

NOWROSJEE WADIA COLLEGE, PUNE

Experiment Incomplete For
Diagram _____

Performed On 1/9/15

Obs. Table _____

Signature _____

Calculations _____

Submitted On 1/9/15

Graphs _____

Experiment Complete

Results _____

of II Student

Unit _____

Incharge

Name Vrushil Soni

Class XII

Roll No. 12032

Batch Tuesday

Pair No. -



Expt. No. _____ Title Introduction to Microprocessor (up)

Aim: The up assembled with 8085 up by the company Anshuman contains following different procedures to operate the system

Program Steps:-

Procedure I :- To enter the program

Key to Press

Display

COMMAND	SUBSTIT?	MEMORY	Addr
ESC			
S			
CR			
CR			
6			
0			
0			
0			
(R)			

Program Table.

Mem loc.	Opcode	Label	Mnemonics	Operand	Comments
6000	21		LXI H	6050	load 60 & 50 to HL
6001	50				
6002	60				
6003	7E		MOV A M		Move M to A .
6004	23		INX H		Increment HL pair.
6005	86		ADD M		Add M by I .
6006	47		MOV B A		Move A to B .
6007	4F		MOV C A		Move A to C .
6008	23		INX H		Increment HL pair.
6009	77		MOV M A		Move A to M .
600A	23		INX H		Increment HL pair.
600B	77		MOV MA		Move A to m .
600C	CF		RST-1		Stop .

After last CR key, microcomputer displays some previous content. we have to enter the opcode as written in the program table for the program to be entered. After entering content on 6000, press CR key to move on next location 6001 to enter the content that is operand or data byte as per the program table. In this way, go on entering opcode or operand & pressing CR key upto the last location where CF opcode is available after that entry of CF, press CR key 3 times.

Procedure II :- To enter the data block:-

Key to Press	Display.
ESC	COMMAND
S	SUBSTIT?
CR	Memory
CR	Addr
6	6
0	60
5	605
0	6050
CR	6050 26.

After last CR key it display some previous display content which can be replaced by data byte mentioned in data block after that press CR to come on next location 6051 on which next data byte should be entered. In this way, enter the data bytes as per the data block.

Procedure III :- To execute the program:-

Key to Press	Display.
ESC	COMMAND
G	GOTO?
CR	BURST
CR	Addr
6	6
0	60
0	600
0	6000
CR	COMMAND

After last CR key, microcomputer should display command that means program is error free it displays weight-

Procedure IV:- To check result in registers.

Key to Press	Display
ESC	COMMAND
S	SUBSTIT?
CR	Memory.
Any 2 keys other than C & T & CR we can press any no. keys twice	register.

After display of register press CR twice to check O/p in accumulator. Press CR key twice to observe various register contents as results.

Procedure 5:- To check result in memory locations

Key to Press	Display.
ESC	Command
S	Substit?
CR	Memory
CR	Add -
6	6
0	60
5	605
2	6052
CR	6052 E5.

The location mentioned 6052 may change as per the various programs. we have to enter the address which is the starting location in result section.

After entering that location & CR, it displays required O/p. Press CR to arrive on next location.

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Experiment Incomplete For

Diagram _____

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Graphs _____

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Unit _____

Name Vrushil Soni.Class XIIRoll No. 12032 Batch Tuesday Pair No. -Performed On 15/8/15

Signature

Submitted On 15/9/15

Experiment Complete

Incharge J.S. Date (3/11/15)Expt. No. 1 Title Addition of 5 data bytes.

Aim: To design a program for addition of 5 data bytes & to store result of carry & addition on locations 6055 & 6056 respectively.

Program Steps.

XRA A

MVI B 00

MVI C 05

LXI H 6050

ADD M C

JNC

INR B

INX H

DCR C

JNZ

MOV M B

INX H

MOV M A

RST-1.

$$\begin{array}{r}
 A=00 \\
 + M=04 \\
 \hline
 A=04
 \end{array}
 \quad
 \boxed{C=0} \quad
 \boxed{Z=1}$$

$$\begin{array}{r}
 A=04 \\
 + M=00 \\
 \hline
 A=A4 \\
 + M=04 \\
 \hline
 A=A8
 \end{array}
 \quad
 \boxed{C=0} \quad
 \boxed{Z=1}$$

$$\begin{array}{r}
 A=A8 \\
 + M=05 \\
 \hline
 A=A9
 \end{array}
 \quad
 \boxed{C=1} \quad
 \boxed{Z=0}$$

$$\begin{array}{r}
 A=A9 \\
 + M=02 \\
 \hline
 A=AB
 \end{array}
 \quad
 \boxed{C=0} \quad
 \boxed{Z=0}$$

$$\begin{array}{r}
 A=AB \\
 + M=AF \\
 \hline
 A=5A
 \end{array}
 \quad
 \boxed{C=1} \quad
 \boxed{Z=0}$$

$$\boxed{Y=1}$$

Data block:-	
Location	Data byte
6050	05
6051	0A0
6052	005
6053	012
6054	0F
	FF
	70

Program Table

15.2

Mem loc	Opcode	Label	Mnemonics	Operand	Comments
6000	AF		XRA A		Make acc 0
6001	06		MVI B	00	Move immediate 00 to B reg.
6002	00		MVI C	05	Move immediate 05 to C register.
6003	0E		LXI H	6050	Initialize location 6050 in H-L pair.
6004	05				
6005	21				
6006	50				
6007	60				
6008	86	X ₂	ADD M		Add memory content to acc
6009	D2		JNC X ₁	600D	Jump if carry not set.
600A	BD				
600B	60				
600C	04		INR B		Increment B reg by 1.
600D	23	X ₁	INX H		Arrive on next location.
600E	0D		DCR C		Decrement C reg by 1.
600F	C2		JNZ X ₂	6008	Jump if zero not set.
6010	208				
6011	60				
6012	70		MOV M B		Move B reg content to memory
6013	23		INX H		Arrive on next location.
6014	77		MOV M A		Move acc content to memory loc.
6015	CF		RST -1.		Stop.

Result

loc	O/P
6055	01
6056	5A
A	5A
B	01
C	00
H	60
L	56
F	55

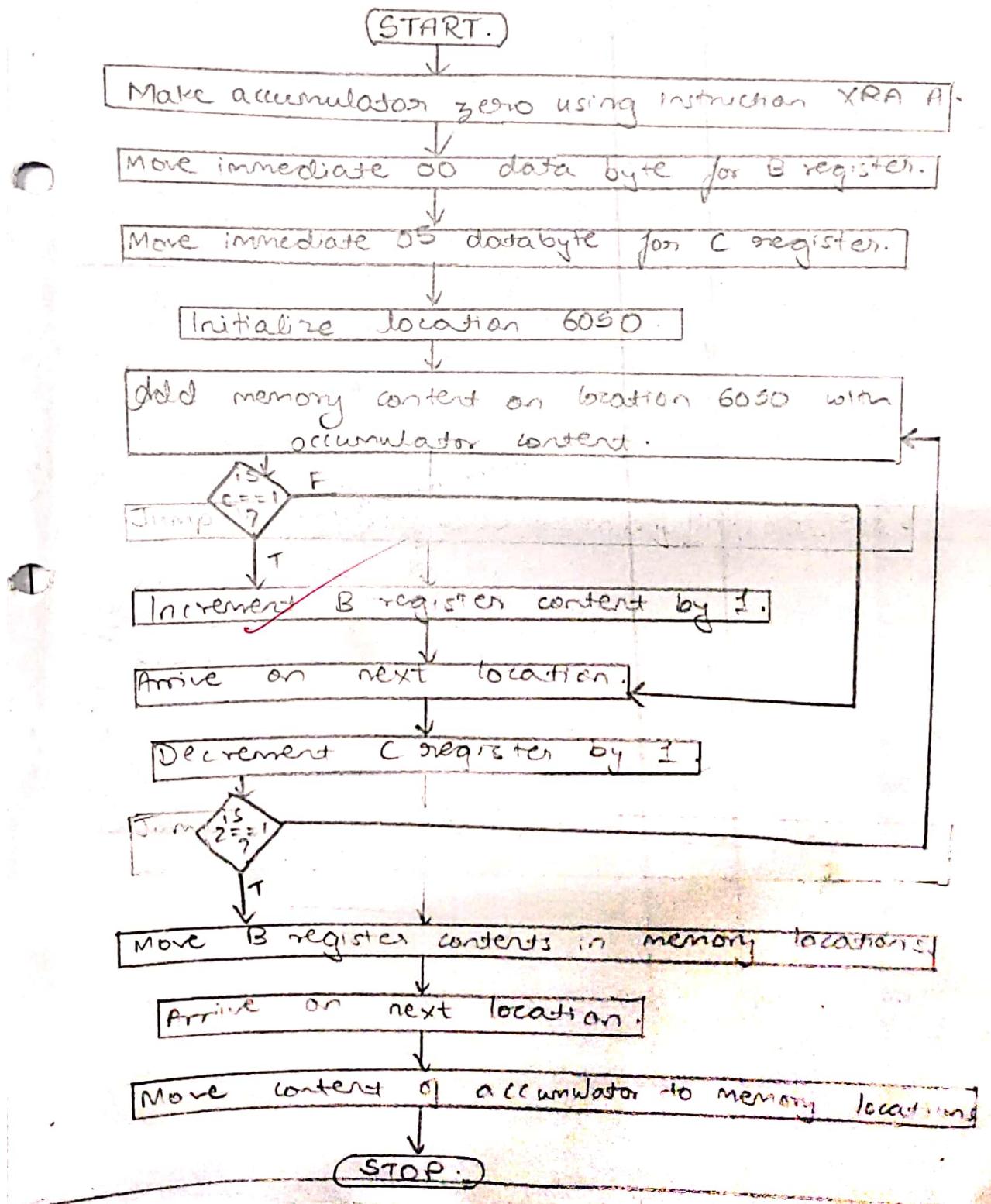
Implementation of flag register :- 15-3

F = 55

S Z - AC - P - Cy
0 1 1 0 1 1 0 1 1 0 1 1

- 1) Cy=1 since carry is operated.
- 2) P=1 since P it contains even no of 1's.
- 3) AC=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since C register (counter)=0 at last.
- 5) S=0 since answer is +ve.

Flowchart:-



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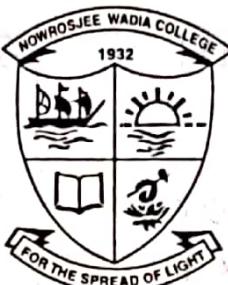
Results _____

Unit _____

Name Vrushil Soni.Class XIIRoll No. 12032Batch Tuesday

Pair No. _____

Expt. No. _____

Title Multiplication of 2 data bytes.Performed On 29/9/15

Signature _____

Submitted On 29/9/15

Experiment Complete

Incharge AB1310

Aim: To design a program for multiplying the data bytes available on the locations 6050 and 6051 & store the result of carry & multiplication at location 6052 & 6053 respectively.

Program Steps:-

XRA A

MVI B 00

LXI H 6050

MOV C M

INX H

ADD M ←

JNC

INR B

DCR C ←

JNZ

INX H

MOV M B

INX H

MOV M A

RST-1

Data Block:-

location	Data byte
6050	03
6051	0A

Program Table.

14-2

Memory Location.	Opcode	Label	Mnemonics	Operand	Comments.
6000	AF		XRA A		Make acc. zero.
6001	06		MVI B	00	Move immediate 00 for B register.
6002	00				
6003	21		LXI H	6050	Initialize location 6050.
6004	50				
6005	60				
6006	4E		MOV C M		Move memory content to C.
6007	23		INX H		Arrive on next location.
6008	86	X ₂	ADD M		Add memory with memory.
6009	D2		JNC X ₁	600D	Jump if carry not set.
600A	0D				
600B	60				
600C	04		INR B		Increment B reg. by 1.
600D	0D		DCRC		Decrement C reg. by 1.
600E	C2		JNZ 6008	6008	Jump if zero not set.
600F	08				
6010	60				
6011	23		INX H		Arrive on next location.
6012	70		MOV M B		Move B reg. content to memory.
6013	23		INX H		Move acc to memory location.
6014	77		MOV M A		Move acc to memory loc.
6015	CF		RST-1.		Stop.

Result :-

location / register -	Output
1) 6052	00
2) 6053	1E
3) A	1E
4) B	00
5) C	00
6) H	60
7) L	53
8) F	54

← carry.

← multiplication.



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U

→ V



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

→ T

→ U



→ m 60A

→ H

→ L

→ F

→ C

→ B

→ A

→ D

→ E

→ M

→ N

→ P

→ Q

→ R

→ S

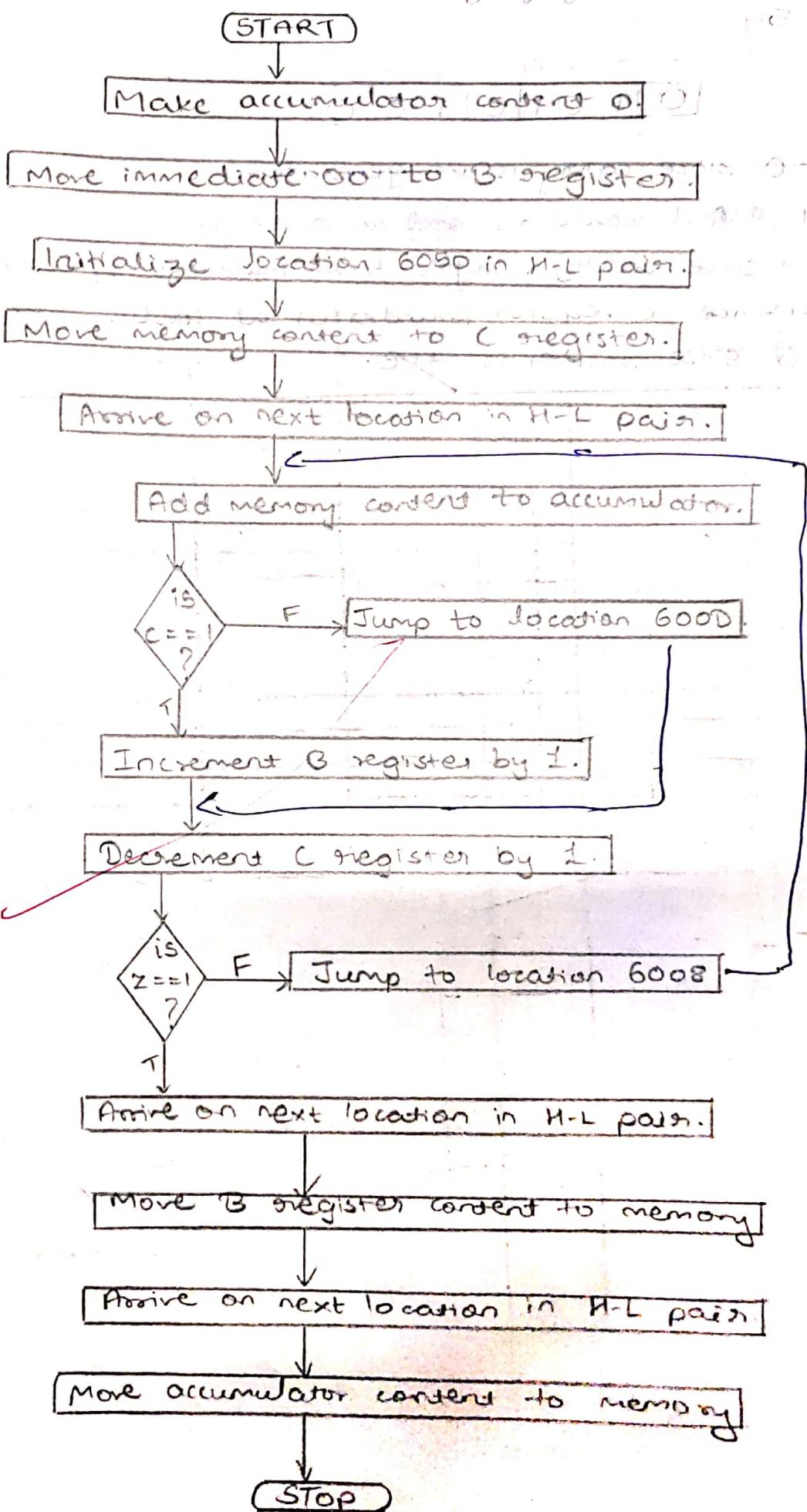
→ T

→ U



Flowchart:-

14.3



Implementation of flag register.

$$F = 54$$

S	Z	- AC -	P	=	Cy
0	1	0 1 0	1	0 0	

- 1) Cy=0 since carry is not generated.
- 2) P=1 since it contains even no of ones.
- 3) AC=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since C register (counter=0) at last.
- 5) S=0 since answer is +ve.

