Students :   Date : 25-08-2022

202212046   Day : Thursday

202212047

202212048

202212049

202212050 (Absent)

Sets & Cartesian Product

➔ Power Set = It is known as set of set.
   Set of all subsets in a set. Number of subset = 2^n
   S={1,2}

P(S)= {∅,{1},{2},{1,2}}

Cardinality of power set of N elements is N= number of elements in a set
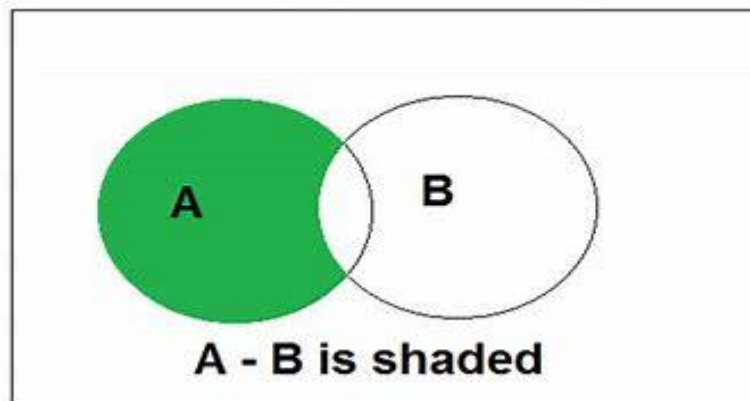
that is 2^n

If 'a' is a set the it can be written like this as well.

Another power set notation is $|2^a| = 2^{|a|}$

Cartesian product (AxB):

1. Non commutative operations on set.
2. Reverse the order of the set will get the same set.
3. A = {1,2,3} B = {a,b}
4. AxB = {(1,a), (2,a), (3,a), (1,b), (2,b), (3,b), ∅ }
5. Cardinality of AxB = Cardinality of BxA.
6. AxB not equals to BxA when it comes to the ordering of the elements within a particular set that is you can not write (1,a) as (a,1) if AxB is given.
7. AxBxB = total number of subset is 3x2x2 = 12.

➔ Set difference operation:

A - B is shaded

A\B or A-B both are the same thing to find out the elements only in A and excluding B.

OR = corresponds to set UNION

AND = corresponds to set INTERSECTION

➔ Symmetric difference:

1. $(A \backslash B) \cup (B \backslash A)$
2. $(x \in A) \oplus (x \in B)$
3. $(A \cup B) \backslash (A \cap B)$

All these formulas are different ways to find the symmetric difference.

For symmetric difference in set operation XOR method is also used.

➔ Relations:
Relation from set S to set T is any subset of the cartesian product.

Domain = It is a set of all possible inputs.
Codomain = It is derived from the domain.

$|A| = n$

$|A \times A| = n^2$

$|2^{A \times A}| = 2^{n^2}$

The number of relation of an n^2 elements of a set is 2^{n^2}.