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	
INPUT VALUE : 2	0	1
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
```

```
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
```

```
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 BIT MANIPULATION INSTRUCTIONS

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
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: -1
-- program is finished running --
```

NOT MASK BITS

SOLUTION:

```
.data

prompt: .asciiz"Enter an integer number:"

result: .asciiz"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
```

```
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
```

```
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
```

```
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 --
```

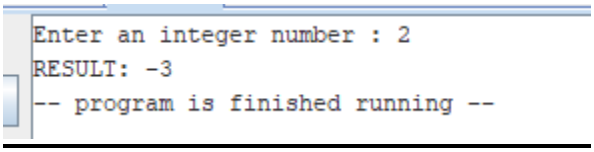
XNOR MASK BITS 0

SOLUTION:

```
.data

prompt: .asciiz"Enter an integer number : "

result: .asciiz"RESULT: "

.text

.globl main

main:

li $t0,0x00000000

li $v0,4
```

```
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:



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 --
```

AHSAN SAJJD BIT MANIPULATION INSTRUCTIONS

NOR 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
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
```

```
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
```

```
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
```

```
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:

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