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Sessional Assignment
BSSE- 2nd Semester
Subject: Discrete Structure

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1) What is Venn diagram? Explain in detail the Applications of Venn diagram.

Ans:

- **Venn diagram:**

A Venn diagram uses overlapping circles or other shapes to illustrate the logical relationships between two or more sets of items. Often, they serve to graphically organize things, highlighting how the items are similar and different.

Venn diagrams, also called Set diagrams or Logic diagrams, are widely used in mathematics, statistics, logic, teaching, linguistics, computer science and business. Many people first encounter them in school as they study math or logic, since Venn diagrams became part of "new math" curricula in the 1960s. These may be simple diagrams involving two or three sets of a few elements, or they may become quite sophisticated, including 3D presentations, as they progress to six or seven sets and beyond. They are used to think through and depict how items relate to each within a particular "universe" or segment. Venn diagrams allow users to visualize data in clear, powerful ways, and therefore are commonly used in presentations and reports. They are closely related to Euler diagrams, which differ by omitting sets if no items exist in them. Venn diagrams show relationships even if a set is empty.

- **Applications:**

To visually organize information to see the relationship between sets of items, such as commonalities and differences. Students and professionals can use them to think through the logic behind a concept and to depict the relationships for visual communication. This purpose can range from elementary to highly advance.

- **To compare two or more choices** and clearly see what they have in common versus what might distinguish them. This might be done for selecting an important product or service to buy.

- **To solve complex mathematical problems.** Assuming you're a mathematician, of course.

- **To compare data sets,** find correlations and predict probabilities of certain occurrences.

- **To reason through the logic** behind statements or equations, such as the Boolean logic behind a word search involving "or" and "and" statements and how they're grouped.

2) What is Union? Draw Membership table for union using different examples.

ANS:

Union

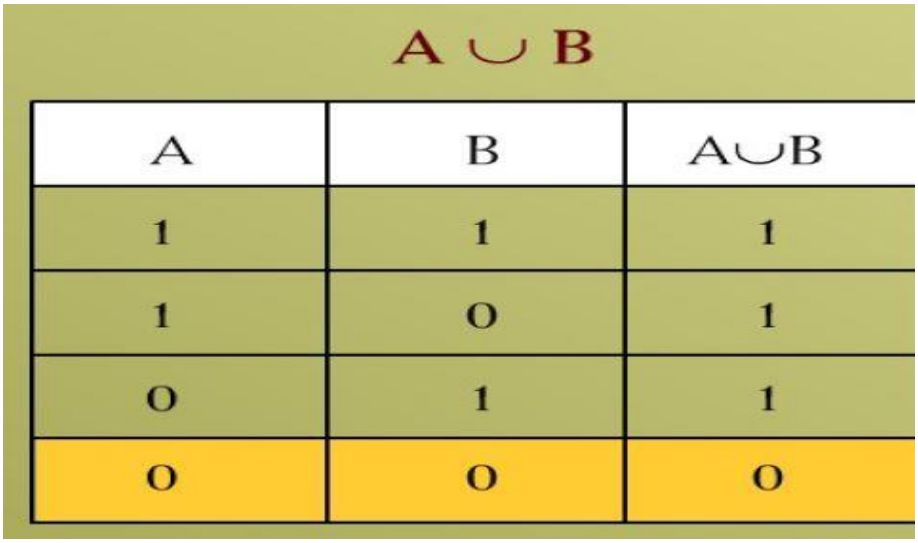
- Union of two given sets is the smallest set which contains all the elements of both the sets.
- To find the union of two given sets A and B is a set which consists of all the elements of A and all the elements of B such that no element is repeated.
- The symbol for denoting union of sets is **'∪'.**

For example

- Let set A = {2, 4, 5, 6}
  And set B = {4, 6, 7, 8}
- Taking every element of both the sets A and B, without repeating any element, we get a new set = {2, 4, 5, 6, 7, 8}
- This new set contains all the elements of set A and all the elements of set B with no repetition of elements and is named as union of set A and B.
- The symbol used for the union of two sets is '∪'.
- Therefore, symbolically, we write union of the two sets A and B is A ∪ B which means A union B.
- Therefore, A ∪ B = {x : x ∈ A or x ∈ B}

Membership Tables for Union

1)



$A \cup B$

A	B	A∪B
1	1	1
1	0	1
0	1	1
0	0	0

2)

A	B	C	$B \cap C$	$A \cup (B \cap C)$
1	1	1	1	1
1	1	0	0	1
1	0	1	0	1
1	0	0	0	1
0	1	1	1	1
0	1	0	0	0
0	0	1	0	0
0	0	0	0	0

3) What is Intersection? Draw Membership table for intersection using different examples.

ANS:

Intersection

- Intersection of two given sets is the largest set which contains all the elements that are common to both the sets.

- To find the intersection of two given sets A and B is a set which consists of all the elements which are common to both A and B.

- The symbol for denoting intersection of sets is '∩'.

For Example

- Let set A = {2, 3, 4, 5, 6}
  And set B = {3, 5, 7, 9}

- In this two sets, the elements 3 and 5 are common. The set containing these common elements i.e., {3, 5} is the intersection of set A and B.

- The symbol used for the intersection of two sets is '∩'.

- Therefore, symbolically, we write intersection of the two sets A and B is A ∩ B which means A intersection B.

- The intersection of two sets A and B is represented as $A \cap B = \{x : x \in A \text{ and } x \in B\}$

Membership Tables for Intersection

1)

$A \cap B$		
A	B	$A \cap B$
1	1	1
1	0	0
0	1	0
0	0	0

4) What is Difference? Draw Membership table for Set difference using different examples.

ANS:

Difference

- If A and B are two sets, then their difference is given by A - B or B - A.
- If A = {2, 3, 4} and B = {4, 5, 6}

- A - B means elements of A which are not the elements of B.

- i.e., in the above example A - B = {2, 3}

- In general, B - A = {x : x ∈ B, and x ∉ A}

- If A and B are disjoint sets, then A – B = A and B – A = B

For Example

- A = {1, 2, 3} and B = {4, 5, 6}.

- Find the difference between the two sets:
- A and B
- B and A

Solution:

The two sets are disjoint as they do not have any elements in common.

(i) A - B = {1, 2, 3} = A

(ii) B - A = {4, 5, 6} = B

Membership Tables for Difference

A – B		
A	B	A – B
1	1	0
1	0	1
0	1	0
0	0	0

END...