ACY-2018-2019

05

Sri Shridevi Charitable Trust (R.)

SHRIDEVI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by the AICTE, Affilliated to VTU, Belgaum, Recognized by Govt. of Karnataka.)

TUMAKURU - 572106.

Avg - 39

SHRIDEVI
EDUCATION

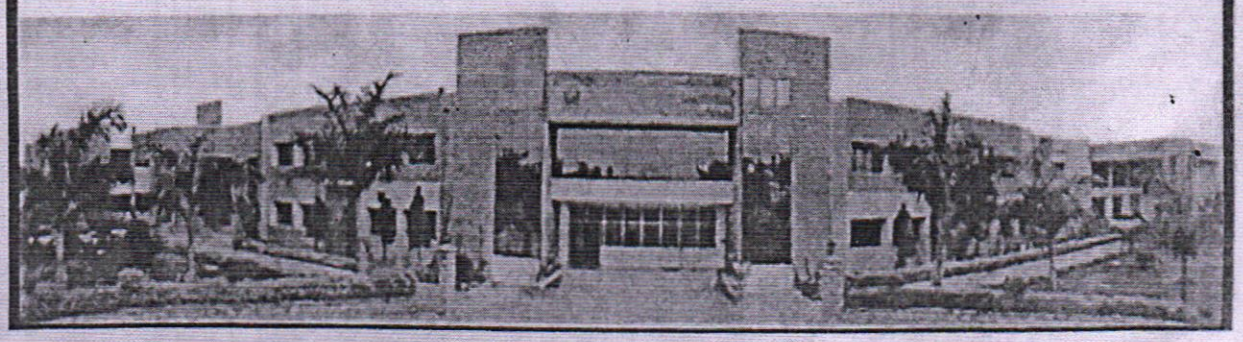
BLUE BOOK

USN :	1	S	V	1	7	E	C	0	0	3

Name of Student : Daniel-S

Course : Microprocessor

Semester : IV Sem Branch : Electronics and Communication



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INTERNAL ASESSMENT MARKS

Date	Test No.	Max. Marks	Marks Obtained	Course Instructor Signature
16/03/19	01	30	28	18/3
16/04/19	02	30	29	18/4
18/5/19	03	30	30	21/5
	Average	30	29	

Ass 9 10

39/40

23/5/19

CERTIFICATE

This is to certify that Kum/ Sri David.S

with USN 1SV17EL003 has satisfactorily completed the course of tests in the subject of Microprocessor as prescribed by the Visvesvaraya Technological University for the 3rd / IV Sem year / semester B.E. degree course in the year 20 19-2019

David S
Signature of the Student

23/5/19
Course Instructor

23/5/19
Head of the Department

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TEST NO. 1

Q.No.	a	b	c	d	Total
Q1					
Q2	08	05			13
Q3	08	07			15
Q4		07			07
Q5					
Q6					
Test -1 Marks					28

TEST NO. 2

Q.No.	a	b	c	d	Total
Q1	7	7			14
Q2					
Q3	6	9			15
Q4					
Q5					
Q6					
Test -2 Marks					29

TEST NO. 3

Q.No.	a	b	c	d	Total
Q1	8	7			15
Q2					
Q3					
Q4	8	7			15
Q5					
Q6					
Test -3 Marks					30

REMARKS

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2) a) Addressing modes in 8086 are.

i) Register Addressing mode: Register Addressing mode is the type of Addressing mode in which the Register is used as Destination the Address of the source is moved to the Register Destination.

Ex: Mov CX, DX

BE: CX = 0009H

DX = 0023H

AE: CX = 0023H

DX = 0023H

ii) Based Indexed Addressing mode: The Based Indexed Addressing mode is the type of memory reference Addressing mode in Based Indexed Addressing mode the Address of the source is moved to the Address of Destination

Ex: Mov [BX], [SI]

BE: [SI] = 0000H = 0239H

[BX] = 000EH = 0884H

AE:

[BX] = 000EH = 0839H

[SI] = 0000H = 0239H

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iii) Immediate Addressing mode:

The Immediate Addressing mode is which the Immediate instruction that is Immediate Data is moved to the register In this The Data is moded to the register

Ex:- MOV CX, 04H
MOV DX, 45H

* BE
DX = 23H or xx

AE
DX = 45H

* BE:
CX = xx

AE:
CX = 04H

iv) Direct Addressing mode: The Direct Addressing mode is the type of memory reference Addressing mode in which the Data is Directly moved to a particular Registers or Destination

