# Riphah School of Computing and Innovation (RSCI), Lahore



Computer Organization and Assembly Language (Lab)

## Lab Report # 1

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CS 3B

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## Task 1:

## To take input and Subtract.

## Code:

IN

SUB 99

OUT

HLT

\*99

DAT 010

## Explanation:

* Firstly we Store 10 on address 99
* We take input
* Subtract 10 (i.e Address 99 value)
* Output the value
* Halt the program

## Task 2:

## To take two input as hardcore and Add them

## Code:

ADD 80 81

OUT

HLT

\*80

DAT 010

DAT 123

## Explanation:

* Hardcode values at Address 80 and 81
* Add address 80 and 81
* Output value in AC
* Halt the program

## Task 3:

## Add three numbers and display results.

## Code:

IN

STO 30

IN

STO 31

IN

STO 32

LDA 30

ADD 31

ADD 32

OUT

HLT

## Explanation:

* Input value and Store on Address 30
* Input value and store on Address 31
* Input value and store on Address 32
* Load Address 30 in AC
* Add Address 31 to AC
* Add Address 32 to AC
* Output
* Halt the program

## Task 4:

## Write a VVM programs to Input a number, add 100 to it and output the result. The number 100 should be placed in a memory location prior to running the program.

## Code:

IN

STO 30

LDA 30

ADD 10

OUT

HLT

\*10

DAT 100

## Explanation:

* Store Data Value (100) at address 10
* Input value and store at Address 30
* Load address 30 in AC
* Add address 10 (100) to AC value
* Output AC
* Halt the Program

## Task 5:

## Write a VVM programs to input a number, double it, and output the result.

## Code:

IN

STO 30

ADD 30

OUT

HLT

## Explanation:

* Input the value and Store on Address 30
* Add value at address 30 again
* Output the value
* Halt the Program

## Task 6:

## Write a VVM programs to input a number, double it, subtract 1, and output the result

## Code:

IN

STO 30

ADD 30

SUB 12

OUT

HLT

\*12

DAT 001

## Explanation:

* Store Data Value of 01 at Address 12
* Input value and store Address 30
* Add value at address 30 again
* Subtract value at address 12
* Output the Value
* Halt the program

## Task 7:

## Write a VVM programs to input three numbers, add the first two together, subtract the third from the sum, and output the result.

## Code:

IN

STO 31

IN

STO 32

IN

STO 33

LDA 31

ADD 32

SUB 33

OUT

HLT

## Explanation:

* Input value and store at Address 31
* Input value and store at Address 32
* Input value and store at Address 33
* Load Address 31 in AC
* Add value from Address 32
* Subtract value of Address 33 from AC
* Output the Value
* Halt the program

## Task 8:

## Take any integer as input, if the number is greater than 5 print it If a>5, print a Else if a=0,then Halt Else if a<5,then halt

## Code:

IN

// Only input 5

STO 95

IN

STO 98

LDA 98

BRZ 99

LDA 98

SUB 95

BRP 10

BR 12

LDA 98

OUT

HLT

## Explanation:

* Input 5 and store on address 95
* In a value and store on Address 98
* Load 98 address in AC
* Check if value is Zero (if it is zero halt the program)
* Load 98
* Sub value at 95 (i.e 5) from AC
* Check if result is positive or zero (if it is positive go to Instruction 10)
* Load value from 98 address
* Output the value
* If the condition is false i.e negative go to instruction 12 i.e halt the program

## Task 9:

## Take two numbers as input and print the larger number.

## Code:

IN

STO 50

IN

STO 51

LDA 50

SUB 51

BRP 10

LDA 51

OUT

HLT

LDA 50

OUT

HLT

## Explanation:

* Input a value and store at address 50
* Input a value and store at address 51
* Load Value of address 50
* Subtract value of Address 51
* If result is positive (in case first number is greater) go to instruction 10

1. Load value from Address 50
2. Output the value
3. Halt the program

* Else (2nd number is greater)

1. Load value from Address 51
2. Output the value
3. Halt the program

## Task 10:

## Print the square of any integer in the range 1-31.

Note: Add handwritten Iterations here and paste image of it.

**Code:**

IN

STO 99

LDA 98

ADD 99

STO 98

LDA 97

ADD 96

STO 97

SUB 99

BRZ 13

BR 02

LDA 98

OUT

HLT

\*96

DAT 001

DAT 000

DAT 000

## Explanation:

* Store Data value 001 at 96, 000 at 97 for counter, 000 98 for square value
* Input a value and store at address 99
* Add value at 99 to 98 address
* Add 96 (001 value) to Address 97
* Subtract 99 address from 97
* If result is zero (i.e 97==99(input))

1. Output 97 (square)
2. Halt the program

* Go to instruction 02 (i.e 3rd bullet point here)
* Perform each step again

## Task 11:

## Write a VVM program which takes an integer input and display table of that integer.

## Code:

IN

STO 81

LDA 90

SUB 91

BRP 13

LDA 82

ADD 81

OUT

STO 82

LDA 90

ADD 92

STO 90

BR 02

HLT

\*90

DAT 000

DAT 010

DAT 001

## Explanation:

* Store Data value 000 at 90 for counter, 010 at 91 for condition, 001 at 92 as a constant
* Input a value and store at address 81
* Load 90 and subtract 91 (i.e 10)
* If result is positive or zero (i.e 90-91>=0)

1. Halt the program

* Load Address 82 (0 for first time)
* Add 81 (input value) to AC
* Output the value
* Store AC value to address 82
* Load 90
* ADD 92 (i.e 001)
* Store in 90
* Go to instruction 02 (i.e 3rd bullet point here)
* Perform each step again