**Assignment 1**

1. Explain direct proof, indirect proof, and proof by contradiction. Use direct proof to show that "If n is an odd integer, then n2 is an odd integer". Also, use indirect proof to show that "If n is an integer and n2 is odd then n is odd".
2. What is tautology? Show (p ∧q) → (p∨q) is a tautology.
3. Define Cartesian product. Find A3 for the set A= {a, b, c}.
4. How can you represent relations using matrices? Suppose that A= {1, 2, 3} and B= {1, 2}. Let R be the relation from A to B containing (a, b) if a ∈A, b ∈B, and a > b. What is the matrix representing R if a1 = 1, a2 = 2, and a3 = 3, and b1 = 1 and b2 =2?
5. What is implication and biconditional? Explain with example.
6. Explain tautology, contradiction and contingency with example.
7. Explain existential and universal quantifiers with example.
8. What is proposition and negation? Explain with example
9. Show that the square of an even number is an even number by using direct methods.
10. If n is an even integer then n2 is an even integer by using contrapositive.
11. Prove that if n is an integer and n3+5 is odd, then n is even by using indirect proof.