ex: MOV ES, CX
MOV DS, CX

The Data present in the CX register is Directly moved to ES and DS Data Segment

ex:- MOV ES, CX
MOV DS, CX

BE: CX = 0234H
ES = 0000H = xxxx

AE: CX = 0234H
ES = 0000H = 0234H

08

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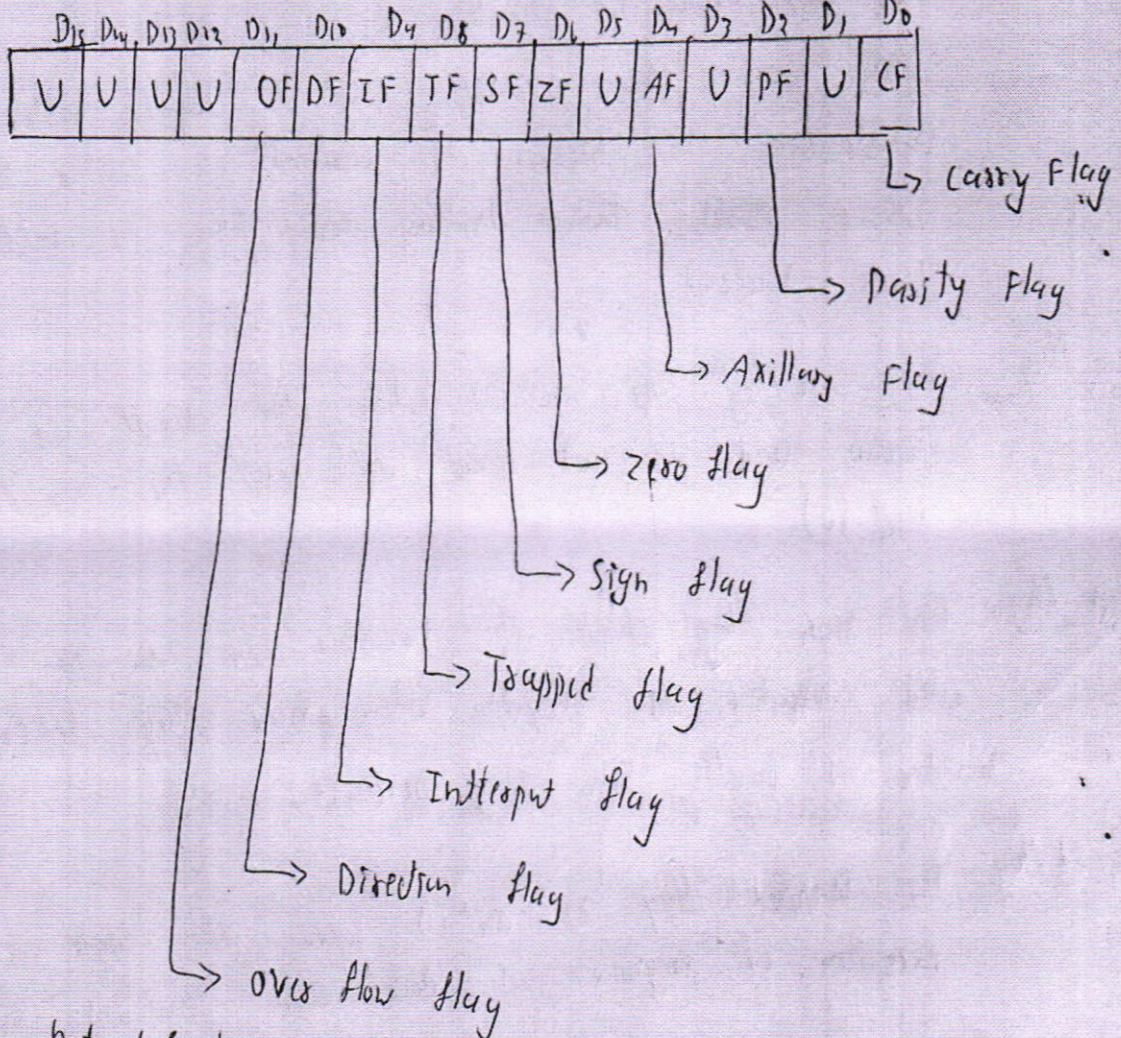
2b) The Flag Register of 8086

The Flag Register in which the when the instruction is perform in the operation the flag are affected and it contains some information the block of the Flag register is shown below



U is not defined

* Carry Flag: The carry Flag is set when the Arithmatic operation is done the result containing carry the carry Flag is set (1) other wise reset (0)

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* Parity Flag:- The parity flag check the even and odd number of the result and when the arithmetic instruction is performed the result is even the parity flag is set(1) other wise reset(0)

* Axillary Flag:- The Axillary carry flag is set(1) when the addition of the two bit number one done and the carry is get from lower nibble and to higher nibble and subtraction the borrow is carryied to higher nibble to lower nibble then Axilary carry flag is set(1) other wise reset(0)

* Zero Flag:- The zero flag is set(1) when the result is equal to zero and is not equal to zero the zero flag is reset(0)

* Sign Flag:- The Sign flag check the nowmbers is negative or positive and number is negative then Sign flag set(1) and number is positive Sign flag reset(0)

* Trapped Flag:- The Trapped flag is set(1) when the sigle step excention of program is done and reset(0) other wise

* Interupt Flag:- The Interupt flag is set(1) when the interupt request in the program or else reset(0) the instruction INTP is

* Direction Flag:- The Direction flag is set(1) when the result is Directed to the other register

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* Overflow flag: When the arithmetic operation is done and then consider 8 bit 2 number to add and store in dest of 8 bit only but the result is 32 bit then overflow flag is set (1) or else reset (0)

3 a) i) LEA (Load effective address)

The LEA instruction is used to Load the effective address of the source to Destination

Ex: LEA CX, [SI]

