

Lab Task:

Complete the table by solving the bitwise instruction of all Logical gates. Add the code and output of the logical gates to show solution of MASK BITS given in the table.

Logic	Mask Bits	
	0	1
INPUT VALUE : 2	0	2
AND	0	2
OR	2	-1
NOT	-3	-3
XOR	2	-3
XNOR	-3	2
NOR	-3	0
NAND	-1	-3

AND MASK BITS 0**SOLUTION:**

```
.data
```

```
prompt: .asciiz"Enter an integer number : "
```

```
result: .asciiz"RESULT: "
```

```
.text
```

```
.globl main
```

```
main:
```

```
li $t0,0x00000000
```

```
li $v0,4
```

```
la $a0,prompt
```

```
syscall
```

```
li $v0,5
```

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

syscall

move \$t1,\$v0

and \$t2,\$t1,\$t0

li \$v0,4

la \$a0,result

syscall

move \$a0,\$t2

li \$v0,1

syscall

li \$v0,10

syscall

OUTPUT:

```
Enter an integer number : 4
RESULT: 0
-- program is finished running --
```

AND MASK BITS 1**SOLUTION:**

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0xffffffff

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

```
li $v0,4
```

```
la $a0,prompt
```

```
syscall
```

```
li $v0,5
```

```
syscall
```

```
move $t1,$v0
```

```
and $t2,$t1,$t0
```

```
li $v0,4
```

```
la $a0,result
```

```
syscall
```

```
move $a0,$t2
```

```
li $v0,1
```

```
syscall
```

```
li $v0,10
```

```
syscall
```

OUTPUT:

```
Enter an integer number : 2
RESULT: 2
-- program is finished running --
```

OR MASK BITS 0**SOLUTION:**

```
.data
```

```
prompt: .asciiz"Enter an integer number : "
```

```
result: .asciiz"RESULT: "
```

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

```
.text

.globl main

main:

li $t0,0x00000000

li $v0,4

la $a0,prompt

syscall

li $v0,5

syscall

move $t1,$v0

or $t2,$t1,$t0

li $v0,4

la $a0,result

syscall

move $a0,$t2

li $v0,1

syscall

li $v0,10

syscall
```

OUTPUT:

```
Enter an integer number : 2
RESULT: 2
-- program is finished running --
```

OR MASK BITS 1

AHSAN SAJJD
SOLUTION:**BIT MANIPULATION INSTRUCTIONS**

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0xffffffff

li \$v0,4

la \$a0,prompt

syscall

li \$v0,5

syscall

move \$t1,\$v0

or \$t2,\$t1,\$t0

li \$v0,4

la \$a0,result

syscall

move \$a0,\$t2

li \$v0,1

syscall

li \$v0,10

syscall

OUTPUT:

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

```
Enter an integer number : 2
RESULT: -1
-- program is finished running --
```

NOT MASK BITS**SOLUTION:**

.data

prompt: .ascii"Enter an integer number:"

result: .ascii"RESULT: "

.text

.globl main

main:

la \$a0,prompt

li \$v0,4

syscall

li \$v0,5

syscall

move \$t0,\$v0

not \$t1,\$t0

la \$a0,result

li \$v0,4

syscall

move \$a0,\$t1

li \$v0,1

syscall

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**`li $v0,10``syscall`**OUTPUT:**

```
Enter an integer number:2
RESULT: -3
-- program is finished running --
```

XOR MASK BITS 0**SOLUTION:**`.data``prompt: .asciiz"Enter an integer number : "``result: .asciiz"RESULT: "``.text``.globl main``main:``li $t0,0x00000000``li $v0,4``la $a0,prompt``syscall``li $v0,5``syscall``move $t1,$v0``xor $t2,$t1,$t0``li $v0,4``la $a0,result`

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

syscall

move \$a0,\$t2

li \$v0,1

syscall

li \$v0,10

syscall

OUTPUT:

```
Enter an integer number : 2
RESULT: 2
-- program is finished running --
```

XOR MASK BITS 1**SOLUTION:**

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0xffffffff

li \$v0,4

la \$a0,prompt

syscall

li \$v0,5

syscall

Lab no 06**Computer Architecture and logic Design Lab****AHSAN SAJJD****BIT MANIPULATION INSTRUCTIONS**

move \$t1,\$v0

xor \$t2,\$t1,\$t0

li \$v0,4

la \$a0,result

syscall

move \$a0,\$t2

li \$v0,1

syscall

li \$v0,10

syscall

OUTPUT:

```
Enter an integer number : 2
RESULT: -3
-- program is finished running --
```

