Exercise No : 1

1. Prove by giving suitable example that if AUB = A UC, then it is not necessary that B = C.
2. For the given sets A and B, there is a possibility that A-B = B-A, if yes, When?
3. For the two finite sets A and B, is it possible that

A-B = B? if yes, when?

A-B = A? if yes, when?

1. Let A = {1,2,3} and S = A X A, define a relation R on S such that (a,b)R(a’,b’) if and only, if ab = a’b’. show that R is an equilvalence relation.
2. Prove the following using PMI: 1 + r + r2 + r3 +……+rn = (rn – 1)/( r – 1)

Exercise No : 2

1. Find the path for the strings abb, abca, aa,abb, abbc in the finite automaton shown in the following figure.



1. Design a finite automaton M over {0,1} to accept all strings satisfying the following conditions:
2. Ending with 111 or 000
3. Starting with 111 or 000
4. Containing the substring 000 or 111
5. Design a finite automaton M over {0,1} to accept all strings satisfying the following conditions:
6. Containg exactly two 0’s
7. Containing at least two 0’s
8. Containing at the most two 0’s
9. Design the DFA equivalent for the NFA given in the following table:Starting state is q0 and ending state is q3.

|  |  |  |
| --- | --- | --- |
| Current state | Input Symbol | |
|  | a | b |
| q0 | q0,q1 | q0,q2 |
| q1 | - | q3 |
| q2 | q0,q3 | q1 |
| q3 | q2 | - |

1. For the Mealy machine in the following table, find the equivalent Moore Machine. Starting state is q0.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Current state | Input symbol | | | |
|  | a | | b | |
|  | Next State | Output | Next State | Output |
| q0 | Q1 | 1 | q3 | 1 |
| q1 | q1 | 0 | q0 | 1 |
| q2 | q0 | 1 | q2 | 0 |
| q3 | q3 | 0 | q1 | 1 |

1. For the Moore Machine given in the following table. Find the equivalent Mealy Machine, Start state in q0.

|  |  |  |  |
| --- | --- | --- | --- |
| Current state | Input Symbol | | output |
|  | a | b |  |
| q0 | q1 | q2 | 1 |
| q1 | q3 | q4 | 1 |
| q2 | q4 | q0 | 0 |
| q3 | q1 | q2 | 0 |
| q4 | q3 | q0 | 1 |