BE: CX = 2309H

[SI] = 00EFH = 8844H

AE: [SI] = 00EFH = 8844H

CX = 8844H

ii) IDIV (Integer Division)

The Integer Division IDIV is used to Divided the number of unsigned or negative numbers in DIVS or in DIVD

Ex: IDIV Num

IDIV DIVD, DIVS

BE:

DIVD = -24H

DIVS = 12H

Rq = 0000H

AE:

Rq = -2H

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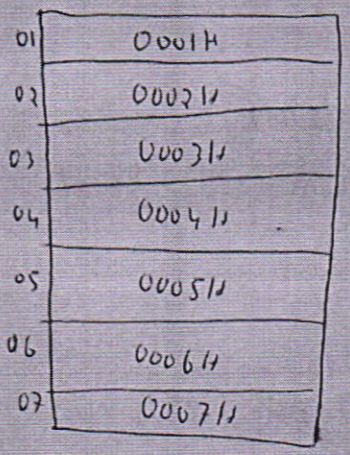
iii) XLAT :- (x Translate Table)

In this XLAT instruction the Translate Table is used and exchange of the Data is done between the Destination and with the Translate Table



Translate table

Ex:- XLAT DX, [SI]

BE:-

[SI] = 0006H = 06H

DX = 0008H

AE:-

[SI] = 0006H = 0008H

DX = 06H

iv) DAA (Decimal Adjust Addition):-

The DAA instruction is used to Adjust the Decimal value of the given Hexadecimal value the addition is done between the Decimal numbers

Ex:- DAA (AX, BX

BE:- AX = 0364H

DX = 0584H

AE = 8EF

BX = 0584H

873
+1417
2287
8EF

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3b) To find square of a given number

⇒ Code

```
.MODEL SMALL
.DATA
Num dB 09H
RES dw 00H
.CODE
START: MOV AX, @DATA
       MOV DS, AX
       MOV Num, 09H
       MOV AX, Num
       MUL Num
       MOV RES, AX
       MOV AH, 04CH
       INT 21H
       END START
```

* Result:

Befor Execution

DS:	000EH Num 09 00	Rq 00	00

AE

DS:	000EH	Num 09	00	Rq 81	00

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```
.CODE
.MODEL SMALL
.DATA
Num dB 09H
RES dw 0011
.CODE
START : MOV AX, @DATA
        MOV DS, AX
        MOV AX, 09H
        MUL Num
        MOV RES, AX
        MOV AH, 04CH
        INT 21H
        END START
```

4b) To convert Binary number into gray code

```
CODE
.MODEL SMALL
.DATA
Num dB 34H
RES dw 0011
.CODE
START: MOV AX, @DATA
       MOV DS, AX
       MOV al, 34H
       MOV bl, al
       CLC
       RCR al, 01H
```

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```
XOR bl, al
Mov RES, bl
Mov AH, 04CH
INT 21
END START
```

Binary => gray code
ex 341H => 2E1H

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2nd Internal Assesment

1 a) * CMPS: (compare string)

The compare string is used in the program to compare string the DI is compared with SI source and SI substrated by the DI and SI is updated and CF, PF, SF, ZF affected

CMPS [SI: DI] → [ES: DI]

Ex:-

DE * CMPSB DI

SI: 0000H DI: 0000H PF→0 SF→0 ZF→0

AE

SI: 0001H DI: 0001H PF→1 SF→0 ZF→0

* SCAS (Scan string):

The Scan string is used to substrate the SI with the AL or AX and SI is update and flag register are affected.

SCAS SI, AL

Ex:-

DE SI: 0001H [Dx=45]

AL: 54H

54-45

= F

AE SI: 0001H [Dx=F]

AL: 54H

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* REPNZ: (Repeat if Not zero)

The program is Repeated if not zero means that the program should not containing zero then the program is repeated

Ex: REPNZ AL

* INTO: (Interrupt over flow)

The over flow flag is set then the interrupt is introduced in the program (or) Delay is made in the program.

OF flag is set means that the interrupt is made in the program.

* HLT: (Halt)

The Halt is the time delay in the program that is used when xchange operation is done HLT is used when xchange Instruction used between registers the Halt is used

* CLD: (Clear Direction flag)

The CLD is used to clear the Direction flag and made zero initially

* Lock: The Lock is used to HOLD the program for some time and then it is work properly as it is