XNOR MASK BITS 0**SOLUTION:**

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0x00000000

li \$v0,4

Lab no 06**Computer Architecture and logic Design Lab****AHSAN SAJJD****BIT MANIPULATION INSTRUCTIONS**

```
la $a0,prompt
```

```
syscall
```

```
li $v0,5
```

```
syscall
```

```
move $t1,$v0
```

```
xor $t2,$t1,$t0
```

```
not $t1,$t2
```

```
li $v0,4
```

```
la $a0,result
```

```
syscall
```

```
move $a0,$t1
```

```
li $v0,1
```

```
syscall
```

```
li $v0,10
```

```
syscall
```

OUTPUT:

```
Enter an integer number : 2
RESULT: -3
-- program is finished running --
```

XNOR MASK BITS 1**SOLUTION:**

```
.data
```

```
prompt: .asciiz"Enter an integer number : "
```

```
result: .asciiz"RESULT: "
```

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

```
.text

.globl main

main:

li $t0,0xffffffff

li $v0,4

la $a0,prompt

syscall

li $v0,5

syscall

move $t1,$v0

xor $t2,$t1,$t0

not $t1,$t2

li $v0,4

la $a0,result

syscall

move $a0,$t1

li $v0,1

syscall

li $v0,10

syscall
```

OUTPUT:

```
Enter an integer number : 2
RESULT: 2
-- program is finished running --
```

SOLUTION:

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0x00000000

li \$v0,4

la \$a0,prompt

syscall

li \$v0,5

syscall

move \$t1,\$v0

nor \$t2,\$t1,\$t0

li \$v0,4

la \$a0,result

syscall

move \$a0,\$t2

li \$v0,1

syscall

li \$v0,10

syscall

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS****OUTPUT:**

```
Enter an integer number : 2
RESULT: -3
-- program is finished running --
```

NOR MASK BITS 1**SOLUTION:**

.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li \$t0,0xffffffff

li \$v0,4

la \$a0,prompt

syscall

li \$v0,5

syscall

move \$t1,\$v0

nor \$t2,\$t1,\$t0

li \$v0,4

la \$a0,result

syscall

move \$a0,\$t2

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**

```
li $v0,1
```

```
syscall
```

```
li $v0,10
```

```
syscall
```

OUTPUT:

```
Enter an integer number : 2
RESULT: 0
-- program is finished running --
```

NAND MASK BITS 0**SOLUTION:**

```
.data
```

```
prompt: .asciiz"Enter an integer number : "
```

```
result: .asciiz"RESULT: "
```

```
.text
```

```
.globl main
```

```
main:
```

```
li $t0,0x00000000
```

```
li $v0,4
```

```
la $a0,prompt
```

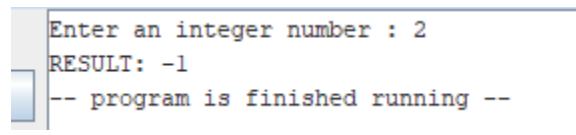
```
syscall
```

```
li $v0,5
```

```
syscall
```

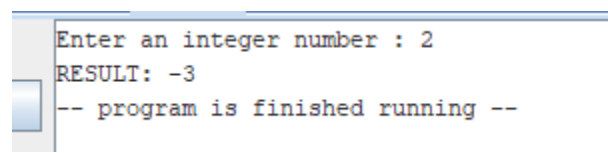
```
move $t1,$v0
```

```
and $t2,$t1,$t0
```

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**`not $t1,$t2``li $v0,4``la $a0,result``syscall``move $a0,$t1``li $v0,1``syscall``li $v0,10``syscall`**OUTPUT:**

```
Enter an integer number : 2
RESULT: -1
-- program is finished running --
```

NAND MASK BITS 1**SOLUTION:**`.data``prompt: .asciiz"Enter an integer number : "``result: .asciiz"RESULT: "``.text``.globl main``main:``li $t0,0xffffffff``li $v0,4``la $a0,prompt`

AHSAN SAJJD**BIT MANIPULATION INSTRUCTIONS**`syscall``li $v0,5``syscall``move $t1,$v0``and $t2,$t1,$t0``not $t1,$t2``li $v0,4``la $a0,result``syscall``move $a0,$t1``li $v0,1``syscall``li $v0,10``syscall`**OUTPUT:**A screenshot of a terminal window with a light blue border. The text inside the terminal is as follows:

```
Enter an integer number : 2
RESULT: -3
-- program is finished running --
```