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**PRACTICAL LAB - 2**

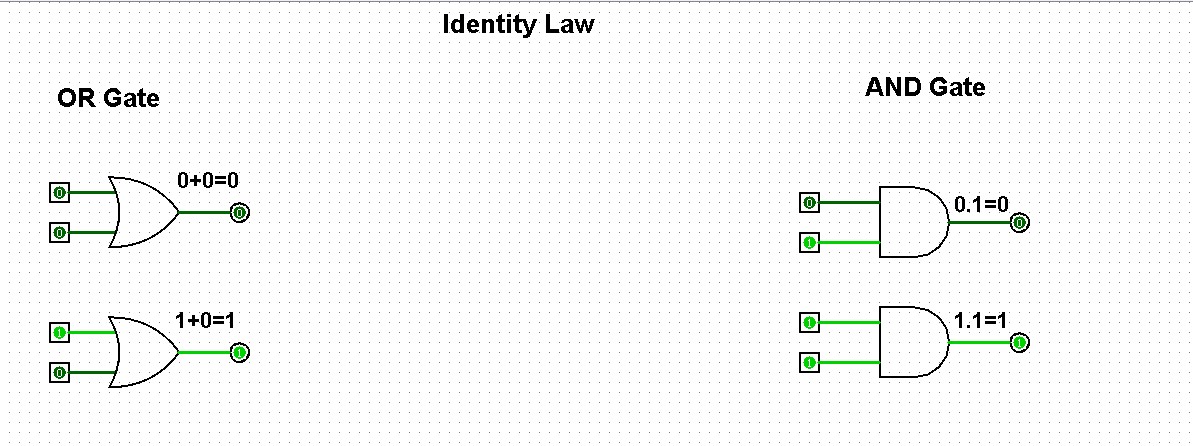
**DIGITAL LOGIC DESIGN**

**Assign by: SIR ABDUL RAFAY**

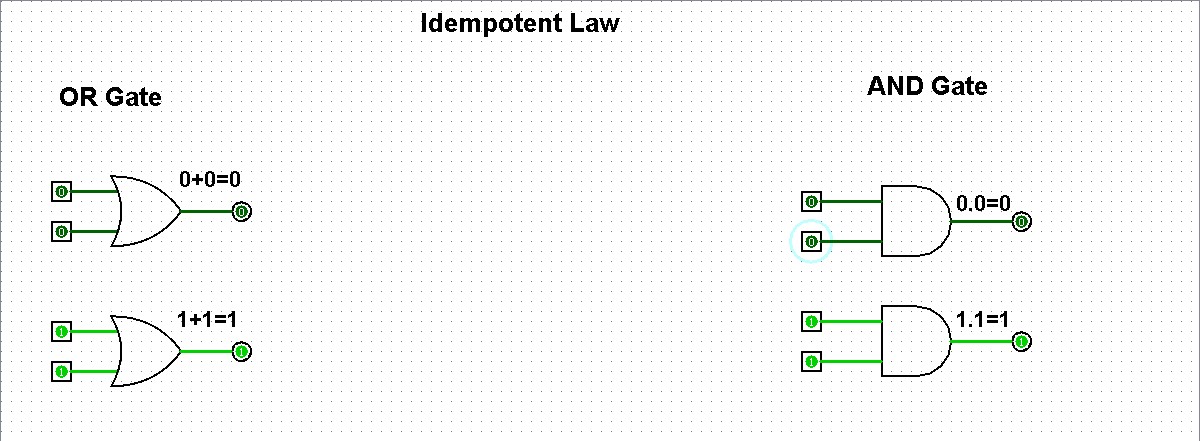
**Prepared by: Muhammad Aamir**

**1. Verify following Rules of Boolean Algebra by designing them using Circuit Makers.**

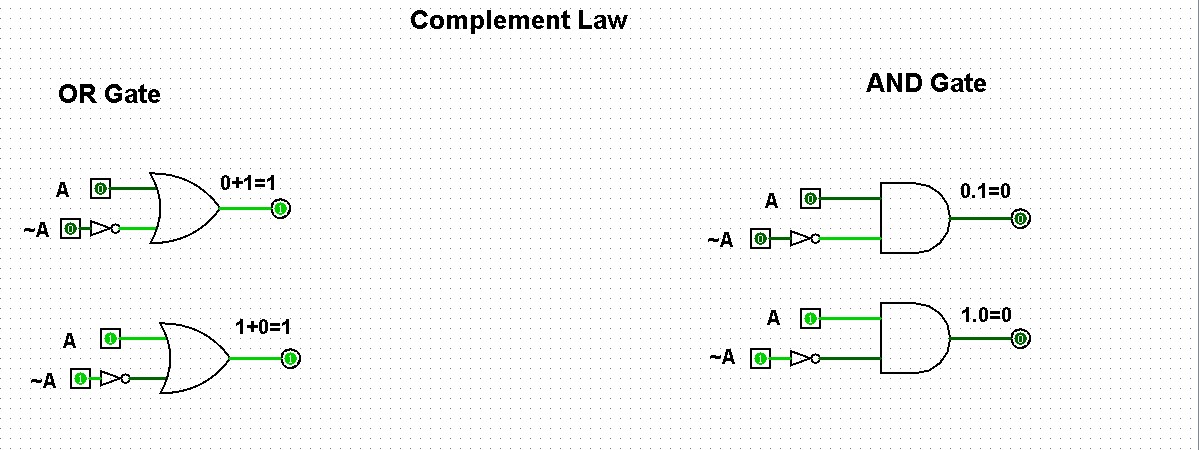