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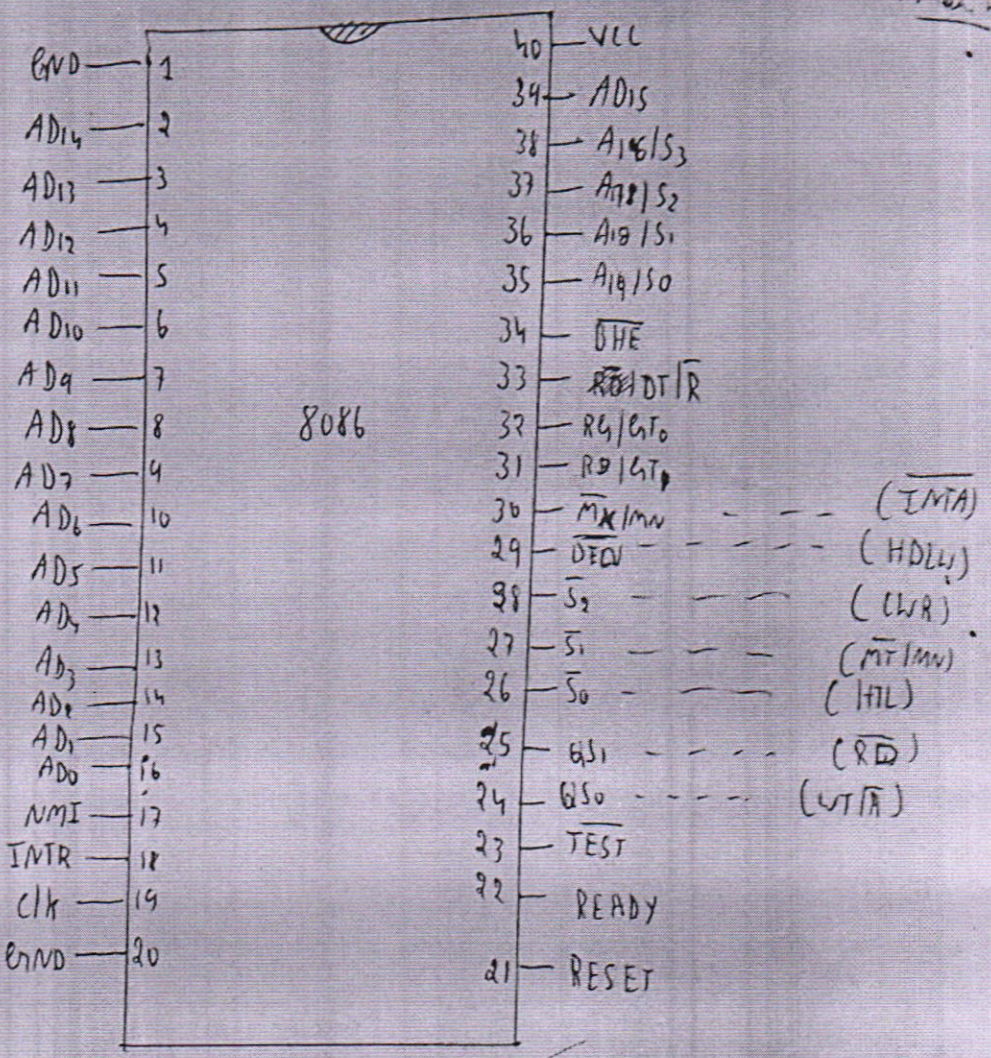
5) The Pin diagram of 8086.



* The 8086 is worked for the range of the frequency 5, 8 and 10 MHz and an Vcc supply PIN diagram of 8086 is as shown and the memory block and the system control with the PINs is explained as follows.

* GND and Vcc: The PIN no: 1 and 20 are grounded and 40 PIN is Vcc

$AD_{15} - AD_0$ - the PIN 39 and 2 to 16 Pin are to input and output connection of the 8086 is shown and the S_4 and S_5 are pin selection. it looks as

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S_3	S_4	Indication
0	0	Alternate
0	1	Steady
1	0	code ~~or mode~~
1	1	None

That is the work of 8086 in that suitable one.

+ NMI (Non muscable Interrupt)
The interrupt is made to us 8086 with out disturbing any other pin mode operation

+ CLK: clk is to give the clock pluse to the 8086.

+ $\overline{DHE}$: (Bus Data enable)
it is active low pin. and it transfer the data to the microprocessor and device the Address. -ev to the Bus

