

* Laboratory Practice II (Information Security) - Experiment Number - 1.

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Title:-

Logical operations on string characters.

Aim:-

Write a C/C++/Java/Python program that contains a string (char pointer) with a value 'Hello World'. The program should AND or XOR each character in this string with 127 and display the result.

Objective:-

1. AND 'Hello World' with 127.
2. XOR 'Hello World' with 127.

Theory:-

String -

The string is the one-dimensional array of characters terminated by '\0' null. Each and every character in the array consumes one byte of memory and the last character must always be 0. The termination character '\0' is used to identify where the string ends. In C language string declaration can be done in

in two ways-

1. By char array
2. By string literal

```
char ch[] = {'o', 'n', 'l', 'i', 'n', 'e', 's', 'm', 'a', 'r', 't', 't', 'r', 'a', 'i', 'n',  
            'e', '\0'};
```

As we know, array index starts from 0, so it will be represented as in figure given below:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
o	n	l	i	n	e	s	m	a	r	t	t	r	a	i	n	e

while declaring string, size is not mandatory. So we can write the above code as given below:

```
char ch[] = {'o', 'n', 'l', 'i', 'n', 'e', 's', 'm', 'a', 'r', 't', 't', 'r', 'a', 'i', 'n',  
            'e', '\0'};
```

We can also define the string by the string literal in C language. For example

```
char str[] = "onlinemarttrainer";
```

In such case, '\0' will be appended at the end of the string by the compiler.

AND Operation-

There are two inputs and one output in binary AND operation. The inputs and result to a binary AND operation can only be 0 or 1. The binary AND operation will always produce

a 1 output if both inputs are 1 and will produce a 0 output if both inputs are 0, for two different inputs, the output will be 0.

AND Truth Table -

Input		Output
x	y	
0	0	0
0	1	0
1	0	0
1	1	1

XOR Operation -

There are two inputs and one output in binary XOR operation. It is similar to ADD operation which takes two input and produces one result i.e. one output.

The input and result to a binary XOR operation can only be 0 or 1. The binary XOR operation will always produce a 1 output if its inputs are 1 and will produce a 0 output if both of its inputs are 0 or 1.

XOR Truth Table -

Input		Output
x	y	
0	0	0
0	1	1
1	0	1
1	1	0

Conclusion:-

Thus we applied the logical AND and XOR operation on string 'Hello World' and 127 and displayed the corresponding output as result.