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Experiment Incomplete For
 Diagram _____
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 Graphs _____
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 Unit _____



Performed On 13/10/15

Signature

Submitted On 13/10/15
 Experiment Complete

Incharge Dny 13/10/15

Name Vrushil Joshi

Class XII A Stream Roll No. 12032 Batch Tuesday Pair No. -

Expt. No. _____ Title Disassembly of a program.

Aim: A program is available on microcomputer from the location 6000 to 600E. Copy the contents on paper using given data block. Trace the program & write the purpose / conclusion for which the program is designed.

Program steps:-

```
MVI C 05
LXI H 6050
MOV A M C
CMA
INR A
MOV M A
INX H
DCRC
JNZ 6005
RST-1
```

Given Program:-

location	Content:
6000	0E
6001	05
6002	21
6003	50
6004	60
6005	7E
6006	2F
6007	3C
6008	77
6009	23
600A	0D
600B	C2
600C	05
600D	60
600E	CF

location	Data byte
6050	01
6051	02
6052	03
6053	04
6054	05

Program Table:-

Memory Location	Opcode	Label	Mnemonics	Operand	Comments
6000	0E		MVI C	05	Move immediate 05 to C register.
6001	05				
6002	21		LXI H	6050	Initialize location 6050 for H-L pair.
6003	50				
6004	60				
6005	7E	X1	MOV A M		Move memory to accumulator.
6006	2F		CMA		Complement acc.
6007	3C		INR A		Increment acc by 1.
6008	77		MOV MA	6051	Move Accumulator content to memory.
6009	23		INX H		Move on next location in H-L pair.
600A	0D		DCRC		Decrement C register by 1.
600B	C2		JNZ X1	6005	Jump if zero not set.
600C	05				
600D	60				
600E	CF		RST-1		STOP.

Result:-

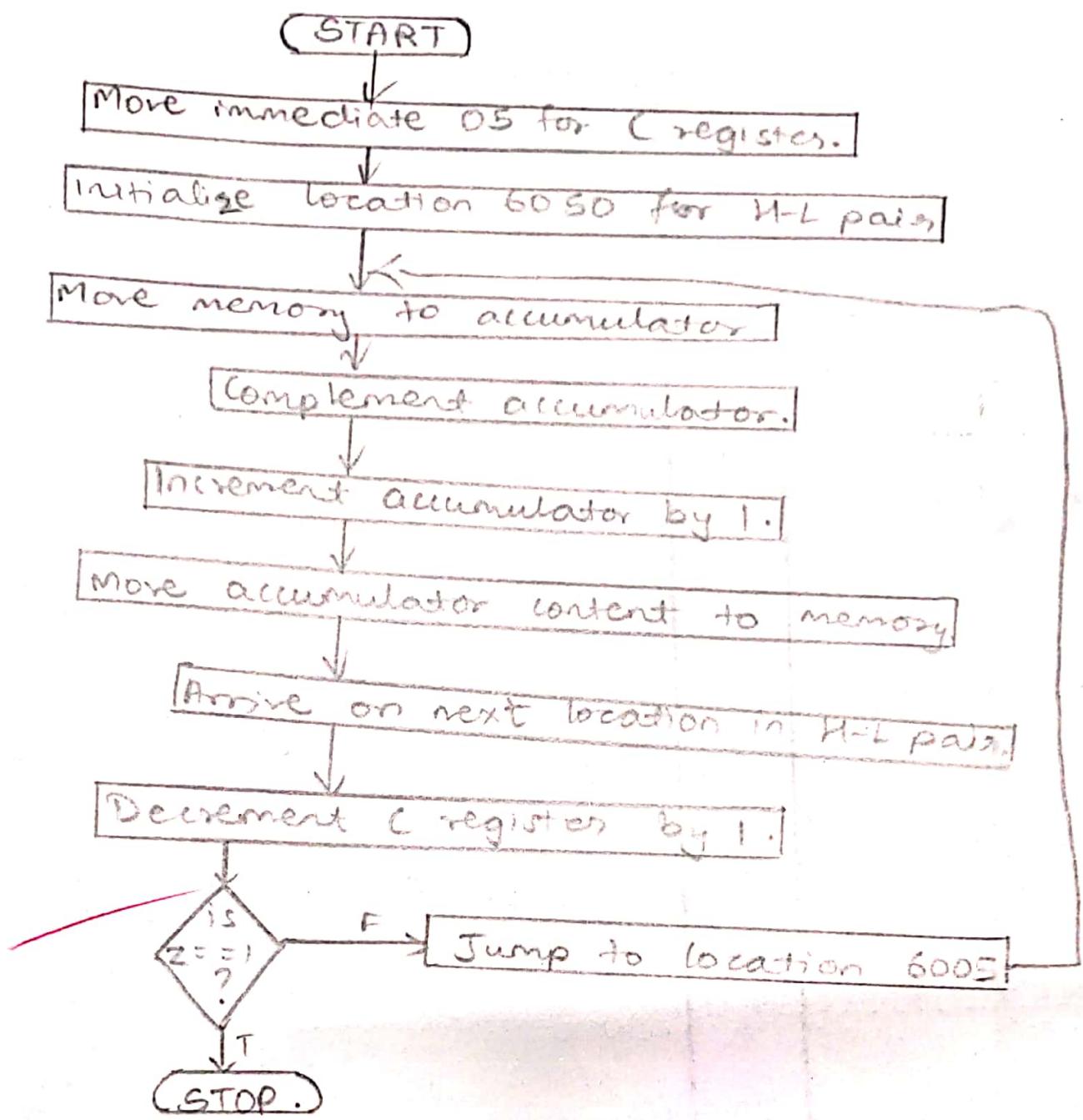
Mem loc	O/P
6050	FF
6051	FE
6052	FD
6053	FC
6054	FB
A	FB
C	00
H	60
L	55
F	5h

Conclusion:-

The program stored in between 6000 & 600E is to make 2's complement of 5 data bytes available from location 6050 & to store the answers on same locations.

Flowchart:-

6.3.



Implementation of flag registers.

- 1) $F = 54$ $S \ z - A_c - P - C_y$
- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|
- 1) $C_y = 0$ since carry is not generated.
2) $P = 1$ since it contains even no. of ones.
3) ~~$A_c = 1$ since carry is shifted from lower to upper nibble.~~
4) $z = 1$ since C register counter = 0 at last.
5) $S = 0$ since answer is true.

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Experiment Incomplete For

Diagram _____

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Unit _____



Performed On 4/11/15

Signature

Submitted On 4/11/15

Experiment Complete

6

Incharge

4/11/15

Name Vrushil Soni

Class XII

Roll No. 12032

Batch Tuesday

Pair No. -

Expt. No. 1 Title Display a message

Aim:- Design a program that displays a message

?HELP & also it should be blinking

① CLEAR: 04FA ② DISPLAY: 2078 ③ DELAY: 4050

Program Steps:-

```
LXISP 20FF
CALL 04FA
CALL 4050
MVI A 48
MVI A 45
CALL 2078
MVI A 4C
CALL 2078
MVI A 50
CALL 2078
CALL 4050
JMP
```

↑
Main
program

```
MVI B A050
MVI C A140
MVI D F211
DCR D
JNZ
DCRC
JNZ
DCR B
JNZ
RET
```

↑
Subroutine
Program.

①

Program Table:- Main Prog

(2)

Memory location	Oprcode	Label	Mnemonics	Operand	Comments.
4000	31		LXI SP,	20FF	
4001	FF				↑ Translation from hex
4002	20				→ 0000000000000000
4003	Cd	X1	CALL	405004FA	
4004	EA				
4005	04				
4006	Cd		CALL	4050	
4007	50				
4008	40				
4009	3E		MVI A	48	
400A	48				
400B	Cd		CALL	2078	→ 00293 - 00293
400C	78				
400D	20				→ 00293 - 00293
400E	3E		MVI A	45	
400F	45				
4010	Cd		CALL	2078	→ 00293 - 00293
4011	78				
4012	20				
4013	3E		MVI A	4C	
4014	4C				
4015	Cd		CALL	2078	→ 00293 - 00293
4016	78				
4017	20				
4018	3E		MVI A	50	
4019	50				
401A	Cd		CALL	2078	
401B	78				
401C	20				
401D	Cd		CALL	4050	
401E	50				
401F	40				
4020	C3		JMP X1	4003	
4021	03				
4022	40				

Program Table:- Subroutine program.

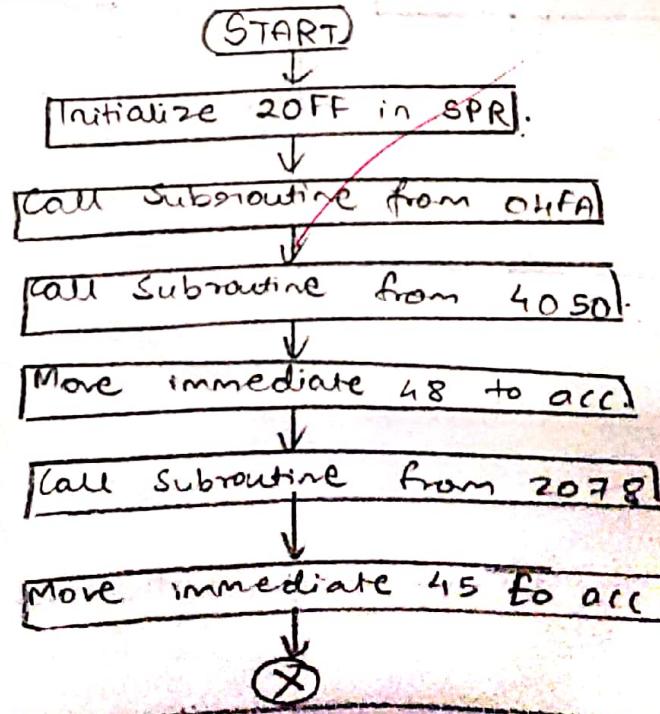
(3)

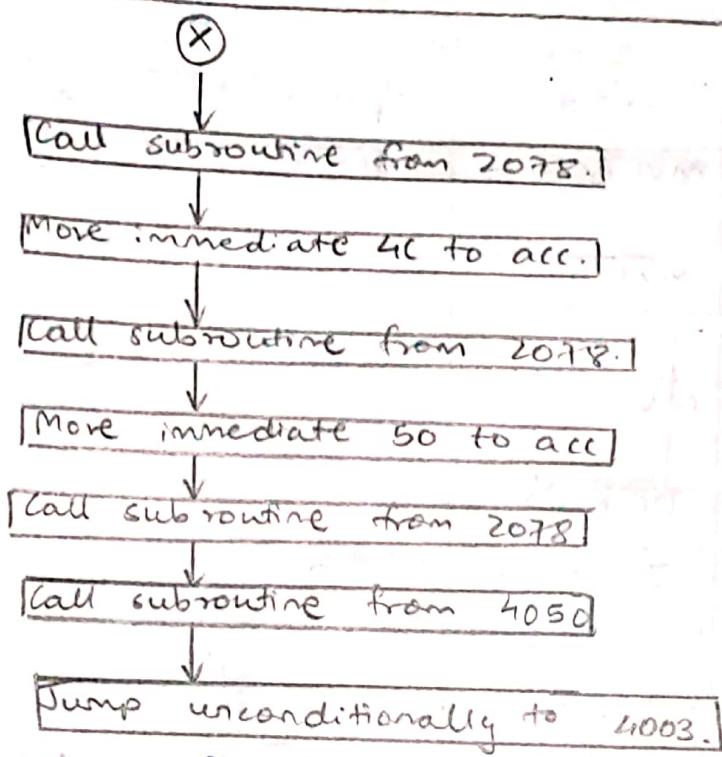
Memory Location	Opcode	Label	Mnemonics	Operands	Comments
4050	06		MVI B	B0	
4051	50				
4052	0E	X3	MVI C	40	
4053	40				
4054	16	X2	MVI D	11	
4055	11				
4056	15	X1	DCR B		
4057	C2		JNZ X1, 405A		
4058	54				
4059	40				
405A	0d	*	DCR C		
405B	C2		JNZ X2, 405L		
405C	54				
405D	40				
405E	05		DCR B		
405F	C2		JNZ X3, 4052		
4060	52				
4061	40				
4062	C9		RET		

Result:-

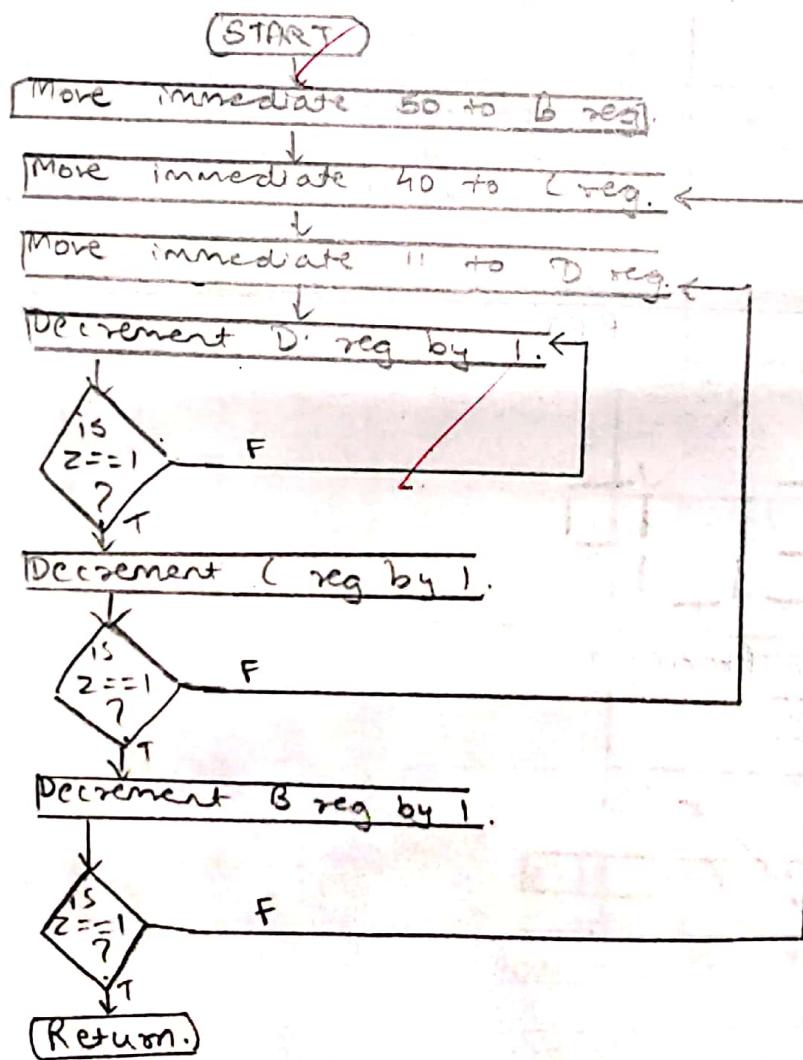
F I T I E L P

Flowchart:- Main Program.