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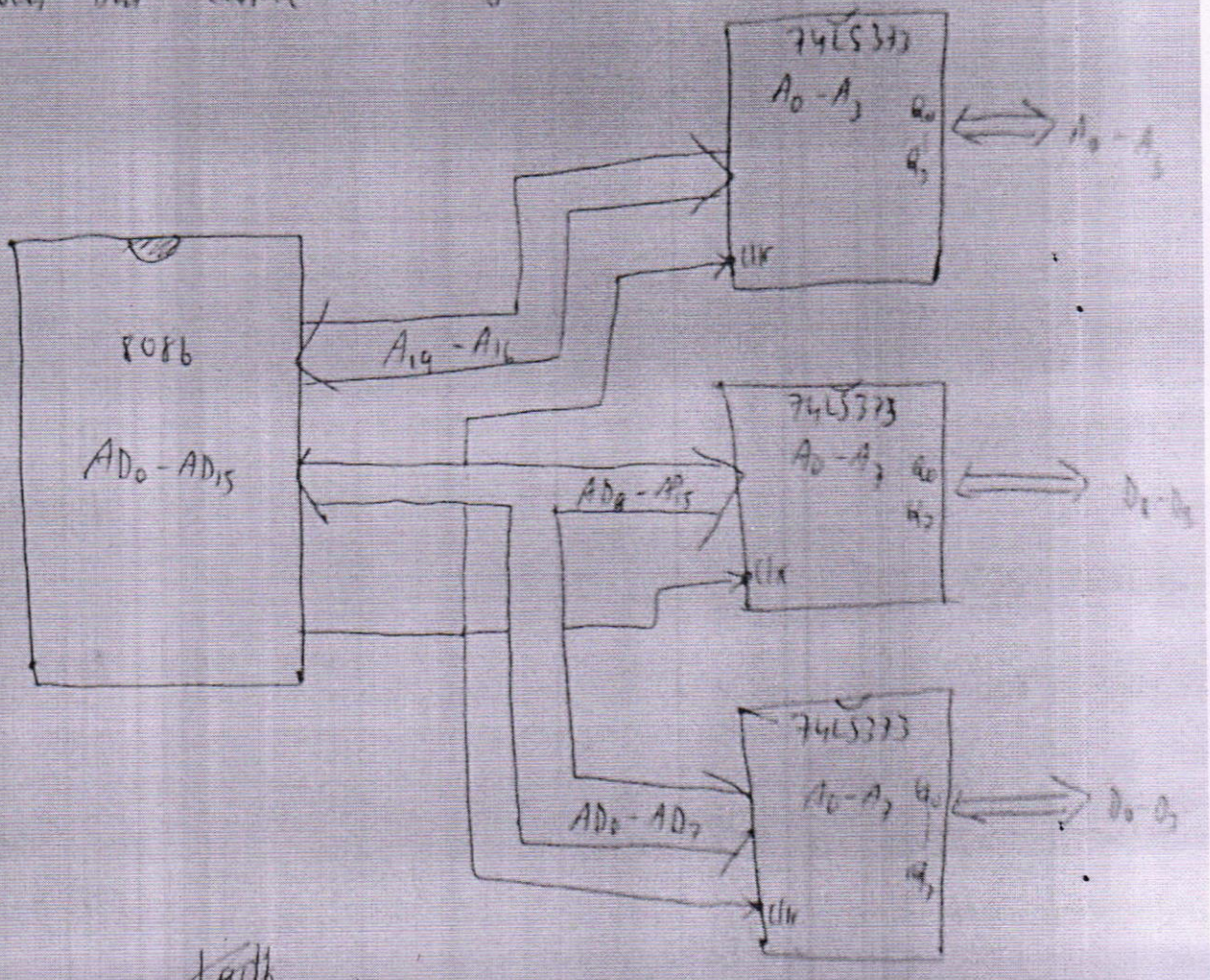
3.9) Address bus derived from system bus



Each Latch output derived from system bus

⇒ The address bus is read to the Device through the 74LS373 as shown and $A_{19} - A_{16}$ Address datas is sended through one IC 74LS373 and $AD_0 - AD_{15}$ is Divided $AD_0 - AD_7$ & AD_8 - to AD_{15} is send through one two different IC 74LS373.

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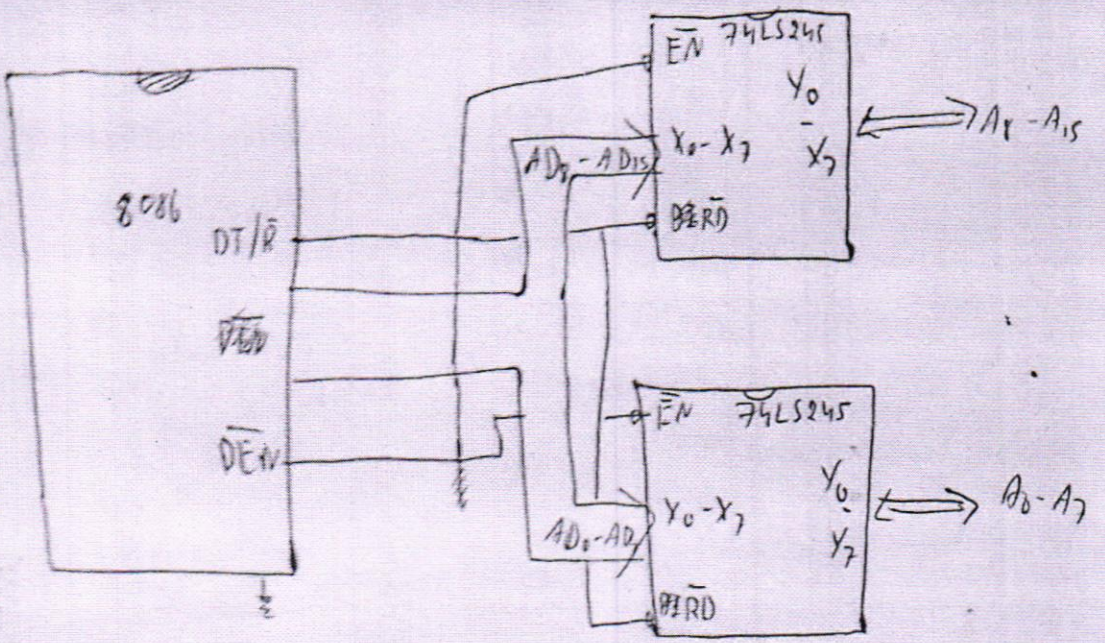

* Data bus derived from system bus

The Data bus is vended via 74LS245 IC taken two IC's and and AD_0 - AD_7 is one, and AD_8 to AD_{15} is another IC $\overline{DEN}$ is connect and DT/$\overline{R}$ is connect is as shown in the Block Diagram of Data bus.

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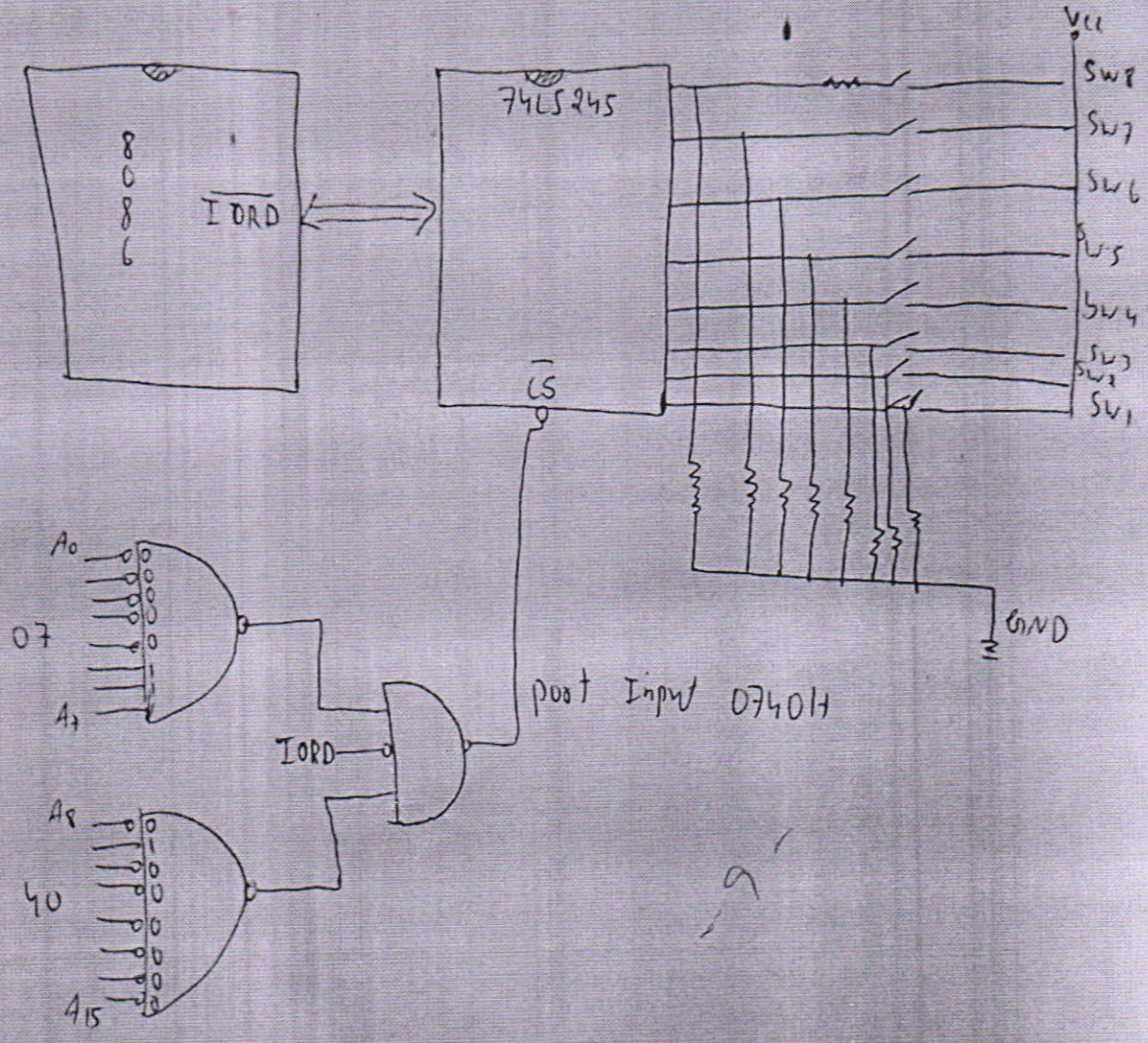
5b)

⇒ Program:

```
MOV  BL, 00H      (Move 00H to BL)
MOV  DX, 0740H    (Move 0740H to DX)
IN   AL, DX
MOV  BL, AL       (Move AL to BL)
HLT               (Halt)
```



