	2	2
Total	20	8

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Demonstrated Knowledge	5	3-4	1-2
Legibility	3	2	1
Completeness and Timely submission	2	1	0

Checked by

Name of Faculty :

Signature : Bharat 6/8/24

Date :

DATE:

Q.1.

$(532.125)_8$

Octal to Decimal conversion can be done as follows:

$(532.125)_8 = (5\times8^2)+(3\times8^1)+(2\times8^0)+(1\times8^{-1})+(2\times8^{-2})+(5\times8^{-3})$

$= 320 + 24 + 2 + 0.125 + ~~0.0156~~\ 0.03125 + 0.00976$

$\therefore (532.125)_8 = (346.16601)_{10}$

Octal to Binary conversion can be done as follows:

$(532.125)_8 = (101011010.001010101)_2$

Since we know that

$(5)_8 \rightarrow (101)_2$, $(3)_8 \rightarrow (011)_2$, $(2)_8 \rightarrow (010)_2$, $(1)_8 \rightarrow (001)_2$

Octal to Hexadecimal conversion can be done as follows:

we know that,

$(532.125)_8 = (101011010.001010101)_2$

$(5)_8 \rightarrow (101)_2$, $(3)_8 \rightarrow (011)_2$, $(2)_8 \rightarrow (010)_2$, $(1)_8 \rightarrow (001)_2$.

Also,

(Since, 4 bits in a group are extracted to form hexadecimal number)

$(101011010.001010101)_2 = (000101011010.001010101000)$

$(532.125)_8 = (15A.2A8)_{16}$

DATE:

Q3.

Q2.

→ Gray code is a binary numbering system where two successive values differ by only one bit (binary digit) respectively.

To find gray code of $(29)_{10}$, we first convert it to binary numbers respectively.

2	29		
2	14	1	↑ ← LSB
2	7	0	
2	3	1	
2	1	1	
	0	1	← MSB

$\therefore (29)_{10} = (11101)_2$

1011
10011

Now binary to gray code,

$(11101)_2 = (10011)$ gray code

$\therefore (29)_{10} = (10011)$ gray code.

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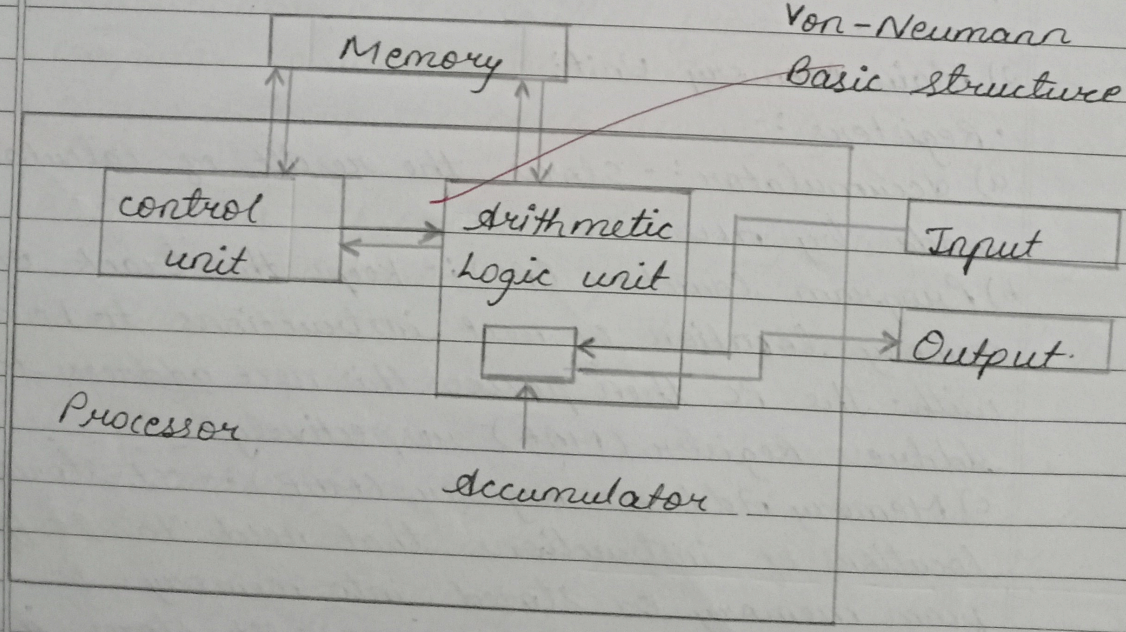
Q3.

The von-Neumann architecture is a computer architecture based on a 1945 description by John von-Neumann and by others. The document describes a design architecture for an electrical digital computer.

There have been 2 types of computers:
1] Fixed program computers - Their function is very specific and they couldn't be programmed.
2] Stored Program computers - These can be programmed to carry out many different tasks, applications are stored on them, hence the name.
In this stored-program concepts, programs and data are stored in a seperate storage unit called memories.



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It is also known as IAS computer and is having three basic units:
1] Central Processing Unit (CPU)
2] The Main Memory unit
3] The Input/output Device.

1) Central Processing Unit:
a) Control unit:- It handles all processor signals It directs all input and output flow, fetches code for instructions and controls how data moves around the system.
b) Arithmetic & logic unit (ALU):- It is that part of the CPU that handles all the calculations the CPU needs. It performs logical operations, Bit shifting operations and Arithmetic operations respectively.

2) Main Memory Unit:
• Registers:-
a) Accumulator:- Stores the result of calculations made by ALU
b) Program Counter (PC):- Keeps the track of the memory location of next instructions to be dealt with. The PC then passes this next address to Memory Address Register (MAR) respectively.
c) Memory Address Register (MAR):- It stores memory locations of instructions that need to be fetched from memory or stored into memory.
d) Memory Data Register (MDR): It stores instructions

fetched from memory or any data that is to be transferred to and stored in memory.

e) Current Instruction Register (CIR) :- It stores the most recently fetched instructions while it is waiting to be coded and executed.

f) Instruction Buffer Register (IBR) :- The instruction that is not to be executed immediately is placed in the instruction buffer register IBR.

3) Input / output devices :

- Program or data is read into main memory from the input device under the control of CPU input instruction
- Output devices are used to output the information from a computer.

- Buses : Data is transmitted from one part of a computer to another, connecting all major internal components of the CPU & memory by bus. Types are as follows :

a] Data Bus : It carries data among the memory unit, the I/O device and the processor.

b] Address Bus : It carries the address of data between memory & processor.

c] Control Bus : It carries control commands from CPU (and status signals from other devices) in order to control and coordinate all the activities within the computer respectively.