Flow chart for Sub-routines



Inclusion -

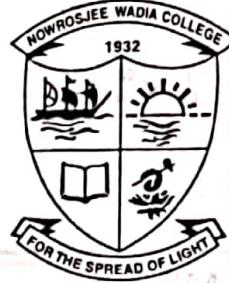
This message is displayed in flashing mode with time interval of 2 sec.

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Signature



Submitted On 29/9/15

Experiment Complete

Incharge

Name Vrushil Soni

Class XII Roll No. 12032 Batch Tuesday Pair No. -

Expt. No. _____ Title Exchange of data bytes in between 2 blocks

Aim: To design a program for exchanging 5 data bytes in between 2 blocks starting at 6050 & 6060

~~Date~~ Program Steps:-

~~Data blocks:-~~

LXI H 6050

LXI D 6060.

MVI C 05

MOV A M

XCHG

MOV BM

MOV M A

XCHG

MOV M B

INX H

INX D

DCRC

JNZ

RST-1.

location	Data byte	location	Data byte
6050	A1	6060	01
6051	A2	6061	02
6052	A3	6062	03
6053	A4	6063	04
6054	A5	6064	05

FF FF 6050

FF FF 6060

FF FF 6050

Program Table

9.2

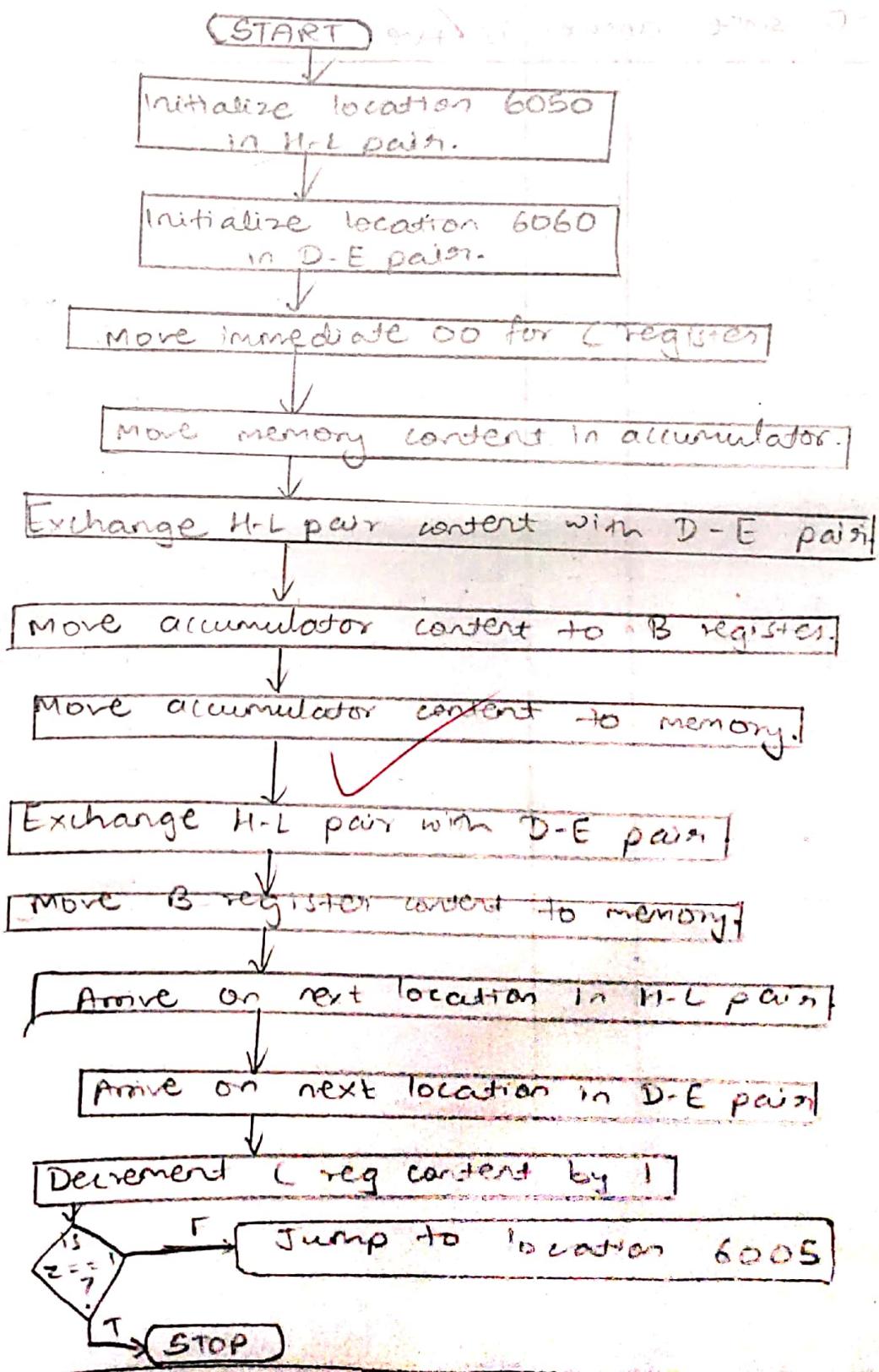
Memory Location	Opcode	Label	Mnemonics	Operand	Comments
6000	21		LXI H	6050	Initialize location 6050 in H-L pair.
6001	50				
6002	60				
6003	11		LXI D	6060	Initialize location 6060 in D-E pair.
6004	60				
6005	60				
6006	OE		MVI C	05	Move immediate 05 for C register.
6007	05				
6008	7E	X1	MOV A M		Move memory content in acc.
6009	EB		XCH G		Exchange H-L pair content with D-E pair.
600A	46		MOV B M		Move memory content to B register.
600B	77		MOV M A		Move accumulator content with to memory.
600C	EB		XCHG		Exchange H-L pair content with D-E pair.
600D	70		MOV M B		Move B register content to memory.
600E	23		INX H		Arrive on next location in H-L.
600F	13		INX D		Arrive on next location in D-E pair.
6010	0D		DCR C		Decrement C register content by 1.
6011	C2		JNZ X1	6005	Jump if zero not set.
6012	05				
6013	60				
6014	CF		RST-1		STOP.

Result:-

Location/Register	O/P.
6050	01
6051	02
6052	03
6053	04
6054	05
6060	A1
6061	A2
6062	A3
6063	A4
6064	A5

Location	O/P.
A	A5
B	05
C	00
H	60
L	55
D	60
E	65
F	54

Flowchart:-



Implementation of flag registers.

9.3

F = 54

$\therefore \begin{array}{|c|c|c|c|c|c|c|} \hline s & z & - & Ac & - & P & - \\ \hline 0 & 1 & | & 0 & | & 1 & 0 & 0 \\ \hline \end{array}$

- 1) cy is = 0, since carry is not generated.
- 2) P=1 since it contains ~~odd~~ even no of ones.
- 3) Ac=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since (register counter=0) at last.
- 5) S=0 since answer is +ve.

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Experiment Incomplete For
Diagram _____

Obs. Table _____

Calculations _____

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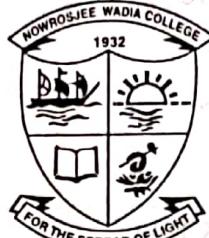
Results _____

Unit _____

Name Navishil Soni.

Class XII Roll No. 12037 Batch _____ Pair No. _____

Expt. No. _____ Title Ocurrence of data byte.



Performed On 13/10/15.

Signature

Submitted On 13/10/15.

Experiment Complete

Incharge

B
2015

Aim:- Design a program to find occurrence of data byte A1 in datablock of 5 location starting at 6050 and to store result at 6055.

Program Steps:-

MVIC 05

MVIA A1

MVIB 00

LXIH 6050

CMP SM

JNZ

INRB

INX H

DCR C

JNZ

MOV M B

RST-1.

Data block :-

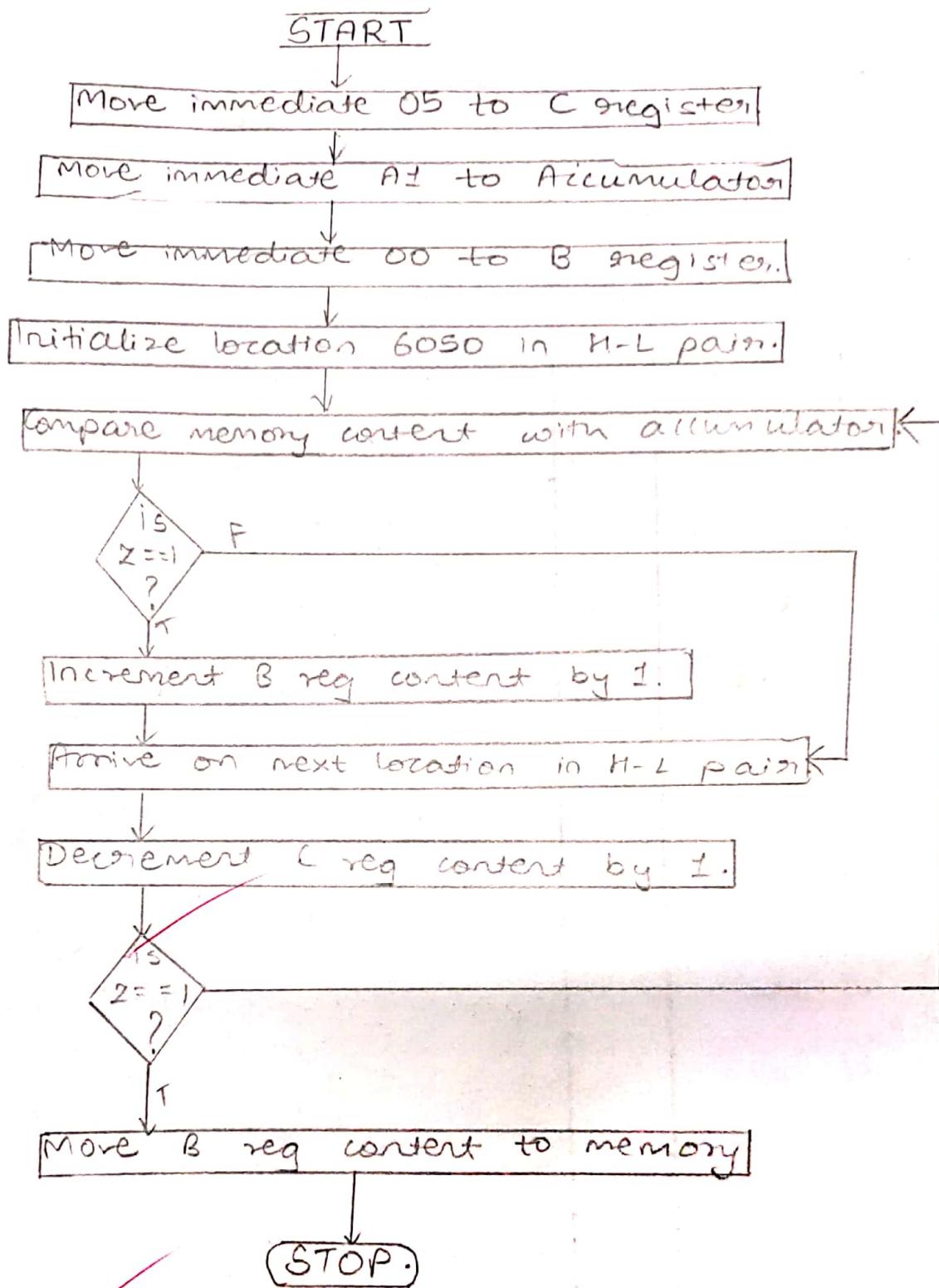
location	data byte
6050	01
6051	A1
6052	02
6053	A1
6054	A1

Program Table:-

Memory location	Opcode	Label	Mnemonics	Operand	Comments
6000	OE		MVI C	05	Move immediate 05 to C reg.
6001	05				
6002	3E		MVI A	A1	Move immediate A1 to A reg.
6003	A1				
6004	06		MVI B	00	Move immediate 00 to B reg.
6005	00				
6006	21		LXI H	6050	Initialize location 6050 in H-L pair.
6007	50				
6008	60				
6009	BE	X2	CMP M		Compare memory content with acc.
600A	C2		JNZ X1	600E	Jump if zero not set.
600B	OE				
600C	60				
600D	04		INR B		Increment B reg content by 1.
600E	23	X1	INX H		Arrive on next location in H-L pair.
600F	0D		DCR C		Decrement C reg by 1.
6010	C2		JNZ X2	6009	Jump if zero not set.
6011	09				
6012	60				
6013	70		MOV M B		Move B reg content to memory.
6014	CF		RST-1		Stop

Result:-

Location	Result
6055	03
A	A1
B	03
C	00
H	60
L	55
F	54



Implementation of flag register.

$$F = 54 \quad \begin{array}{c} s \ z - Ac - P - Cy \\ \hline 01101101110100 \end{array}$$

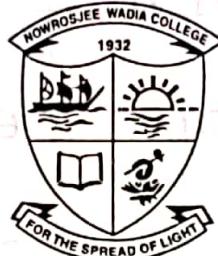
- 1) $Cy = 0$ since carry is not generated.
- 2) $P = 1$ since it contains even no. of 1's.
- 3) $Ac = 1$ since carry is shifted from lower to upper nibble.
- 4) $Z = 1$ since register (counter = 0) at last.
- 5) $S = 0$ since answer is +ve.

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Experiment Incomplete For
 Diagram _____
 Obs. Table _____
 Calculations _____
 Graphs _____
 Results _____
 Unit _____

Performed On 20/10/15

Signature



Submitted On 20/10/15

Experiment Complete

Incharge

Name Vrushil Scan

Class XII Roll No. 12032 Batch Tuesday. Pair No. 60 - Rima

Expt. No. _____ Title Search for a databyte.

Aim:- Design a program to find the 1st occurrence of databyte.
 But in a block of location from 6050 to 6054. If search is successful, H-L pair should contain corresponding address otherwise it should contain AOBON.

Program Steps:

Data block:-

Memory location.	Databyte.
6050	02
6051	03
6052	BC
6053	A1
6054	BC

MVIC 05

MVI A BC

LXI H 6050

CMP M 6052

JZ

INX H

DCR C

JNZ

LXI H AOBON

RST 1.

Program Table:-

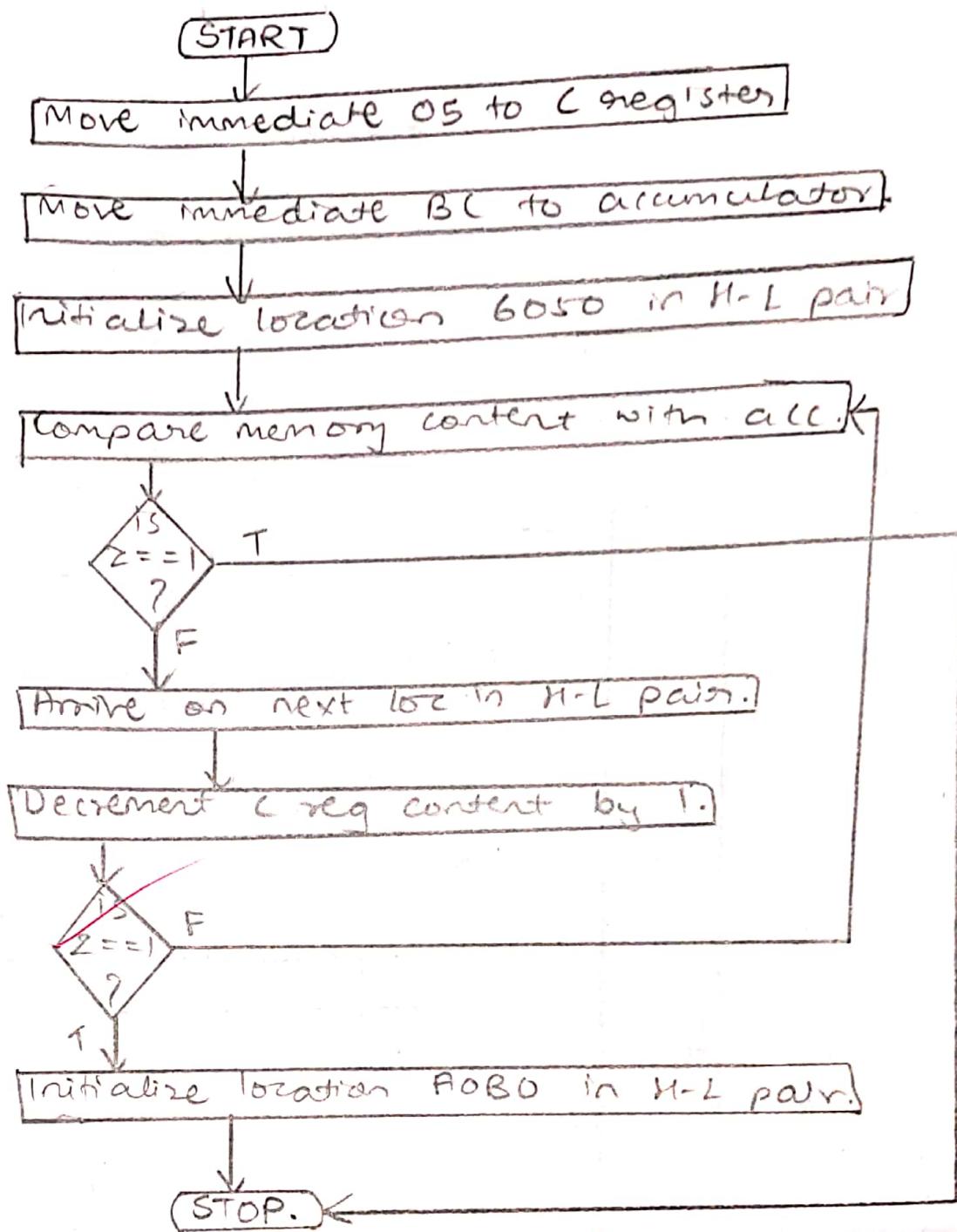
2.2

Memoay Location	Opcode	Label	Mnemonics	Operand	Comments.
6000	OE		MVI C	05	Move immediate 05 to C register.
6001	05				
6002	3E		MVI A	BC	Move immediate BC to Accumulator.
6003	BC				
6004	21		LXI H	6050	Initialize location 6050 in H-L pair.
6005	50				
6006	60				
6007	BE	X ₂	CMP M		Compare memory content with acc.
6008	CA		JZ X ₁	6013	Jump to 6013 if z = 1.
6009	13				
600A	60				
600B	23		DEINX H		Move to next loc in H-L pair.
600C	0D		DCR C		Decrement C reg content by 1.
600D	C2		JNZ X ₂	6007	Jump to 6007 if z not set.
600E	07				
600F	60				
6010	21		LXI H	A0B0	Initialize location A0B0 in H-L pair.
6011	B0				
6012	A0				
6013	CF	X ₁	RST-1		STOP.

Result:-

Register	Output
A	BC
C	03
H	60
L	52
F	54

Flowchart:-



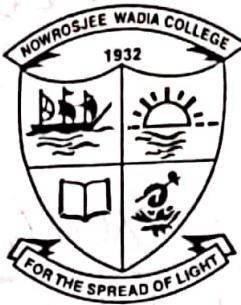
Implementation of flag register.

$$F = 54 \quad : \quad \begin{matrix} S & Z & - & A_c & - & P & - & C_y \\ \hline 0 & 1 & 0 & 1 & 0 & 1 & 0 & 0 \end{matrix}$$

- 1) $C_y = 0$ since carry is not generated.
- 2) $P = 1$ since it contains even no. of 1's.
- 3) $A_c = 1$ since carry is shifted from lower to upper nibble.
- 4) $Z = 1$ since C register (counter=0) at last.
- 5) $S = 0$ since answer is +ve.

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Experiment Incomplete For
 Diagram _____
 Obs. Table _____
 Calculations _____
 Graphs _____
 Results _____
 Unit _____



Performed On 8/9/15 Signature _____
 Submitted On 8/9/15
 Experiment Complete
 Incharge KB11

Name Vrushnil Soni Class XII G Roll No. 12037 Batch Tuesday Pair No. -

Expt. No. 3 Title Two byte addition

Aim : To design a program for 2 byte addition of 2 byte data A1 & A2 which is available on consecutive locations with lower byte A2 starting at 6050 with another 2 byte data starting at 6051 with another 2 byte data which is available at 6052 with consecutive locations starting at 6053 & to store 2 byte result starting with lower byte on consecutive locations 6054.

Program Steps.

LHLD 6050
 XCHG

~~LHLD 6052~~

DAD D

SHLD 6054

RST - 1.

Data block.

location	Data byte.
6050	A2
6051	A1
6052	O2
6053	O1

Program Table:-

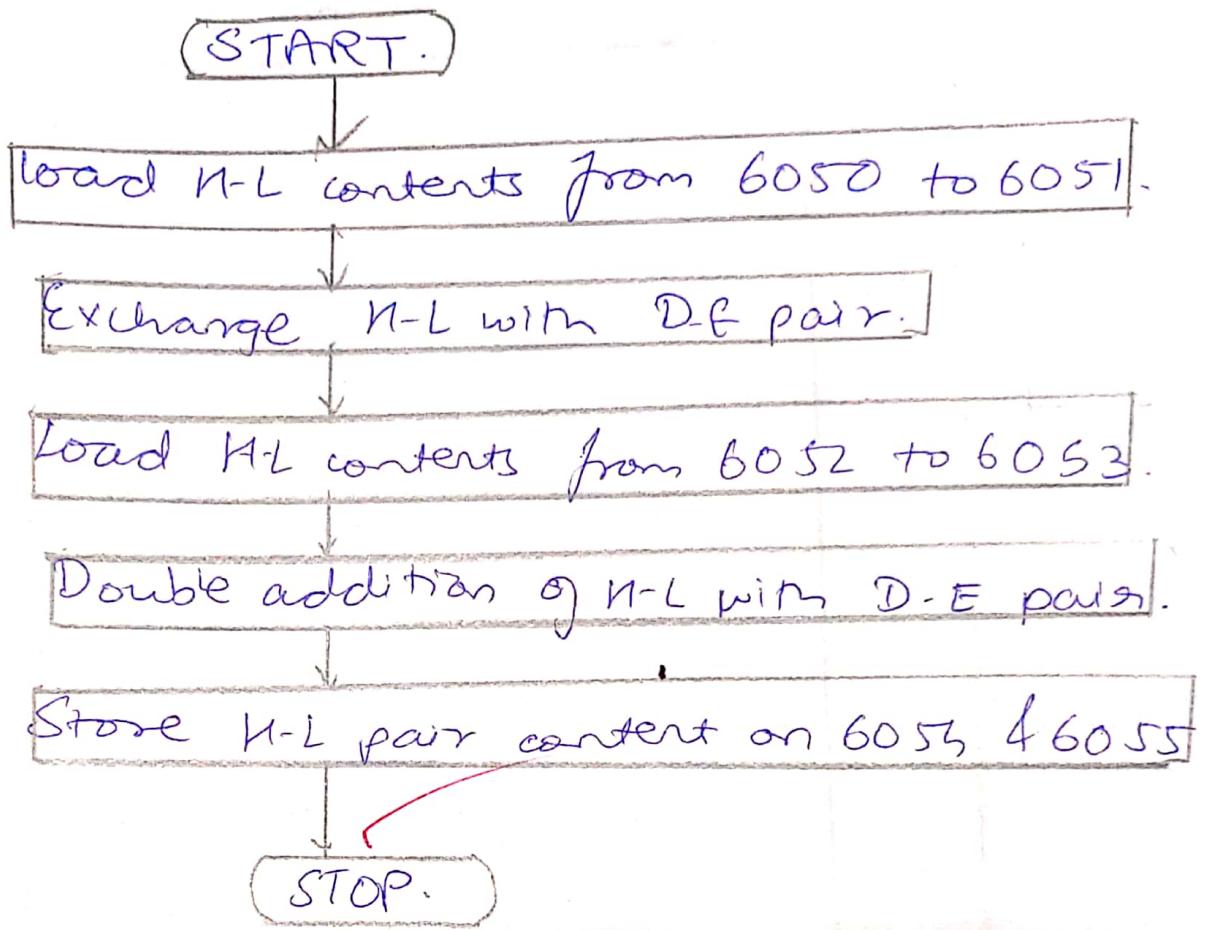
Memory location	Opcode	Label	Mnemonics	Operands	Comments
6000	2A		LHLD	6050	load H-L pair with 2 bytes from consecutive locations
6001	50				
6002	60				
6003	E8		XCHG		Exchange data with D-E.
6004	2A		LHLD	6052	Again load H-L pair with data bytes of 2 consecutive memory locations
6005	82				
6006	60				
6007	19		DADD		Add H-L & DE pair.
6008	22		SHLD	6054	Stores H-L pair contents on D
6009	54				6054 & 6055.
600A	60				
600B	C0		RST-1		STOP.

Result:-

location/register	Output
6054	A4
6055	A2
H	5A
L	1A
D	A3
E	A1
	A2

Flowchart.

11.3



NOWROSJEE WADIA COLLEGE, PUNE

Experiment Incomplete For

Diagram _____

Obs. Table _____

Calculations _____

Graphs _____

Results _____

Unit _____



Performed On 15/9/15

Signature

15/9/15

Submitted On 15/9/15

Experiment Complete

Incharge

M 15/9/15

Name Vrushali Joshi

Class XII

Roll No. 12032

Batch Tuesday

Pair No. -

Expt. No. _____ Title 4 Byte addition.

Aim: Design a program for 4 byte addition of 4 byte data (A_1, A_2, A_3, A_4) with lower byte A_1 available on consecutive locations starting @ 6050 with another 4 byte data $01, 02, 03, 04$ with lower byte 04 available on consecutive locations starting at 6054 & store 4 byte result (A_2, A_3, A_6, A_8) on consecutive locations starting at 6058.

Program Steps:-

LHLD 6050	H=A3	L=A5
XCHG		
LHLD 6054	D=A3	E=A4
+ H=03	L=04	
	<u>H=A6 ; L=A8</u>	
SHLD 6058		
LHLD 6052	H=A1	L=A2
XCHG		
LHLD 6056	D=A1	E=A2
+ H=01	L=02	
	<u>H=A2, L=A4</u>	
SHLD 605A		
RST-1.		

Data Block:-

Location	Data bytes.
6050	A, A3
6051	0, A3
6052	A2
6053	A1
6054	64
6055	0, 03
6056	02
6057	01

Program Table:-

16-2

Memory location	Opcode	Label	Mnemonics	Operand	Comment.
6000	2A		LHLD	6050	load H-L pair
6001	50				
6002	60				
6003	EB		XCHG		
6004	2A		LHLD	6054	load contents from 6054 & 6055 in H-L
6005	54				
6006	60				
6007	19		DAD D		Double addn of H-L with DE?
6008	22		SHLD	6058	Store H-L pair contents on 6058 & 6059
6009	58				
600A	60				
600B	2A		LHLD	6052	load H-L pair on 6052 & 6053
600C	52				
600D	50				
600E	EB		XCHG		Exchange H-L with D-E
600F	2A		LHLD	6056	Load H-L pair
6010	56				on 6056 & 6057
6011	60				
6012	19		DAD D		Double addn of H-L & DE pair
6013	22		SHLD	605A	Store H-L pair content on 605A & 605B
6014	5A				
6015	60				
6016	CF		RST-1		STOP

Data block Result:

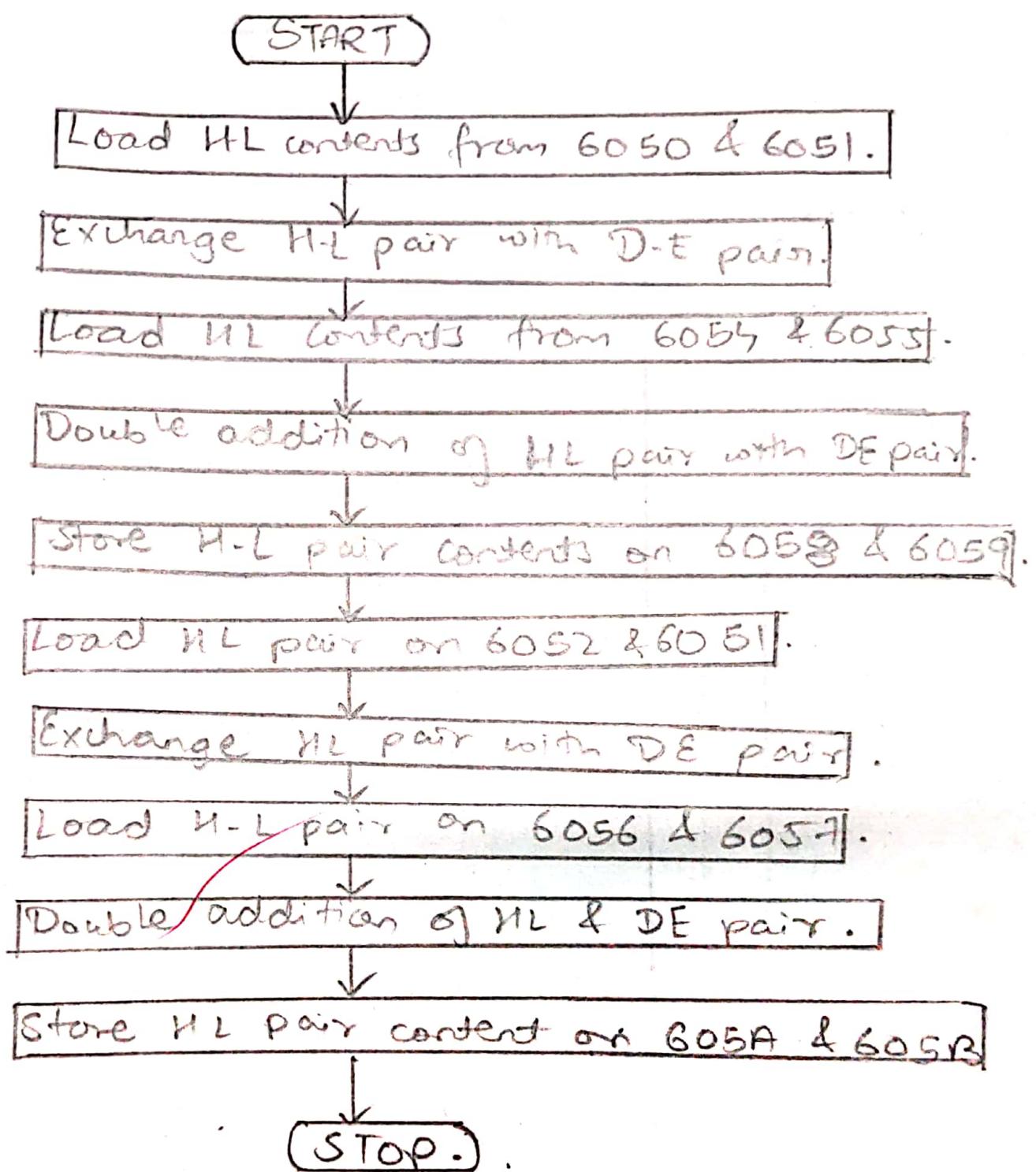
Loc.	Data output
6058	A8
6059	A6
605A	A4
605B	A2
H	A2
L	A3
D	A1
E	A2

A1	A2	A3	A4
01	02	03	04
A2		A3	A4

dead code
dead code
dead code

Flowchart:-

16-3



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Experiment Incomplete For

Diagram _____

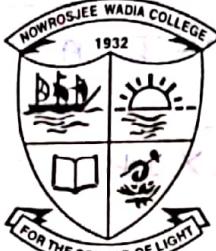
Obs. Table _____

Calculations _____

Graphs _____

Results _____

Unit _____



Performed On 20/10/15

Signature

Submitted On 20/10/15

Experiment Complete

Incharge

Name Vrushali Soni

Class XII

Roll No. 12032

Batch Tuesday

Pair No. -

Expt. No. _____

Title Largest & Smallest databyte.

Aim: To find a largest & smallest databyte from a given data block & to store the result on 6055 & 6056.

Program Steps:-

MVIC 05

MVI A 00

LXI H 6050

CMP M

JNC

MOV A M

INX H

DCR C

JNZ

MOV M A

MVIC 05

LXI H 6050

MVIA FF

CMP M

JC

MOV A M

INX H

DCRC

JNZ

INX H

MON M A

RST-1

Data block :-

Location / databyte.	
6050	02
6051	03
6052	01
6053	05
6054	04

00	FF	00	FF
01	00	01	00
02	00	02	00
03	00	03	00
04	00	04	00
05	00	05	00
06	00	06	00
07	00	07	00
08	00	08	00
09	00	09	00
0A	00	0A	00
0B	00	0B	00
0C	00	0C	00
0D	00	0D	00
0E	00	0E	00
0F	00	0F	00

Program Table:-

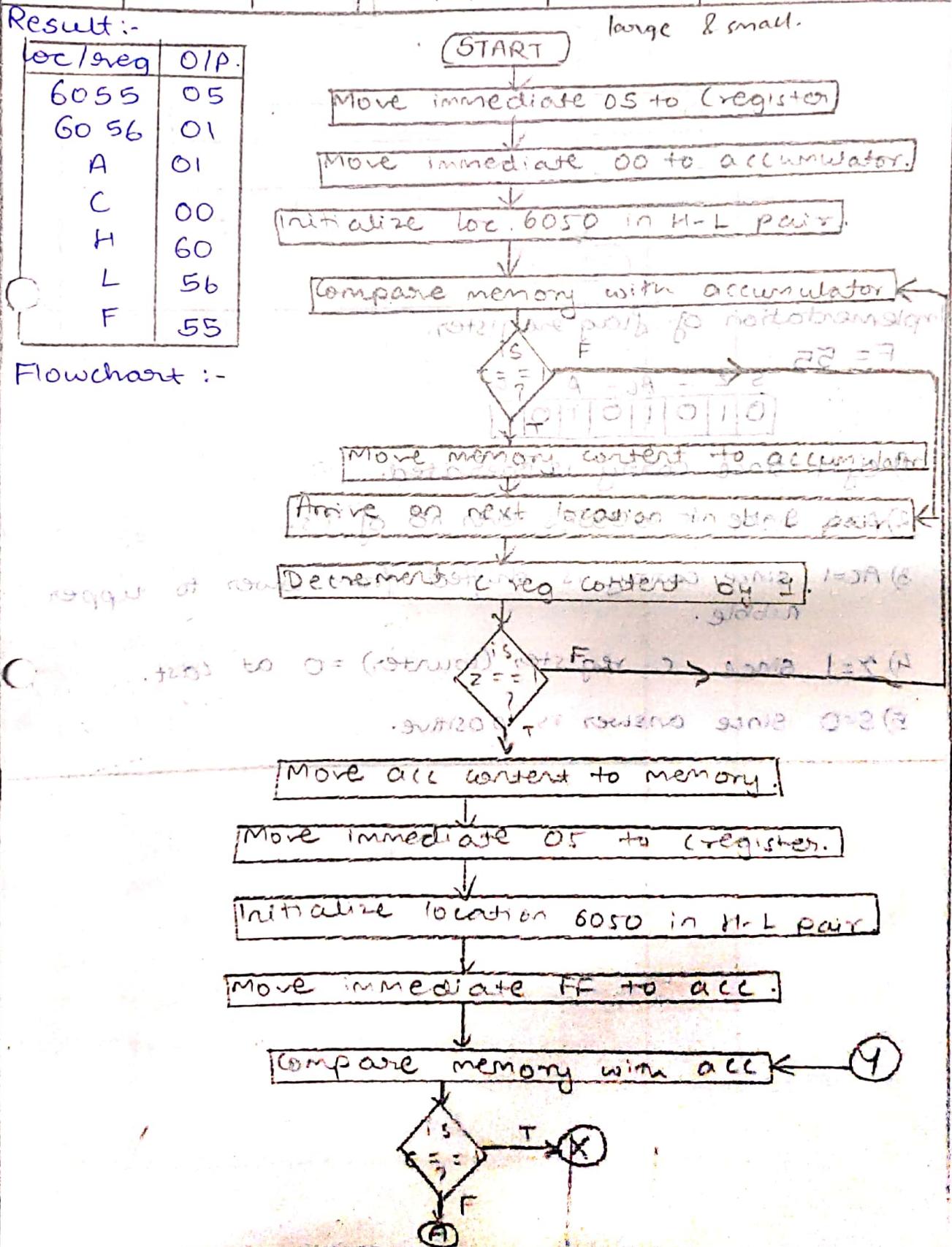
Memory location	Opcode	Label	Mnemonics	Operand	Comments
6000	OE		MVI C	05	Move immediate 05 to C reg.
6001	05				
6002	3E		MVI A	00	Move immediate 00 to acc.
6003	00				
6004	21		LXI H	6050	Initialize loc. load 6050 in H-L pair
6005	50				
6006	60				
6007	BE	X2	CMP M		Compare memory with acc.
6008	D2		JNC X1	600C	Jump if carry not set.
6009	0C				
600A	60				
600B	7E		MOV AM		Move memory content to acc.
600C	23	X1	INX H		Arrive on next location in H-L.
600D	0D		DCR C		Decrement C reg content by 1.
600E	C2		JNZ X2	6007	Jump if zero not set.
600F	07				
6010	60				
6011	77		MOV M A		Move acc content to memory.
6012	OE		MVI C	05	Move immediate 05 to C reg.
6013	05				
6014	21		LXI H	6050	Initialize location 6050 in H-L pair
6015	50				
6016	60				
6017	3E		MVI A	FF	Move immediate FF to acc.
6018	FF				
6019	BE	X4	CMP M		Compare memory with acc.
601A	DA		JC X3	601E	Jump if carry is set.
601B	1E				
601C	60				
601D	7E		MOV AM		Move memory to acc.
601E	23	X3	INX H		Arrive on next location in H-L.
601F	0D		DCRC		Decrement C reg by 1.
6020	C2		JNZ X4	6019	Jump if zero not set.

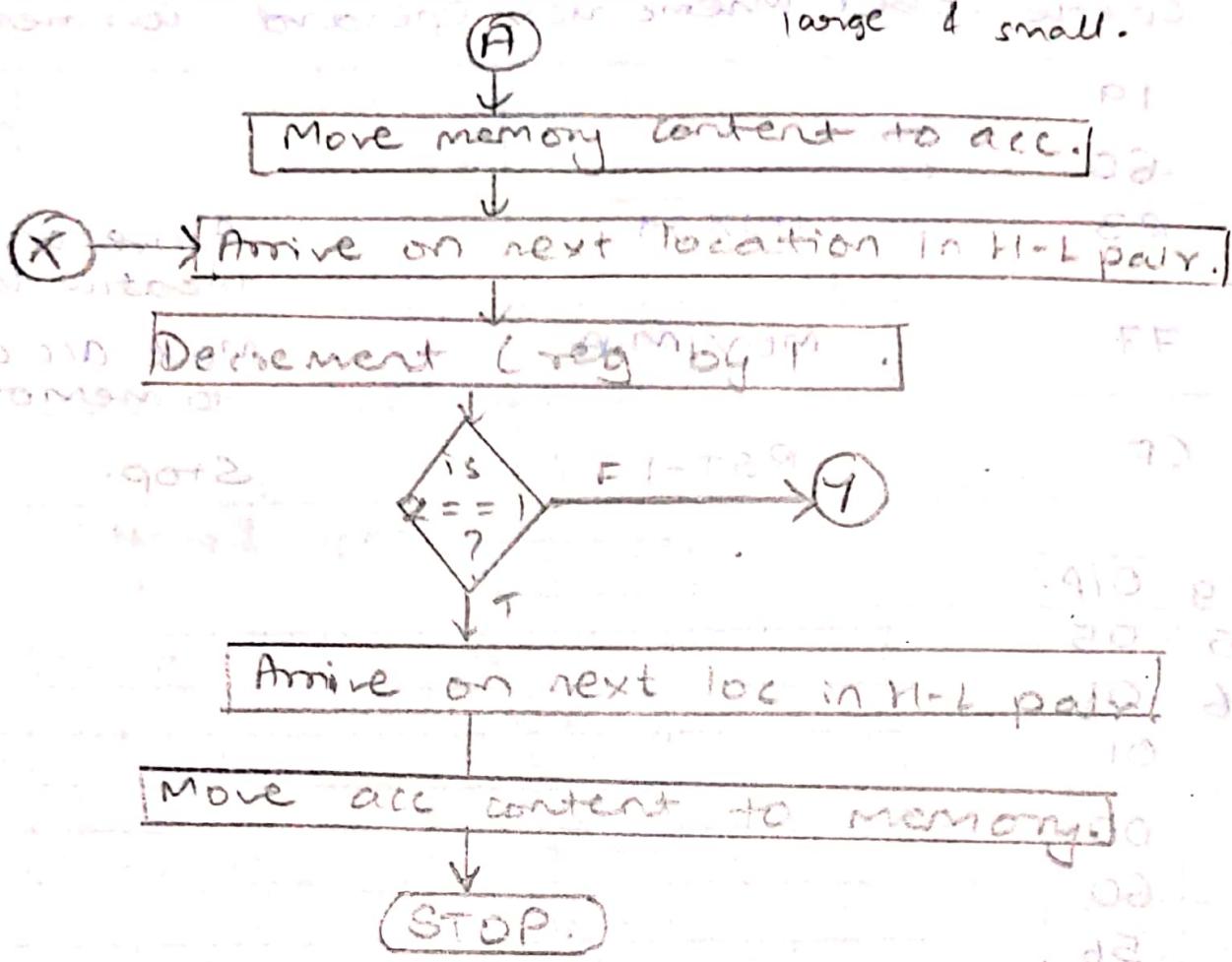
Memory location	Opcode	Label	Mnemonics	Operand	Comments
6021	19				
6022	60				
6023	23		INX H		Arrive on next location in H-L.
6024	77		MOV M A		Move acc content to memory.
6025	CF		RST-1		STOP.

Result :-

loc / reg	OIP
6055	05
60 56	01
A	01
C	00
H	60
L	56
F	55

Flowchart :-





Implementation of flag register.

$$F = 55$$

S	Z	-	AC	-	P	-	Cy
0	1	0	1	0	1	1	0

- 1) Cy=1 since carry is operated.
- 2) P=1 since it contains even no of 1's.
- 3) AC=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since c register (counter) = 0 at last.
- 5) S=0 since answer is positive.

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Experiment Incomplete For
 Diagram _____
 Obs. Table _____
 Calculations _____
 Graphs _____
 Results _____
 Unit _____



Performed On 20/10/15 Signature _____
 Submitted On 20/10/15
 Experiment Complete

Incharge

Name Vrushil Soni

Class XII Roll No. 12032 Batch _____ Pair No. —

Expt. No. _____ Title Odd & Even data bytes.

Aim: Design a program for counting odd & even data bytes in a block of locations from 6050 to 6054 & to store the result of odd & even data bytes at location 6055 & 6056 respectively.

Program Steps:- Data block.

MVID.00

MVI B 00

MVIC @5

LXH 6050

MOV A M

RRC

JC

INR B

JMP

INRD

INXH

DCRC

JNZ

MOV MD

INX H

MOV MB

RST-1.

loc	data byte
6050	01
6051	02
6052	03
6053	04
6054	05

Program Table:-

13.2

Memory location	Opcode	Label	Mnemonics	Operand	Comment
6000	16		MVI D	00	Move immediate 00 to D reg.
6001	00				
6002	06		MVI B	00	Move immediate 00 to B reg.
6003	00				
6004	0E		MVI C	05	Move immediate 05 to C reg.
6005	05				
6006	21		LXI H	6050	Initialize 6050 in H-L pair.
6007	50				
6008	60				
6009	7E	X ₃	MOV A M		Move memory content to Accumulator.
600A	0F		RRC		Rotate acc right without carry.
600B	DA		JC X ₁	6012	Jump to 6012 if carry is set.
600C	12				
600D	60				
600E	04		INR B		Increment B reg content by 1.
600F	C3		JMP X ₂	6013	Jump unconditionally at 6013.
6010	13				
6011	60				
6012	14	X ₁	INR D		Increment D reg content by 1.
6013	23	X ₂	INX H		Arrive on next location in H-L pair.
6014	0D		DCR C		Decrement C reg content by 1.
6015	C2		JNZ X ₃	6009	Jump to 6009 if carry not set.
6016	09				
6017	60				
6018	72		MOV M D		Move D reg content to memory.
6019	23		INX H		Arrive on next location in H-L pair.
601A	70		MOV M B		Move B reg content to memory.
601B	CF		RST-1		Stop.

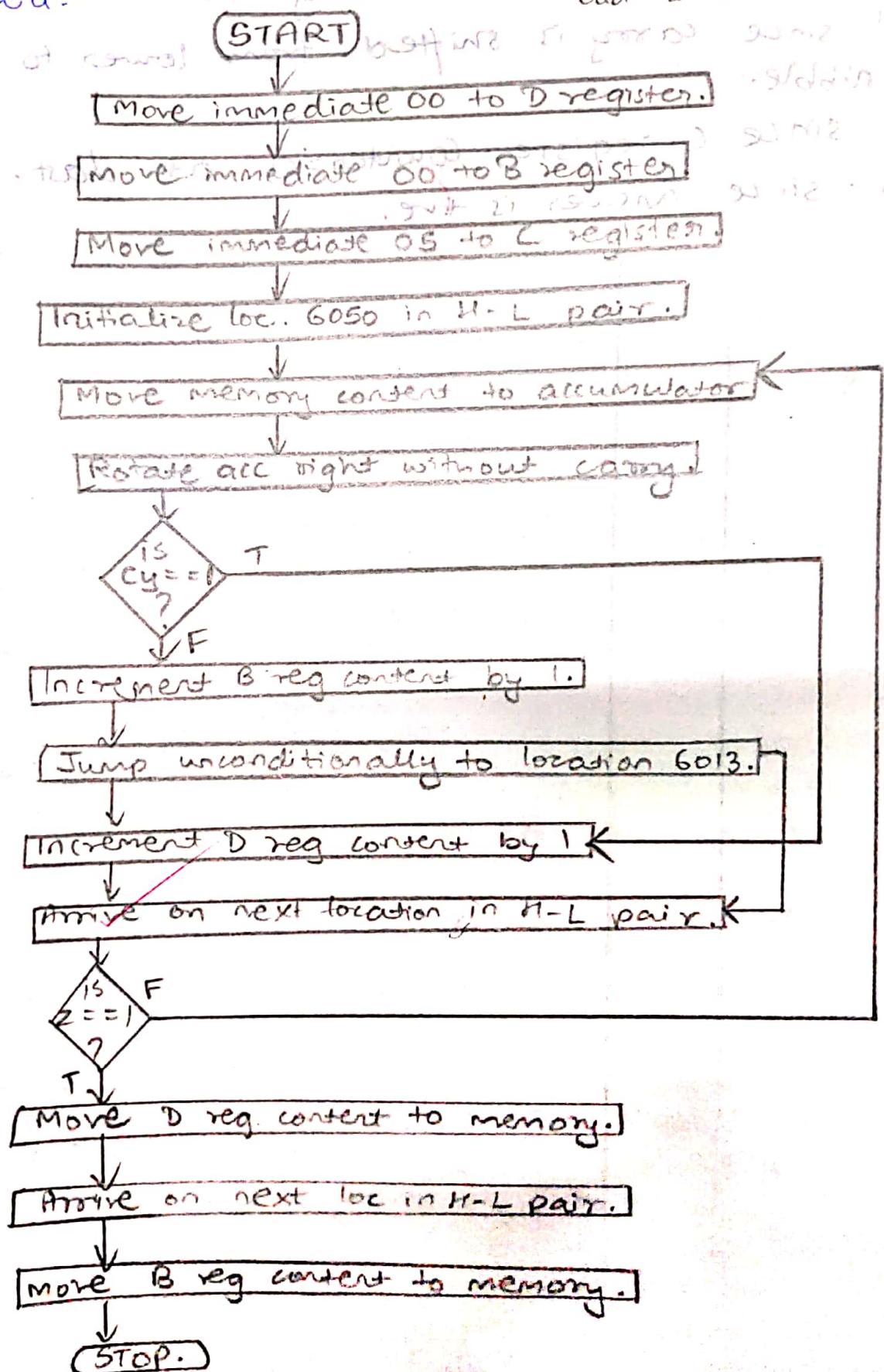
Result:-

loc reg	OIP.
6055	03
6056	02
A	82
B	02
C	00

loc reg	OIP.
D	03
H	60
L	56
F	55

13.3

Flowchart:-



Implementation of flag register.

13-5

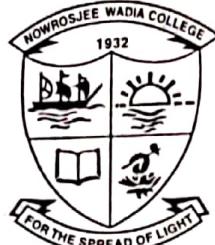
F=55

s	z	-	Ac	-	P	-	Cy
0	1	1	0	1	1	0	1

- 1) Cy=1 since carry is operated.
- 2) P=1 since it contains even no of 1's.
- 3) Ac=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since C register Counter=0 at last.
- 5) S=0 since answer is true.

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Experiment Incomplete For
 Diagram _____
 Obs. Table _____
 Calculations _____
 Graphs _____
 Results _____
 Unit _____



Performed On 27/10/15

Signature

Submitted On 27/10/15

Experiment Complete

Incharge

*W
MT*

Name Vrushil Soni

Class XII

Roll No. 12032

Batch Tuesday

Pair No. _____

Expt. No. _____ Title Separation of nibbles

Aim: To design a program to separate nibbles of a data byte available on loc 6050 to store lower & upper nibble on loc 6051 & 6052 resp. as well as to multiply these nibbles to store carry & product result on loc 6053 & 6054 resp.

Program Steps:

LXI H 6050

MOV A M

MOV B M

ANF OF

MOV C A

INX H

MOV M B

MOV A B

ANF FO

RRC

RRCL

RRC

RRCA and max last loc

MOV DA

INX H

MOV MA

XRA A

MVI E 00

ADD D

JNC

INRE

DCRC

JNZ

INX H

MOV ME

RST INXY

MOV MA

RET - 1

Data block.

loc	data byte
6050	A3

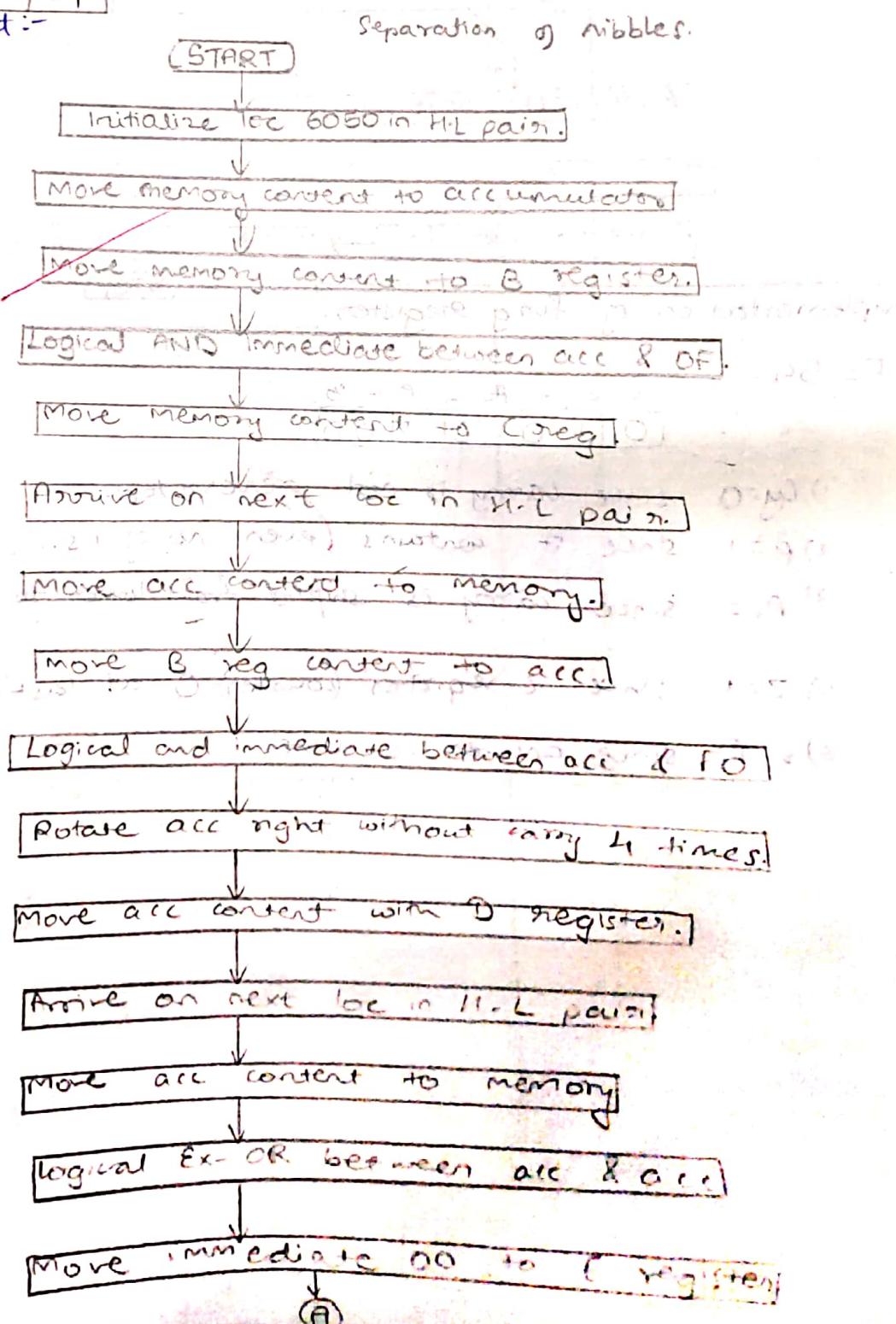
Program Table:-

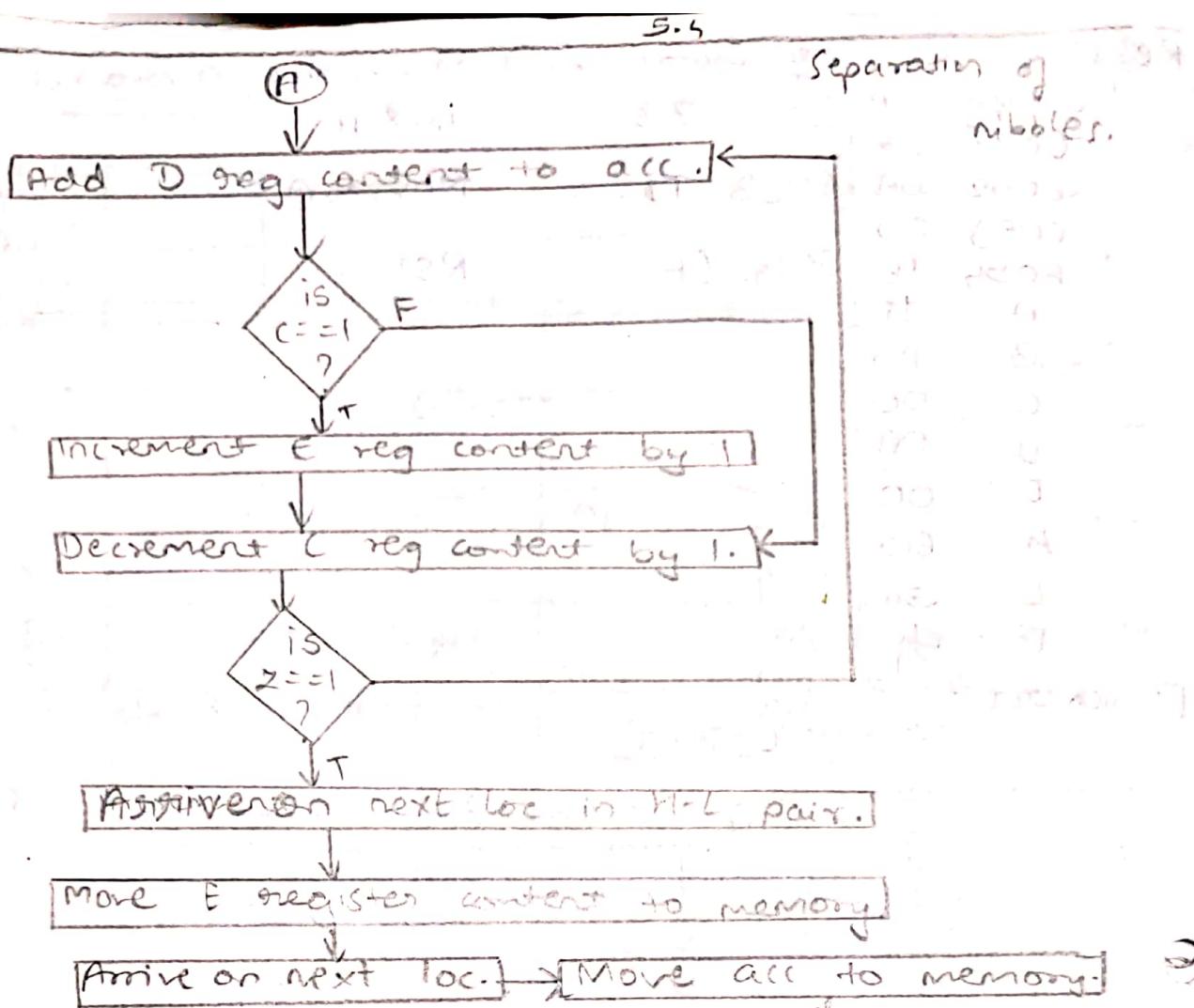
5.2

Mem loc	Opcode	label	Mnemonics	Operand	Comments.
6000	21		LXI H	6050	Initialize loc 6050 M N-L pair.
6001	50				
6002	60				
6003	7E		MOV A M		Move memory content to accumulator.
6004	46		MOV B M		Move memory content to B reg.
6005	E6		ANI F	OF	logical AND immediate between acc & OF.
6006	0F				
6007	4F		MOV C M		Move memory content to C reg.
6008	23		INX H		Arrive on next loc in incrementally N-L pair.
6009	77		MOV M A		Move acc content to memory.
600A	78		MOV A B		Move B reg content to acc.
600B	E6		ANI F	OF	logical and immediate between acc & FO.
600C	FO				
600D	0F		RRC		Rotate acc right without carry.
600E	0F		RRC		
600F	0F		RRC		
6010	0F		RRC		
6011	57		MOV D A		Move Acc content with D reg.
6012	23		INX H		Arrive on next loc in N-L pair.
6013	77		MOV M A		Move acc content to memory.
6014	AF		XRA A		logical EX-or between acc & acc.
6015	1E		MVI E	00	Move immediate 00. to E register.
6016	00				
6017	82	X2	ADD D		Add D reg content to acc.
6018	D2		JNC X1	601C	
6019	1C				Jump if carry not set.
601A	60				
601B	1C		INR E		Increment E reg by 1.
601C	0D	X1	DCR C		Decrement C reg by 1.
601D	C2		JNZ X2	6017	Jump if zero not set.
601E	17				
601F	60				
6020	23		INX H		Arrive on next loc.
6021	73		MOV M E		Move E reg content to memory.
	FF		RST		

Loc / reg	O/P	Mem loc.	Opcode	label.	Mnemonics	Operands	Comments
6051	03	6022	23		INX H.		Arrive on next loc.
6052	0A	6023	77		MOV MA		Move acc to memory.
6053	00						
6054	1E	6024	CF		RST - 1.		stop.
A	1E						
B	A3						
C	00						
D	0A						
E	00						
H	60						
L	54						
F	54						

Flowchart :-





Implementation of flag registers.

$$F = 54.$$

$$\therefore \begin{array}{c} s \ z - Ac - P - Cy \\ \hline 0 | 1 | 0 | 1 | 0 | 0 \end{array}$$

- 1) $Cy=0$ since carry is not generated.
- 2) $P=1$ since it contains even no of 1's.
- 3) $Ac=1$ since carry is shifted from lower to upper nibble.
- 4) $Z=1$ since C register (counter)=0 at last.
- 5) $s=0$ since answer is +ve.