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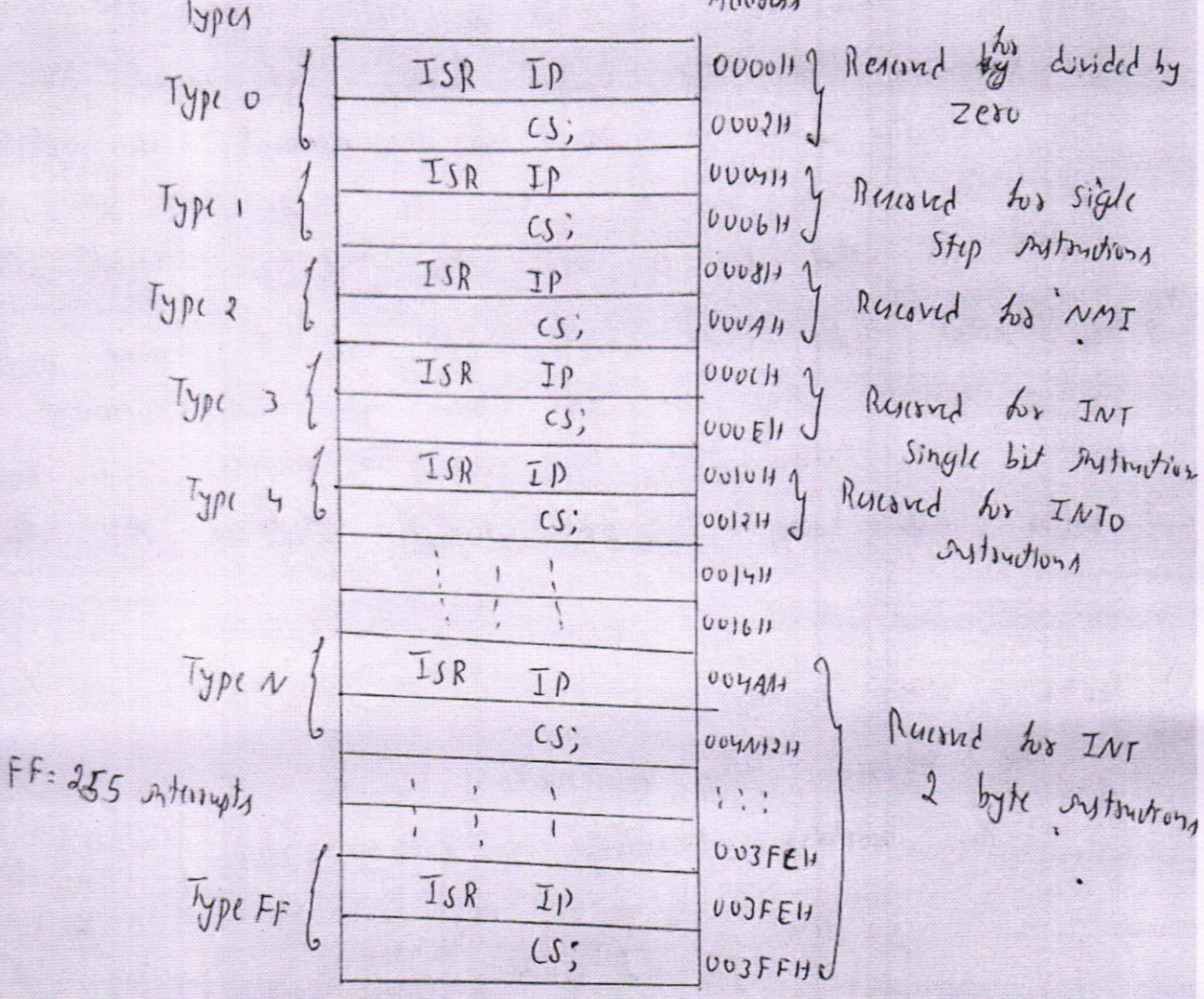
Internal Assignment - 03

1 a) Interrupt vector table :



* Interrupt vector table*

⇒The interrupt vector table is as shown The interrupt is recognized that which Type of interrupt that is Type 0 to Type N it indicate whether the interrupt is performed or not that is Type 0 then Type 0 interrupt is recognized if is divided by zero so the program will interrupted and terminated.

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When Type 1 is recognized it is for INT single bit instruction that make some delay in the program. Type 2 is recognized it is for NMI (Non muscable interrupt) that is having separate pin in the 8086 IC and it is active high pin. when Type 3 is recognized that the system having Int signal for a single bit instruction. Type 4 when Type 4 interrupt is recognized it is for INTO instruction that is active low pin in the 8086 IC that is 0 and active and to interrupt the program

⇒ The interrupt vector table consisting of Types of interrupt and Address and Comments that is for which Type which interrupt is position and. The Address starts from 0000H to 003FFH and Interrupt vector table having Type FF interrupts, that is 255 interrupts.

b) 100ms, 10MHz frequency.

⇒

The required Delay T_d = 100ms

The working frequency of 8086 = 10MHz

Time $T = \frac{1}{f} = \frac{1}{10M}$ = 100nsec
= 0.1MSec

* Delay program:-

MOV CX, count	4	
DEC CX	2	} Delay
NOP	3	
JNZ double	16	
	21 = n	

* 2+3+16 = 21 = n

n = 21 for the Delay program.

