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Subject :- Computer Organisation (2CSE205)
Semester :- 2
Assignment :- Q.1

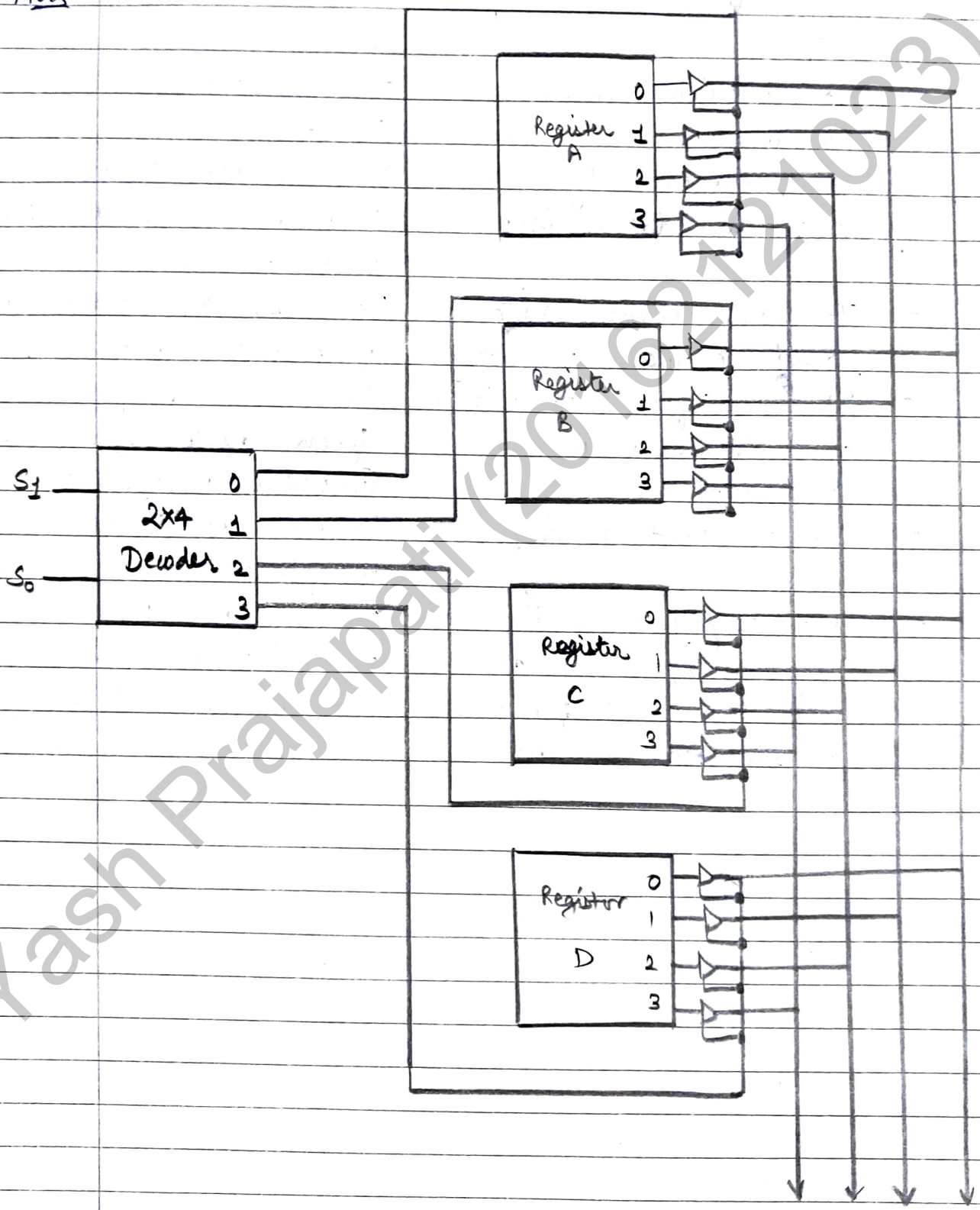
1. Give difference between Von Neumann Architecture & Harvard architecture.

Ans

Von Neumann Arch.	Harvard Arch.
– It requires less space.	It requires more space.
– It requires less hardware.	It requires more hardware
– It requires only one Data & address bus.	It requires separate Data & address bus for each memory.
– It has common data and program memory	It has separate data & program memory.
– It can fetch only/any one either data or instruction	It can properly fetch data & instructions simultaneously.
– Control unit is simple.	Control unit is complex.
– The empty space in program memory can not be used for data or ~~for~~ vice versa	Memory size for data or instructions can be resized or interchanged.

2. Draw the diagram for Bus system using three state buffers and a decoder instead of the multipliers for four bit four registers.

Ans



(4) The 8-bit registers AR, BR, CR and DR initially have foll. values:-

AR = 11110010
BR = 1111 1111
CR = 10111001
DR = 1110 1010

Determine the 8 bit values in each register after execution of foll. sequence of micro-op

AR ← AR + BR	Add BR to AR
CR ← CR ∧ DR, BR ← BR+1	AND DR to CR, increment BR
AR ← AR − CR	Subtract CR from AR

Soln (a) AR ← AR+BR

```
      1 1 1 1 1 1 1
AR    1 1 1 1 0 0 1 0
BR    1 1 1 1 1 1 1 1
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AR  1 1 1 1 0 0 0 1
```

∴ AR = 11110001

(b) CR ← CR ∧ DR, BR ← BR+1

```
CR →  1 0 1 1 1 0 0 1
DR →  1 1 1 0 1 0 1 0
-----------------------
CR →  1 0 1 0 1 0 0 0
```

```
        1 1 1 1 1 1 1 1
BR →    1 1 1 1 1 1 1 1
      +               1
-----------------------
BR ←  0 0 0 0 0 0 0 0
```

(c) AR ← AR - CR

AR ← 11110001
CR ← 10101000
0 1001001

Soln AR → 01001001
BR → 00000000
CR → 10101000
DR → 11101010

5. Starting from an initial value of R = 10011011, determine the sequence of binary values in register R after a logic shift-right, followed by a circular shift left, followed by logical shift-left.

Sol^n R = 10011011

After logical shift - right

R = 01001101

After circular shift - left

R = 10011010

After logical shift - left

R = 00110100

∴ The sequence of binary values in register R after all operations is 00110100

(6) What is wrong with following register transfer statements?

(i) $xT: AR \leftarrow \overline{AR}, AR \leftarrow 0$

Sol^n In this register transfer statement, it cannot be complemented & incremented in same register at same time.

(ii) $yT: R1 \leftarrow R2, R1 \leftarrow R3$

Sol^n We cannot transfer different data, at same time to one single register.

(iii) $zT: PC \leftarrow AR, PC \leftarrow PC + 1$

Sol^n We cannot transfer a new value and increment existing one at same time.