NOWROSJEE WADIA COLLEGE, PUNE

Experiment Incomplete For

Diagram _____

Obs. Table _____

Calculations _____

Graphs _____

Results _____

Unit _____

Name Vrushil Soni.

Class XII

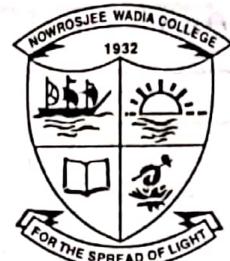
Roll No. 12032

Batch Tuesday.

Pair No. -

Expt. No. _____

Title Palindrome.



Performed On 27/10/15.

Signature

Submitted On 27/10/15.

Experiment Complete

b

Incharge

Aim: To design a program which gives palindrome result of the given data block.

Program steps:-

LXI H 6050

MOV A M

RRC

RRC

RRC

RRC

INX H

INX H

INX H

CMP M

JNZ

DCX H

MOV A M

RRC

RRC

RRC

RRC

DCX H

CMP M

JNZ

LXI H 6055

MVI M 00

JMP

LXI H 6054

MVI M FF

RST - 1

Data block

loc	data byte
6050	BA
6051	DC
6052	CD
6053	AB
6054	00 FF

Program Table:-

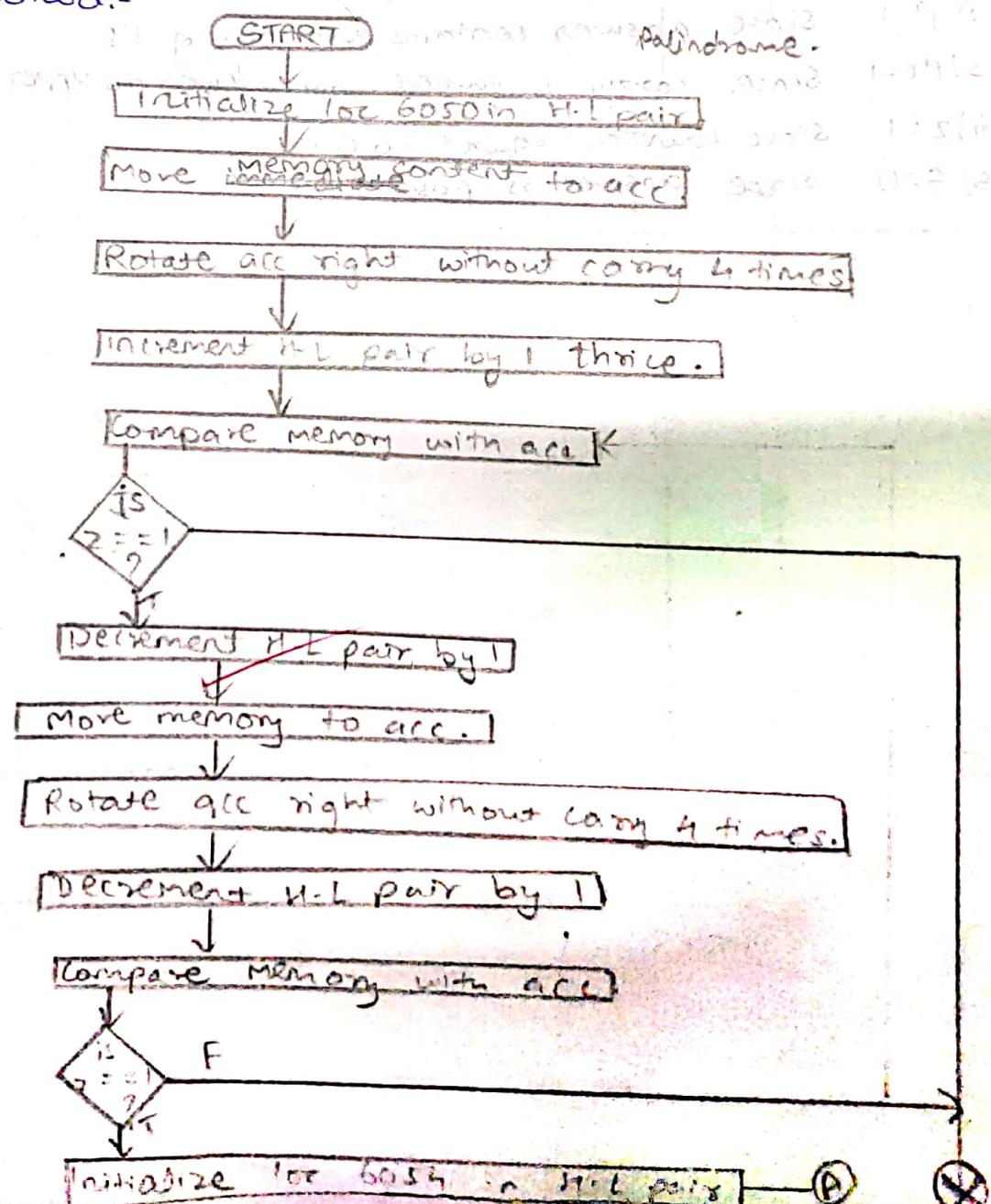
Mem Loc.	Opcode	Label	Mnemonics	Operand	Comments.
6000	21		LXI H	6050	Initialize loc-6050 in H-L pair.
6001	50				
6002	60				
6003	7E		MOV A M		Move memory content to accumulator.
6004	OF		RRC		Rotate accumulator right without carry.
6005	OF		RRC		
6006	OF		RRC		
6007	OF		RRC		
6008	23		INX H		
6009	23		INX H		Arrive on next location in H-L pair.
600A	23		INX H		
600B	BE		CMP M		Compare memory content with acc.
600C	C2		JNZ X1	6022	Jump if zero not set.
600D	22				
600E	60				
600F	2B		DCX H		Decrement H-L pair by 1.
6010	7E		MOV A M		Move memory content to accumulator.
6011	OF		RRC		Rotate accumulator right without carry.
6012	OF		RRC		
6013	OF		RRC		
6014	OF		RRC		
6015	2B		DCX H		Decrement H-L pair by 1.
6016	BE		CMP M		Compare memory content with acc.
6017	C2		JNZ X2	600B 6022	Jump if zero not set.
6018	22				
6019	60				
601A	21		LXI H	6054	Initialize 6054 in H-L pair.
601B	54				
601C	60				
601D	36		MVI M	00	Move immediate 00 to memory.
601E	00				
601F	C3		JMP X3	6027	Jump unconditionally to 6027.
6020	27				
6021	60				

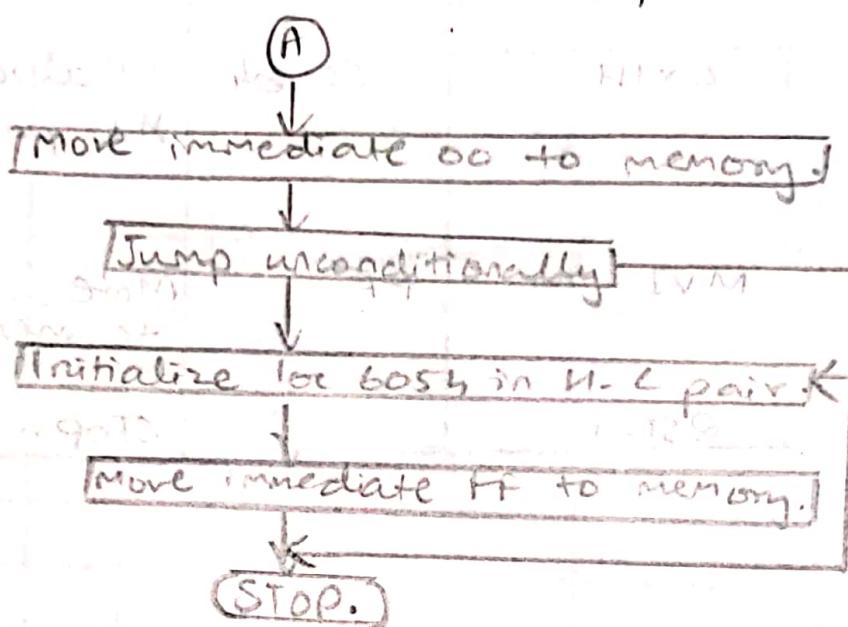
Mem loc.	Opcode	Label	Mnemonics	Operand	Comment.
6022	21	X1	LXI H	60504	Initialize loc 60504 in H-L pair.
6023	54	X2			
6024	60				
6025	36:		MVI M	FF	Move immediate FF to memory.
6026	FF				
6027	C0	X3	RST-1		STOP.

Result:-

seg/loc	O/P.
60504	00
A	DC
H	60
L	54
F	54

Flowchart:-





Implementation of flag register.

$$F = 54$$

$\therefore \begin{matrix} s & z & - & Ac & - & P & - & cy \\ \hline 0 & 1 & 1 & 0 & 1 & 1 & 0 & 0 \end{matrix}$

1) $cy=0$ since carry is not generated.

2) $P=1$ since answer contains even no. of 1's.

3) $Ac=1$ since carry is shifted from lower to upper nibble.

4) $z=1$ since counter equal to 0.

5) $s=0$ since answer is positive.

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Experiment Incomplete For

Diagram _____

Obs. Table _____

Calculations _____

Graphs _____

Results _____

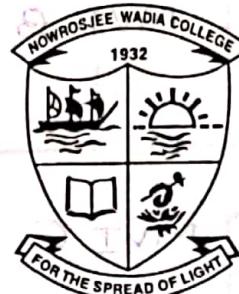
Unit _____

Name Vrushil Soni.

Class XII Roll No. 12082

Batch Tuesday Pair No. -

Expt. No. 72003 Title BCD Addition.



Performed On 29/9/15

Signature

Submitted On 29/9/15

Experiment Complete

Incharge

Aim: Design a program for addition of data bytes available from location 6050 to 6054 & to get the answer in decimal to store about its carry & addition decimal on location 6055, 6056 respectively.

Program Steps:-

XRA A

MVI B 00

MVI C 05

LXI H 6050

ADD M <

DAA

JNC

INR B

INX H

DCR C

JNZ

MOV M B

INX H

MOV M A

RST - I.

Data block:-

Location	Data byte.
6050	03
6051	04
6052	05
6053	06
6054	07

Program Table:-

8.2

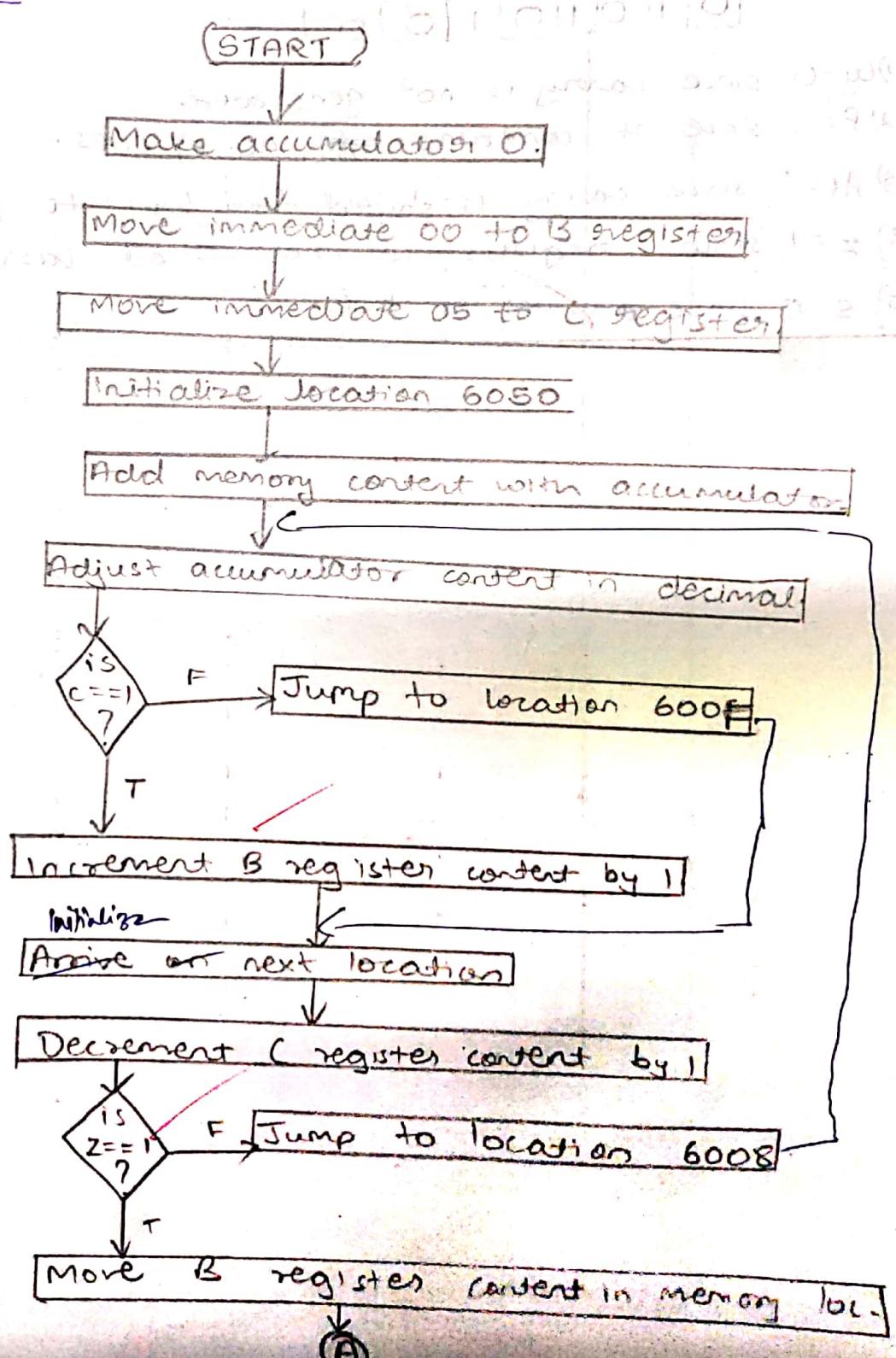
Memory Location.	Opcode	Label	Mnemonics	Operand	Comments
6000	AF		XRA A	00	Makes acc. content 0.
6001	06		MVI B	00	Move immediate 00 to B register.
6002	00		MVI C	05	Move immediate 05 for C register.
6003	OE				
6004	05				
6005	21		LXI H	6050	Initialize loc. 6050.
6006	50				
6007	60				
6008	86		ADD M		Add memory content with acc.
6009	27		DAA		Adjust acc content in decimal.
600A	D2		JNC X1	600F	Jump if carry not set.
600B	OE				
600C	60				
600D	04		INR B		Increment B register content.
600E	23	X1	INX H		Arrive on next location.
600F	0D	*	DCR C		Decrement C register content by 1.
6010	C2	F0	JNZ X2	6008	Jump if zero not set.
6011	08				
6012	60				
6013	70		MOV MB		Move B register content in memory location.
6014	23		INX H		Arrive on next location.
6015	77		MOV MA		Move acc content to memory.
6016	CF		RST -1		STOP.

Result :-

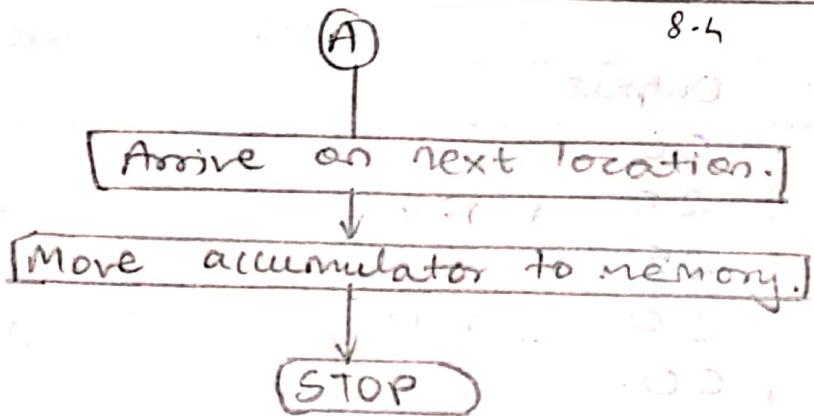
8.3

location/register	Output
6055	00
6056	25
A	25
B	00
C	00
H	60
L	56
F	54

Flowchart:-



8-4



Implementation of flag register:-

$$F = 54.$$

S Z - AC - P - Cy
0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |

- 1) Cy=0 since carry is not generated.
- 2) P=1 since it contains ~~odd~~ even no. of ones.
- 3) AC=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since ~~register~~ counter = 0 at last.
- 5) S=0 since answer is ~~true~~.

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Experiment Incomplete For

Diagram _____

Obs. Table _____

Calculations _____

Graphs _____

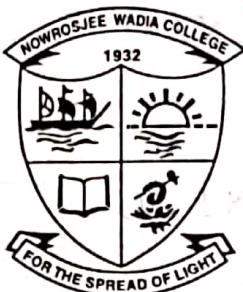
Results _____

Unit _____

Name Vrushil Joshi

Class XII Roll No. 12032 Batch Tuesday Pair No. -

Expt. No. _____ Title Reversal of Data Block:-



Performed On 13/10/15

Signature

Submitted On 13/10/15

Experiment Complete

Incharge

13/10/15

Aim: Consider data block from location 6050 to 6054 & design program to transfer data bytes in this block in reverse order starting at 6060.

Program Steps:-

```
MVI C 05
LXI H 6050
LXI D 6060
MOV A M<
STAX D
INX H
DCX D
DCR C
JNZ
RST-1
```

Data block:-

Memory location	Data byte
6050	A0
6051	B0
6052	C0
6053	D0
6054	E0

Program Table:-

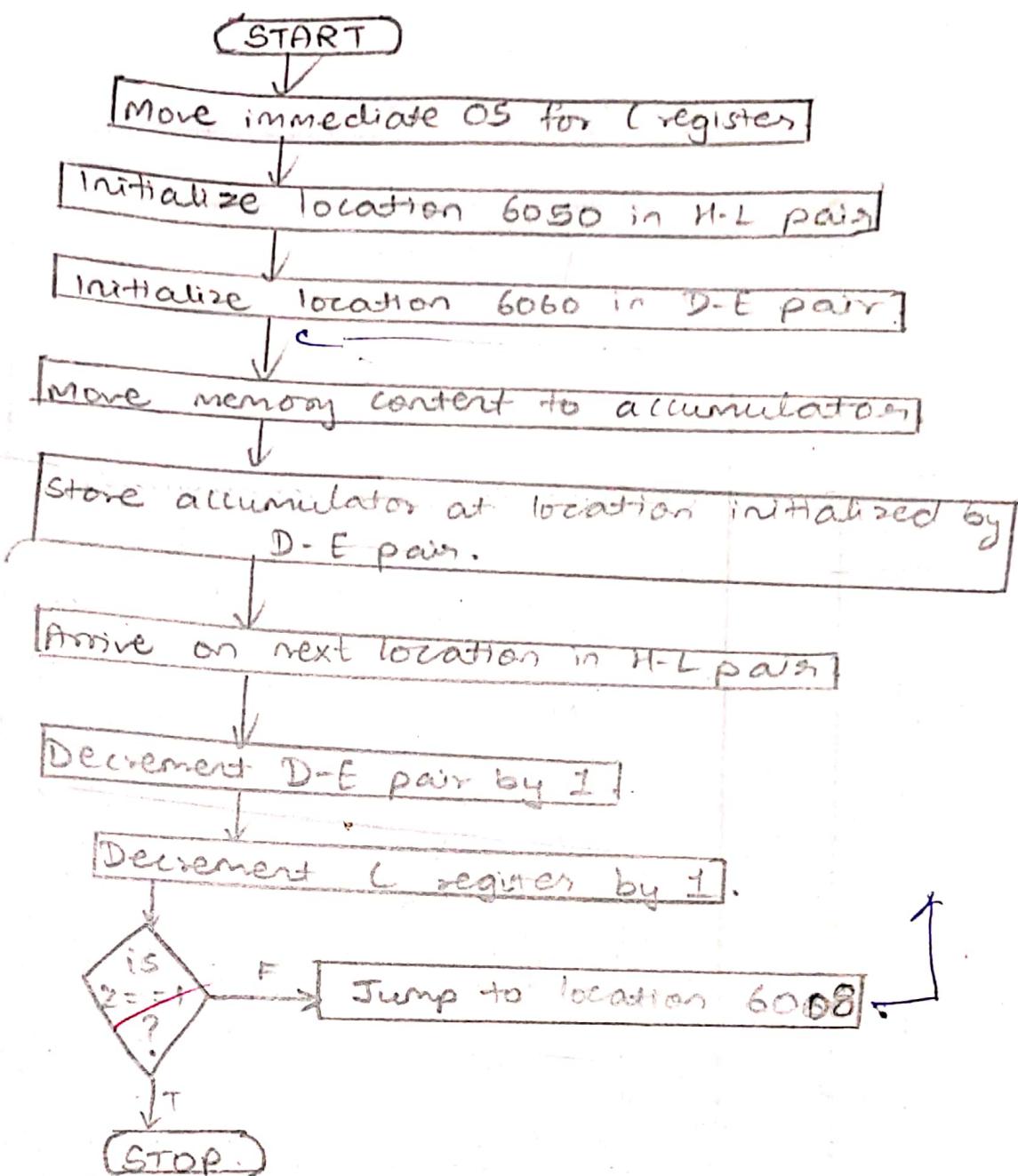
7.2

Memory Location.	Opcode.	Label	Mnemonics.	Operand	Comments.
6000	OE		MVI C	05	Move immediate 05 for C register.
6001	05				
6002	21		LXI H	6050	Initialize location 6050 in H-L pair.
6003	50				
6004	60				
6005	11		LXI D	6060	Initialize location 6060 in D-E pair.
6006	60				
6007	60				
6008	7E	X1	MOV A M		Move memory content to accumulator.
6009	12		STAX D		Store accumulator at location initialized by D-E pair.
600A	23		INX H		Arrive on next location in H-L pair.
600B	1B		D(X D)		Decrement D-E pair by 1.
600C	0D		DCR C		Decrement C register by 1.
600D	C2		JNZ X1	6068	Jump if zero not set.
600E	60				
600F	60				
6010	CF	03	IRST-1.		STOP.

Result :-

Loc / reg	O/P
6060	EO.
6061	DO.
6062	CO.
6063	BO.
6064	AO
A	E0
B	00
C	00
D	60
E	5F
F	54
H	60
L	55

Flowchart:- 7.3



Implementation of flag registers.

F = 54.

S	Z	-	A _C	-	P	-	C _y
0	1	0	1	1	0	1	0

- 1) C_y=0 since carry is not generated.
- 2) P=1 since it contains even no of ones.
- 3) A_C=1 since carry is shifted from lower to upper nibble.
- 4) Z=1 since C register counter=0 @ last.
- 5) S=0 since answer is +ve.

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Experiment Incomplete For

Diagram _____

Obs. Table _____

Calculations _____

Graphs _____

Results _____

Unit _____

Name Vrushil Doni.

Class XII Roll No. 12032 Batch Tuesday. Pair No. —

Expt. No. 2 Title Division of a data byte.



Performed On 27/10/15.

Signature _____

Submitted On 27/10/15.

Experiment Complete

Incharge

W

110

Ques: Design a program to divide no. available on 6050 with no. available on 6051 & to store Quotient & remainder on location 6052 & 6053 respectively.

Program Steps:-

~~Data block.~~

Loc.	I/P.
6050	09
6051	02

MVI B, 00

LXI H, 6050, WDT, F00d

Mov A M.

INXH

CMP M, C

JC, J09, J11

SUB M, 0, DDM

INR B.

JMP

INXH

Mov M, B.

INXH

Mov M, A.

RST-1.

Program Table:-

3.2

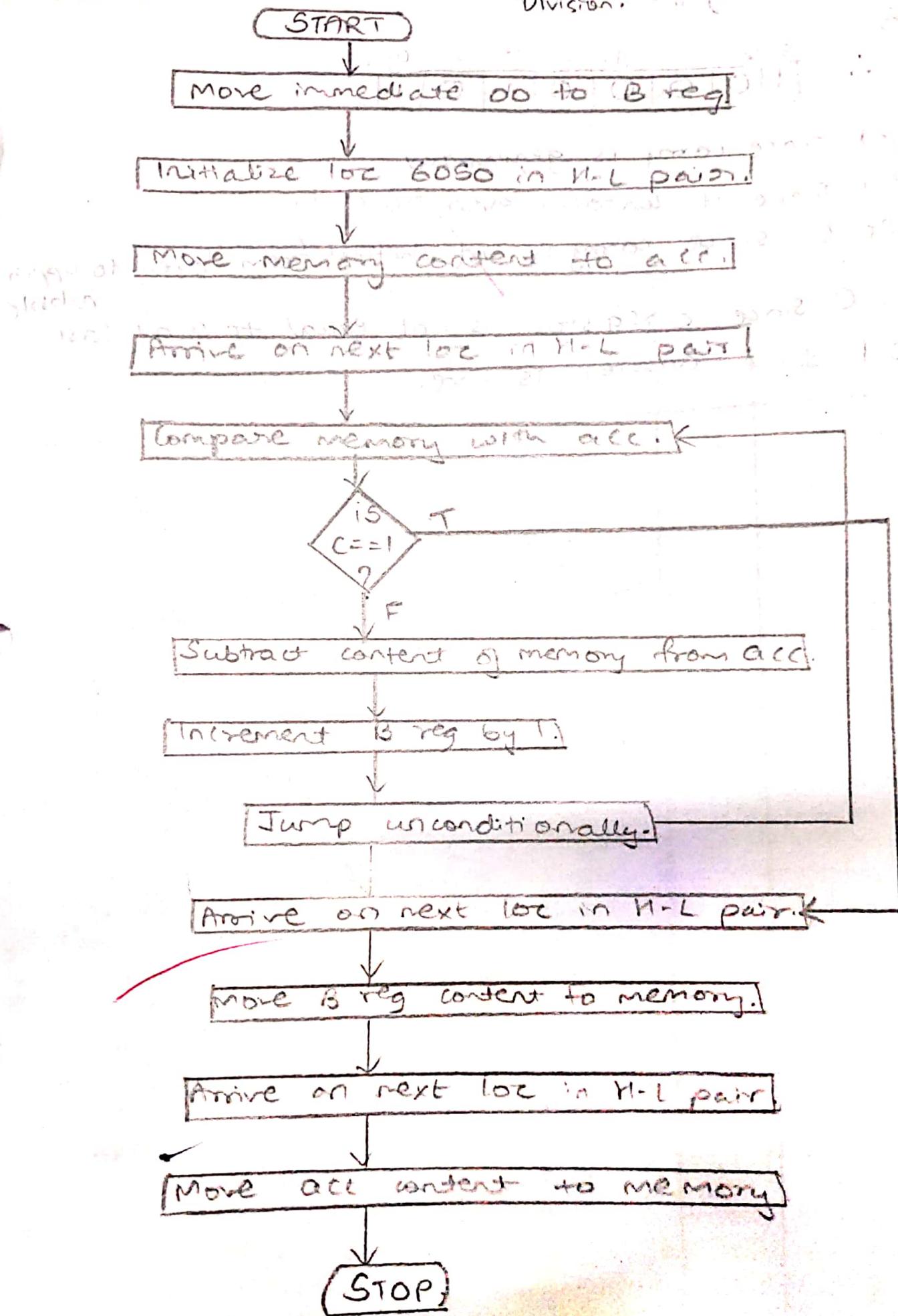
Memory location	Opcodes	Label	Mnemonics	Operands	Comments.
6000	06		MVI B	00	Move immediate 00 to B reg.
6001	00				
6002	21		LXI H	6050	Initialize loc. 6050 in H-L pair.
6003	50				
6004	60				
6005	7E		MOV A M		Move memory content to acc.
6006	23		INX H		Arrive on next location in H-L pair
6007	BE	X2	CMP M		Compare memory with acc.
6008	DA		JC X1	6010	Jump if carry is set.
6009	10				
600A	60				
600B	96		SUB M		Subtract content of memory from acc.
600C	04		INR B		Increment B reg content by 1.
600D	C3		JMP X2	6007	Jump unconditionally
600E	07				
600F	60				
6010	23	X1	INX H		Arrive on next loc in H-L pair.
6011	70		MOV MB		Move B reg content to memory.
6012	23		INX H		Arrive on next loc in H-L pair.
6013	77		MOV M A		Move acc content to memory.
6014	CF		RST-1		STOP.

Result:-

loc/reg.	O/P.
6052	04
6053	01
A	01
B	04
H	60
L	53
F	85

Flowchart:-

Division.



Implementation of flag register:-

3.4

F = 85

$\therefore \boxed{1|1|0|0|0|0|0|1|1|0|1|1}$

- 1) $Cy=1$ since carry is generated.
- 2) $P=1$ since it contains even no of 1's.
- 3) $Ac=0$ since carry is not shifted from lower to upper nibble.
- 4) $Z=0$ since c register is not equal to 0 at last.
- 5) $S=1$ since answer is -ve.

Sr.No.	Name of Experiment
1	Introduction to Microcomputer
2	Addition of 5 data bytes
3	Multiplication of 2 data bytes
4	Disassembly of a program
5	Display Message
6	Exchange of data bytes
7	Occurrences of a data bytes
8	Search for data bytes
9	Two byte addition
10	Four byte addition
11	Smallest & Greatest data byte
12	Odd & Even data bytes
13	Separation of nibbles & multiplication
14	Pallindrome
15	BCD addition
16	Reversal of a data block
17	Division of a databytes