

NAME – KHUSHI PANWAR, khushipanwar26@gmail.com

ROLL NO – 2021334

CSA PRACTICAL: ASSIGNMENT 3

1. Write an assembly language program for simulating following memory reference instructions:

i. LDA

STA LDA

```
INP
STA 30
OUT
INP
STA 34
OUT
INP
STA 38
OUT
LDA 30
LDA 34
OUT
HALT
```

RAM MAIN

A...	Data	Comments
30	0	
31	22	
32	0	
33	0	
34	0	
35	33	
36	0	
37	0	
38	0	
39	44	
40	0	
41	0	
42	0	
43	0	
44	0	
45	0	
46	0	
47	0	
48	0	

Registers

name	width	value
AC	16	33
AR	12	26
DR	16	28673
E	1	0
INPR	8	0
IR	16	28673
OUTR	8	0
PC	12	28
S	1	-1

IO Console

```
Enter an integer: 22
Output: 22
Enter an integer: 33
Output: 33
Enter an integer: 44
Output: 44
Output: 22
Output: 33
```

ii. STA

STA LDA

```
INP
STA 30
OUT
INP
STA 34
OUT
INP
STA 38
OUT
HALT
```

RAM MAIN

A...	Data	Comments
30	0	
31	11	
32	0	
33	0	
34	0	
35	22	
36	0	
37	0	
38	0	
39	33	
40	0	
41	0	
42	0	
43	0	
44	0	
45	0	
46	0	
47	0	
48	0	

Registers

name	width	value
AC	16	33
AR	12	18
DR	16	28673
E	1	0
INPR	8	0
IR	16	28673
OUTR	8	0
PC	12	20
S	1	-1

IO Console

```
Enter an integer: 11
Output: 11
Enter an integer: 22
Output: 22
Enter an integer: 33
Output: 33
```

iii. ADD

The screenshot shows the MACHINE 3-2 interface with the following components:

- ADD Program Window:** Contains the following assembly code:

```
INP
STA 15
INP
ADD 15
OUT
HALT
```
- RAM MAIN Window:** Displays the memory contents with the following data:

A...	Data	Comments
0	-8	INP
1	0	
2	48	STA 15
3	15	
4	-8	INP
5	0	
6	16	ADD 15
7	15	
8	-12	OUT
9	0	
10	112	HALT
11	1	
12	0	
13	0	
14	0	
15	0	
16	10	
17	0	
18	0	
- Registers Window:** Shows the state of registers:

name	width	value
AC	16	15
AR	12	10
DR	16	28673
E	1	0
INPR	8	0
IR	16	28673
OUTR	8	0
PC	12	12
S	1	-1
- IO Console:** Shows the execution log:

```
Enter an integer: 10
Enter an integer: 5
Output: 15
```

2. Write an assembly program to simulate Subtraction operation on two user-entered numbers:

The screenshot shows the MACHINE 3-2 interface with the following components:

- SUBTRACTION Program Window:** Contains the following assembly code:

```
INP
STA 15
INP
CMA
INC
ADD 15
OUT
HALT
```
- RAM MAIN Window:** Displays the memory contents with the following data:

A...	Data	Comments
0	-8	INP
1	0	
2	48	STA 15
3	15	
4	-8	INP
5	0	
6	114	CMA
7	0	
8	112	INC
9	32	
10	16	ADD 15
11	15	
12	-12	OUT
13	0	
14	112	HALT
15	0	
16	17	
17	0	
18	0	
- Registers Window:** Shows the state of registers:

name	width	value
AC	16	12
AR	12	14
DR	16	28672
E	1	0
INPR	8	0
IR	16	28672
OUTR	8	0
PC	12	16
S	1	0
- IO Console:** Shows the execution log:

```
Enter an integer: 17
Enter an integer: 5
Output: 12
```

3. Write an assembly program to simulate AND operation on two user-entered numbers:

The screenshot displays the MACHINE 3-2 assembly simulator interface. It consists of several panels:

- AND Panel:** Contains the assembly code:

```
INP
STA 15
INP
AND 15
OUT
HALT
```
- RAM MAIN Panel:** A table showing memory addresses, data, and comments.

A...	Data	Comments
0	-8	INP
1	0	
2	48	STA 15
3	15	
4	-8	INP
5	0	
6	0	AND 15
7	15	
8	-12	OUT
9	0	
10	112	HALT
11	1	
12	0	
13	0	
14	0	
15	0	
16	4	
17	0	
18	0	
- Registers Panel:** A table showing register names, widths, and values.

name	width	value
AC	16	12
AR	12	10
DR	16	28673
E	1	0
INPR	8	0
IR	16	28673
OUTR	8	0
PC	12	12
S	1	-1
- IO Console Panel:** Shows the execution flow:

```
Enter an integer: 4
Enter an integer: 3
Output: 12
```