National University of Computer and Emerging Sciences

Lab Manual 03
Computer Organization and Assembly Language Lab

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In-lab Activities

Activity 1: Given an array with label my_array and its len in label array_len. Write a code that will add index of element in each element of my_array using loop. Do not hard code array_len, read it from memory instead. For example if data is as follow

my_array: dw 10,34,6,67,24,656,75,59,34
array_len: dw 9

At the end of your code my_Array should be
my_array: dw 10,35,8,70,28,661,81,66,42

Activity 2: Write a program which determines largest number from the given array.

array: *dw* ***111, 999, 888, 888, 11, 99, 88, 88, 1, 9, 8, 8***

Activity 3: Convert the following C++ codes in assembly language.

Part A: Determine the Smallest Number:

```
int p = 42;
int q = 18;
int r = 30;
int smallest;

if (p < q) {
    if (p < r) {
        smallest = p;
    } else {
        smallest = r;
    }
} else {
    if (q < r) {
        smallest = q;
    } else {
        smallest = r;
    }
}
```

Part B: Temperature Classification:

```
int temperature = 78;int
classification;
if
(temperature < 0) { classification =1; //
      Freezing
} else if (temperature >= 0 && temperature < 25) {classification = 2; //
      Cold
} else if (temperature >= 25 && temperature < 70) {classification = 3;
      // Moderate
}
else
{  classification = 4; // Hot
}
```

Activity 4: For each of the code snippet given below, write value of each flag after logical/arithmetic operation and mention if the jump will be taken or not

CODE	SF	OF	CF	ZF	Jump Taken?

`MOV AX, 0XF0F0`
`AND AX, 0X0F0F`
`JZ LABEL1`					

`MOV BX, 0XA2`
`CMP BX, 0XC0`
`JL LABEL1`					

`MOV AX,5`
`CMP AX,6`
`JL L1`					

`MOV AX,5`
`CMP AX,4`
`JG L1`					

`MOV DX,0XA523`
`CMP DX,0XA523`
`JE L1`					

`MOV DX,0XA523`
`CMP DX,0XA523`
`JNE L5`					

`MOV Ax, 0xFFFF`
`SUB AX,2 ;`
`JG LABEL`					

`MOV Ax, 0xFFFF`
`SUB AX,2 ;`
`JA LABEL`					

Post Lab Activity

Write an assembly program which finds if an array 'digits' is palindrome or not. The array ends on a -1. If the number in the array is palindrome, set bx to 1 and 0 otherwise.

Palindrome: A palindrome is a word, number, phrase, or other sequence of characters which reads the same backward as forward, such as madam or racecar or the number 10201.

For example:

If digits: 1,1,2,1,1, -1 set bx=1		If digits: 1,2,2,2,-1 set bx=0