SHAID SMARAK COLLEGE

Kirtipur, Kathmandu

Assignment No. 4 of Microprocessors

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Experiment 6

Objective:

Write a program to find 2's complement.

Statements:

Input numbers from memory location 2013H and store result in memory location 2052H.

Steps:

- Load the contents from 2013h memory location.
- Complement the contents of the accumulator.
- Add 01h to the contents of the accumulator.
- Store the contents in 2052h memory location.

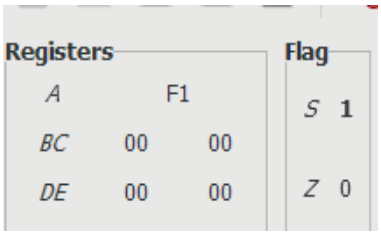
Programs:

```
 7
 8
 9   ;code
10   start: nop
11   LDA 2013H
12   CMA
13   ADI 01H
14   STA 2052H
15
16   hlt
```

Inputs and Outputs:

Address (Hex)	Address	Data
2013	8211	15
2014	8212	0
2015	8213	0
2016	8214	0

Registers:



Experiment 7

Objective:

Write a program to right shift 8-bit numbers.

Statement:

Shift an 8-bit data 4-bits right. Assume the data is in memory location 2051h. Store the result in memory location 2055h.

Steps:

- Load the contents from the memory location 2051h.
- Rotate 4-bit number 1-bit right 4 times.
- Store the result in memory location 2055h.
- Terminate the program.

Program:

```
9    ;code
10   start: nop
11   LDA 2051H
12   RAR
13   RAR
14   RAR
15   RAR
16   STA 2055H
17
18   hlt
```

Input and Outputs:

Address (Hex)	Address	Data
2051	8273	12
2052	8274	13
2053	8275	14
2054	8276	15
2055	8277	128
2056	8278	0

Registers:

Experiment 8

Objective:

Write a program to left shift 8-bit numbers.

Statements:

Shift an 8-bit data 4-bits left. Assume the data is in memory location 2051h. Store the result in memory location 2055h.

Steps:

- Same as experiment 7 (in this case the data is rotated left instead of right).

Programs:

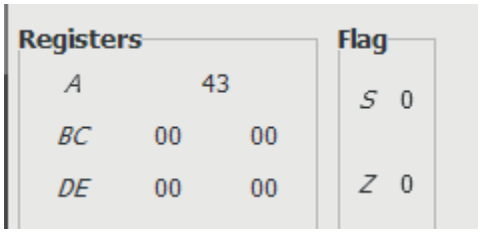
```
;code
start: nop
LDA 2051H
RAL
RAR
RAR
RAR
STA 2055H

hlt
```

Inputs and Outputs:

Address (Hex)	Address	Data
2051	8273	12
2052	8274	13
2053	8275	14
2054	8276	15
2055	8277	67
2056	8278	0

Registers:



Experiment 9

Objective:

Write a program to add 16-bit numbers.

Statements:

Add numbers 1124H and 2253H and store in memory location 2055h and 2056h.

Steps:

- Load 1124h data from HL pair register.
- Load 2253h data from DE pair register.
- Move the contents from l register to accumulator.
- Add the contents from accumulator to E register.
- Move the contents from accumulator to L register.
- Move the contents from H register to accumulator.
- Add the content of accumulator and D register with carry.
- Move contents of accumulator to H register.
- Store the contents in 2055h and 2056h memory location.
- Terminate the program.

Programs:

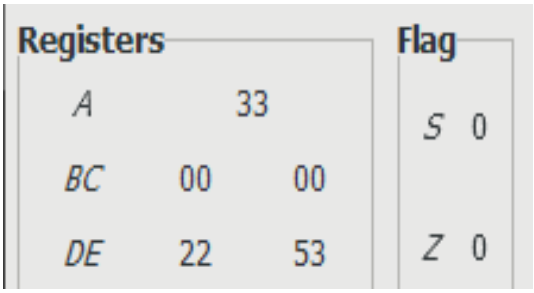
```
;code
start: nop
LXI H, 1124H
LXI D, 2253H
MOV A, L
ADD E
MOV L, A
MOV A, H
ADC D
MOV H, A
SHLD 2055H

hlt
```

Input and Outputs:

Address (Hex)	Address	Data
2055	8277	119
2056	8278	51
2057	8279	0

Registers:



Experiment 10

Objective:

Write a program to add 16-bit numbers.

Statements:

Input first number from the memory location 2050h and 2051h and second number from 2052h and 2053h and store the result in memory location 2055h and 2056h.

Steps:

- Load data from memory location in HL pair.
- Exchange content from HL to DE pair.
- Load data from memory location HL pair.
- Move the contents from L register to accumulator.
- Add contents from accumulator and E register.
- Move contents from accumulator to L register.
- Move contents from H register to accumulator.
- Add contents from accumulator and D register with carry.
- Move the contents from accumulator to H register.
- Store the contents in memory location 2055h.
- Terminate the program.

Program:

```
 9   ;code
10   start: nop
11   LHLD 2052H
12   XCHG
13   LHLD 2050H
14   MOV A, L
15   ADD E
16   MOV L, A
17   MOV A, H
18   ADC D
19   MOV H, A
20   SHLD 2055H
21
22   hlt
```

Input and Outputs:

Start 2050h

Address (Hex)	Address	Data
2050	8272	33
2051	8273	45
2052	8274	24
2053	8275	34
2054	8276	0
2055	8277	57
2056	8278	79

Registers: