Parul University

FACULTY OF ENGINEERING AND TECHNOLOGYBACHELOR OF TECHNOLOGY

Computer Organization and Microprocessor Laboratory
(303105211)

IV SEMESTER

Computer Science & Engineering Department

Laboratory Manual

Session:2023-24

Computer Organization and Microprocessor Laboratory

PREFACE

It gives us immense pleasure to present the first edition of the **Computer Organization and Microprocessor** Practical Book for the B.Tech . 4**th semester** students for **PARUL UNIVERSITY**.

The **COMA** theory and laboratory courses at PARUL UNIVERSITY, WAGHODIA, VADODARA are designed in such a way that students develop the basic understanding of the subject in the theory classes and then try their hands on the experiments to realize the various implementations of problems learnt during the theoretical sessions. The main objective of the **COMA** laboratory course is: Learning **COMA** through Experimentations. All the experiments are designed to illustrate various problems in different areas of **COMA** and also to expose the studentsto various uses.

The objective of this **COMA** Practical Book is to provide a comprehensive source for all theexperiments included in the **COMA** laboratory course. It explains all the aspects related to every experiment such as: basic underlying concept and how to analyze a problem. It also gives sufficientinformation on how to interpret and discuss the obtained results.

We acknowledge the authors and publishers of all the books which we have consulted while developing this Practical book. Hopefully this **COMA** Practical Book will serve the purposefor which it has been developed.

INSTRUCTIONS TO STUDENTS

1. The main objective of the **COMA** laboratory is: Learning through the Experimentation. All the experiments are designed to illustrate various problems in different areas of **COMA** andalso to expose the students to various problems and their uses.
2. Be prompt in arriving to the laboratory and always come well prepared for the practical.
3. Every student should have his/her individual copy of the **COMA** Practical Book.
4. Every student have to prepare the notebooks specifically reserved for the **COMA** practicalwork: ” **COMA** Practical Book”
5. Every student has to necessarily bring his/her **COMA** Practical Book, **COMA** Practical ClassNotebook and **COMA** Practical Final Notebook.
6. Finally find the output of the experiments along with the problem and note results in the **COMA** Practical Notebook.
7. The grades for the **COMA** practical course work will be awarded based on our performancein the laboratory, regularity, recording of experiments in the **COMA** Practical Final Notebook, lab quiz, regular viva-voce and end-term examination.

Sr. No	Experiment Title	Page No		Date of Performance	Date of Subbmission	Sign	Marks (out of 10)
		From	To				
1.	Addition of two 8 bit numbers using 8085						
2.	Write a program to find one's complement and two's complement of 8-bit numbers.						
3.	Write a program to perform 16-bit addition of two numbers.						
4.	Write a program to multiply two 8-bit numbers using addition						
5.	Write an ALP to transfer a block of data from memory location 2010H to 2080H.						
6.	Write a program to perform addition of 6 bytes of data stored at memory location starting from 2050H.Use register B to save carry generated while performing addition. Display sum and carry at consecutive locations 2070H and 2071H.						
7.	[A] Write a program to find the largest number of given two 8-bit numbers at 2050H & 2051H memory location. Store the result at 2060H. [B] Write a program to find the largest number in a set of 8 readings stored at 2050H. Display the number at 2060H.						
8.	Write a program to arrange the numbers in ascending order. The numbers are stored at 2050H onwards. [5 numbers]						
9.	Write a program to convert a number from BCD to Binary.						
10.	Write a program to convert from binary to ASCII						
11.	Introduction to 8086 Microprocessor.						

PRACTICAL-1

AIM: Write a program to add two 8-bit numbers.

PROGRAM:

```
MVI A,50H
MVI B,10H
ADD B
MOV C, A
STA 2001H
HLT
```

OUTPUT:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	3C	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

CONCLUSION: The above code is successfully executed in Lab.

PRACTICAL-2

AIM: Write a program to find one's complement and two's complement of 8-bit numbers.

PROGRAM:

```
MVI A,010101H
CMA
STA 2003H
ADI 1H
STA 2005H
HLT
```

OUTPUT:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	FE	00	FF	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

CONCLUSION: The above code is successfully executed in Lab.

PRACTICAL-3

AIM: Write a program to perform 16-bit addition of two numbers.

PROGRAM:

```
MVI A,12H
STA 2050H
MVI A,34H
STA 2051H
MVI A,12H
STA 2052H
MVI A,34H
STA 2053H
LHLD 2050H
XCHG
LHLD 2052H
DAD D
SHLD 2055H
HLT
```

OUTPUT:

Memory View 0x 2005

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	12	34	12	34	00	24	68	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

CONCLUSION: The above code is successfully executed in Lab.

PRACTICAL-4

AIM:Write a program to multiply two 8-bit numbers using addition.

PROGRAM:

```
MVI A,5
MVI B,5
ADD B
ADD B
ADD B
ADD B
STA 2005H
HLT
```

OUTPUT:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	19	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

CONCLUSION: The above code is successfully executed in Lab.

PRACTICAL-5

AIM:Write an ALP to transfer a block of data from memory location 2010H to 2080H.

PROGRAM:

```
LXI
H,2010H
LXI
D,2080H
MVI C,08H
VISH1:MOV
A,M
STAX D
INX H
INX D
DCR C
JNZ VISH1
HLT
```

OUTPUT:

Memory View 0x 2010

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	20	00	40	50	00	60	70	80	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	20	00	40	50	00	60	70	80	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Start Address at: 0x 1100

CONCLUSION: The above code is successfully executed in Lab.

PRACTICAL-6

AIM:Write a program to perform addition of 6 bytes of data stored at memory location starting from 2050H.Use register B to save carry generated while performing addition. Display sum and carry at consecutive locations 2070H and 2071H.

PROGRAM:

```
MVI A,00H
MOV B,A
LXI H,2050H
MVI C,06H
NXTBYTE:ADD M
JNC NXTMEM
INR B
NXTMEM:INX H
DCR C
JNZ NXTBYTE
LXI H,2070H
MOV M,A
INX H
MOV M,B
HLT
```

OUTPUT:

Memory View 0x 2050

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	24	24	3A	50	3B	40	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	4D	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Start Address at: 0x 1100

CONCLUSION: The above code is successfully executed in Lab.