**Identity Law:**



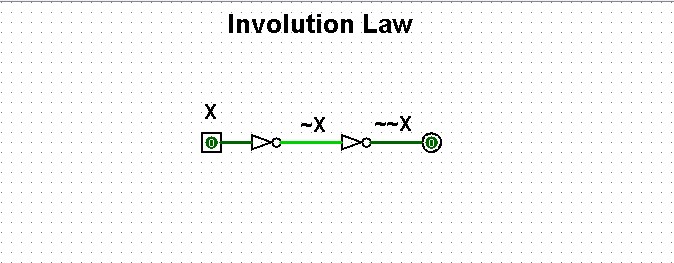
**Idempotent Law:**



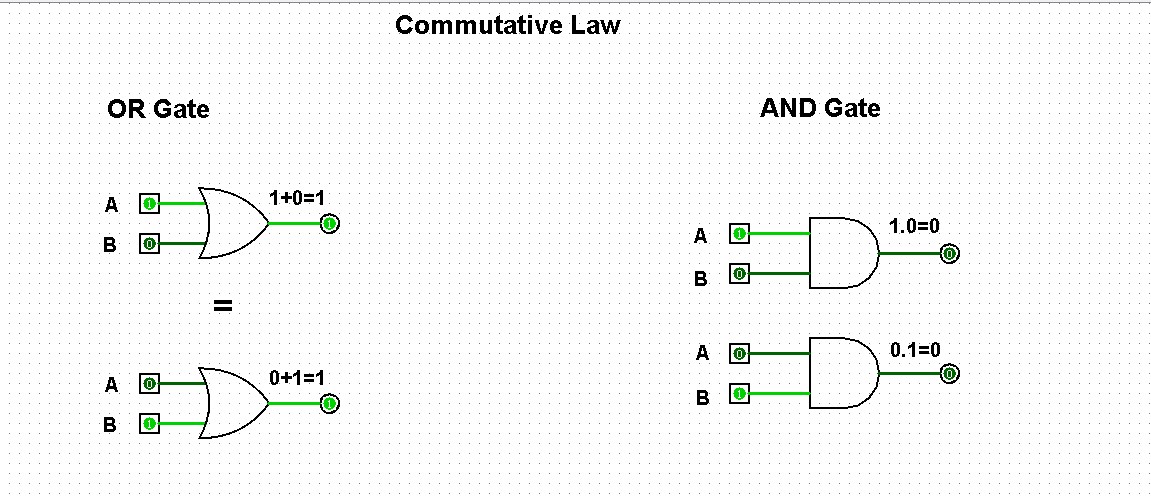
**Complement Law:**



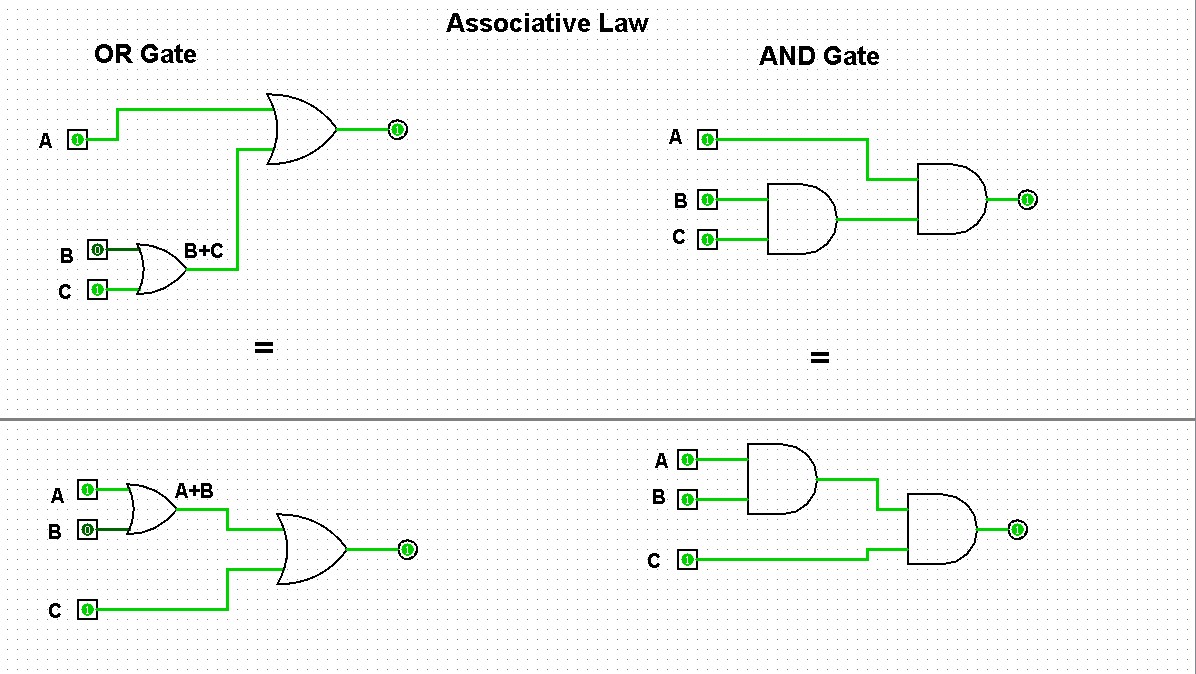
**Involution Law:**



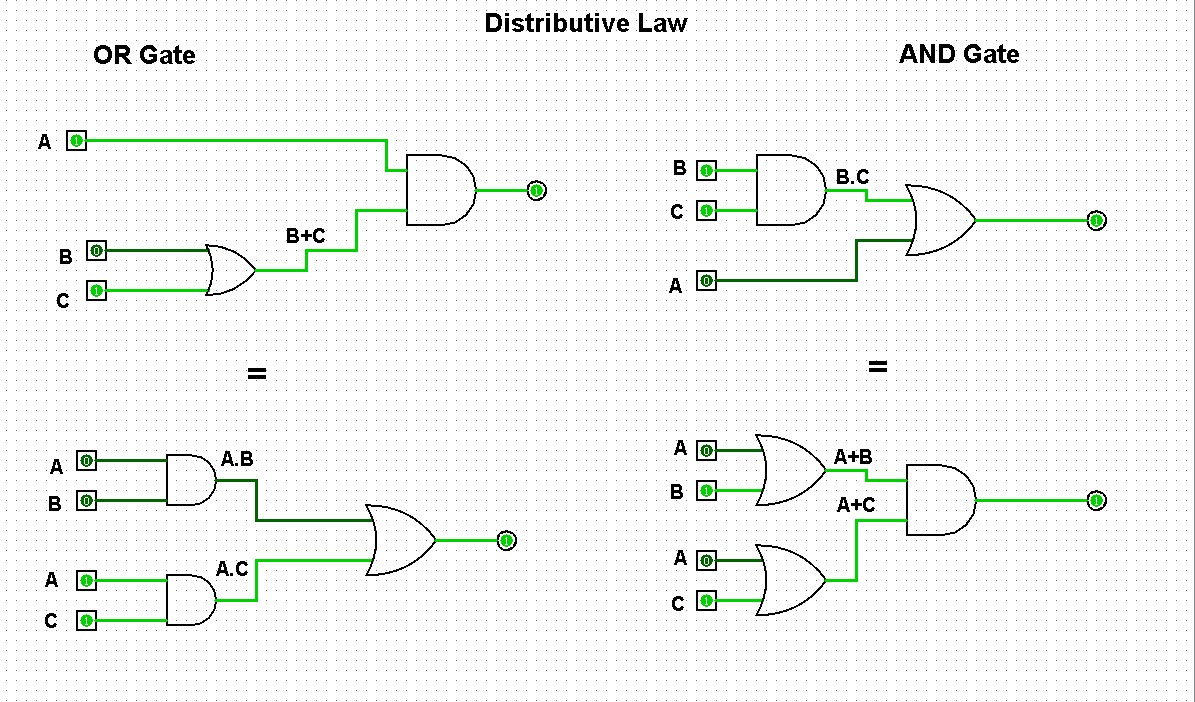
**Commutative Law:**



**Associative Law:**



**Distributive Law:**



**2. Simplify the