The count of $N = \frac{T_d}{n * T} = \frac{100ms}{21 * 0.1M}$ = 47619 (BA03)

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=> The count N in Decimal 47619 is converted into hexa decimal BA03

* Calculation:

Delay = 4 x 0.1M x BA03 + 2 x 0.1M x BA03 + 3 x 0.1M x BA03 + 16 x 0.1M x BA03

Delay = 0.4M + 9.5238m + 0.0142857 + 0.0761904

Delay = 100×10^{-3}

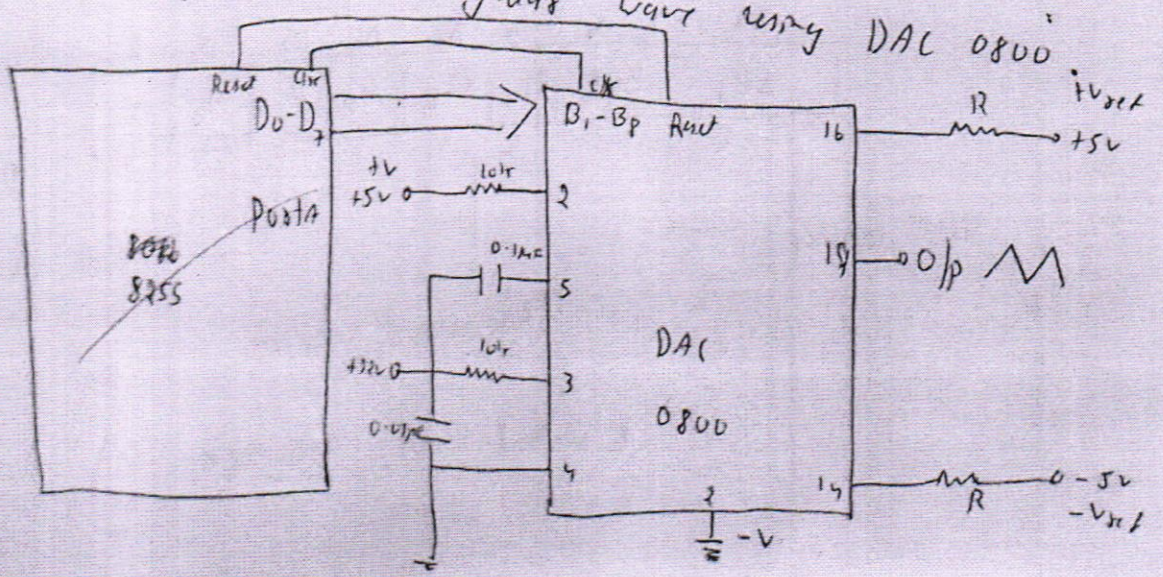
Delay = 100msec

* program:

=> Assume CS: code
Code Segment
MOV CX, BA03 → 4
Wait: DEC CX → 2
NOP → 3
JNZ Wait → 16
RET → 4
code ENDS → 8
END proc

4 a) Program to generate triangular wave using DAC 0800

=>



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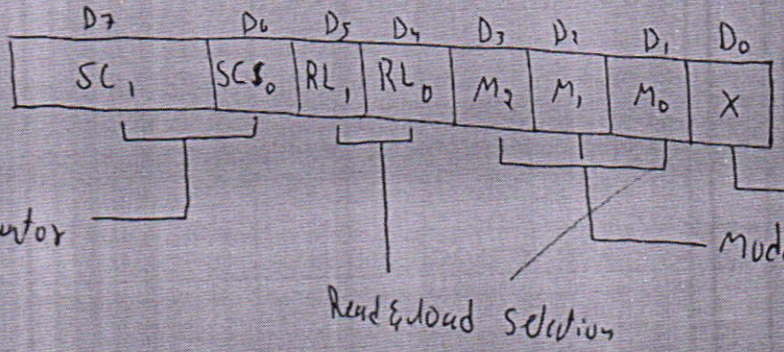
1	0	0	0	0	0	0	0

= 80H = CWR.
Control Word Register

Program:

```
Assume CS: code
code segment
Start: Mov AL, 80H
       out CWR, AL
       Mov AL, 00H
Back: out PortA, AL
      INC AL
      CMP AL, FFH
      JB Back
Back1: out PortA, AL
       DEC AL
       CMP AL, 00H
       JA Back1
       JMP Back
Code Ends
End Start
```

4 b) Control word register of 8254 timer.



* Control Word registers *

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* D_0 - Count selection

BCD	1
Hexa decimal	0

* SC_1 & SC_0 (Select counter)

SC_1	SC_0	operation
0	0	Counter 0
0	1	Counter 1
1	0	Counter 2
1	1	Illegal

* RL (Read / Load selection)

RL_1	RL_0	operation
0	0	No operation
0	1	Read and load LRSB only
1	0	Read and load MSB only
1	1	Read and load LSB first then MSB

where LSB → Least Significant byte

MSB → Most significant byte

* Mode selection:

M_2	M_1	M_0	operation
0	0	0	mode 0
0	0	1	mode 1
X	1	0	mode 2
X	1	1	mode 3
1	0	0	mode 4
1	0	1	mode 5

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* The control word register of 8254 timer is as shown and the working of the Bits D_0 to D_7 is shown in the table of modes and select counter and Read and load selection table that is the D_0 bit is 1 for BCD count and 0 for Hexadecimal count and modes M_2 M_1 & M_0 bit D_{B3} D_2 and D_{B1} is selected as in the table of mode selection. and bit D_{B5} and D_{B4} is Read and load the LSB and MSB of the counter that is shown in table Read and load select. and bit number D_7 and D_6 for select counter that is done as in the table following

SC_1	SC_0	operation
0	0	Counter 0
0	1	Counter 1
1	0	Counter 2
1	1	Illegal

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