expressions 1. F=(A+(BC)’)’**

**Ans:**

F = [ A ] ’ [ ( B C ) ’ ] ’

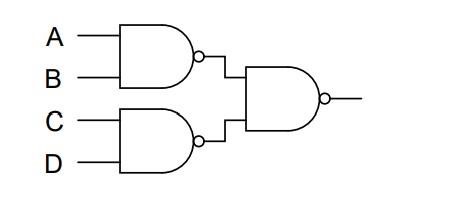
F= A ’ B C

2. F=(AB+CD)’

**Ans:**

F = ( A B ) ’ ( C D ) ’

3. Use DE Morgan’s Theorem to prove that this NAND gate circuit performs the exact same function:



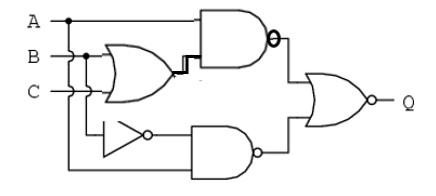
Sol:

# F = [(AB)’ (CD)’]’ //BREAKING LONGEST COMPLIMENT

F = [(AB’)’ + [(CD)’]’ //COMPLIMENT LAW

F = AB + CD

4. Apply the principles of DE Morgan’s theorems to the simplification of a gate circuit:



SOL:

# F = [{A (B+C)}’ + (AB’)’]’ //BREAKING LONGEST COMPLIMENT

F = [A (B+C)] . (AB’) // DISTRIBUTIVE LAW

F = (AB + AC) . AB’ // MULTIPLYING

F = (AB’) (AB) + (AB’) (AC) //A.A=A , B.B’=0

F= A(0) + AB’C

F= AB’C