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COURSE NAME: DISCRETE STRUCTURE

DEPARTMENT OF BS SOFTWARE ENGINEERING

SEMESTER 2ND

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SECTION A

Question 1: What is Venn diagram? Explain in detail the Application of Venn diagram.

Answer:

Venn diagram is an illustration that uses circles to show the relationships among things or finite groups of things. Circles that overlap have a commonality while circles that do not overlap do not share those traits.

Venn diagrams help to visually represent the similarities and differences between two concepts.

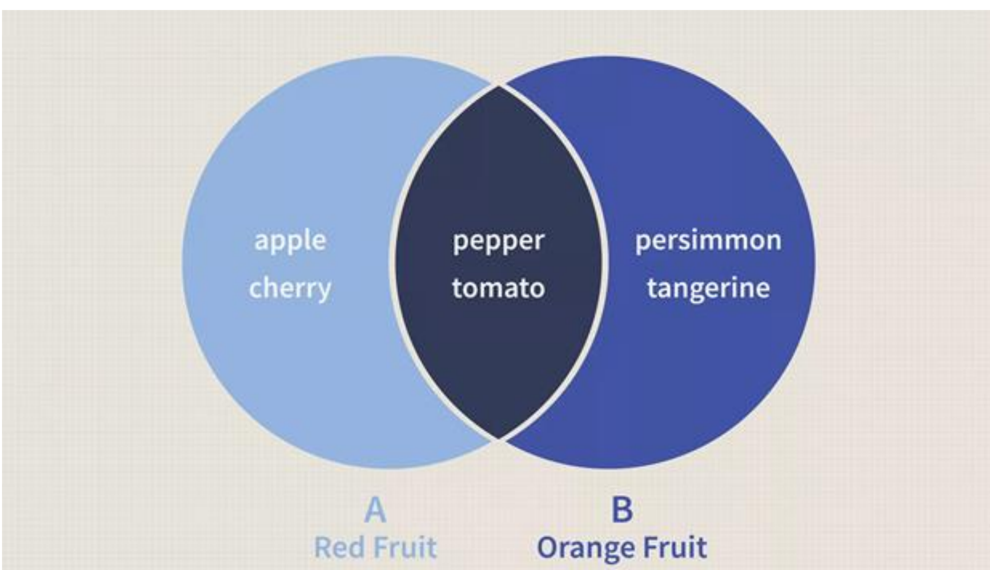
Application of Venn diagram:

Venn diagrams are used to depict how items relate to each other against an overall backdrop, universe, data set, or environment. A Venn diagram could be used, for example, to compare two companies within the same industry by illustrating the products both companies offer (where circles overlap) and the products that are exclusive to each company (outer circles).

- Venn diagrams are, at a basic level, simple pictorial representations of the relationship that exists between two sets of things. However, they can be much more complex. Still, the streamlined purpose of the Venn diagram to illustrate concepts and groups has led to their popularized use in many fields, including statistics, linguistics, logic, education, computer science, and business.

Examples of Venn Diagrams

A Venn diagram could be drawn to illustrate fruits that come in red or orange colors. Below, we can see that there are orange fruits (circle B) such as persimmons and tangerines while apples and cherries (circle A) come in red colors. Peppers and tomatoes come in both red and orange colors, as represented by the overlapping area of the two circles.



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

Answer:

In a similar way we can define the *union* of two sets as follows:

- The ***union*** of two sets *A* and *B*, written *A* ∪ *B*, is the set of elements that are in *A* **or** in *B* (or both).
- So, for example, {1, 2, 3, 4} ∪ {2, 4, 6, 8} = {1, 2, 3, 4, 6, 8}.

You'll see, then, that in order to get into the intersection, an element must answer 'Yes' to *both* questions, whereas to get into the union, *either* answer may be 'Yes'.

The ∪ symbol looks like the first letter of 'Union' and like a cup that will hold a lot of items. The ∩ symbol looks like a spilled cup that won't hold a lot of items, or possibly the letter 'n', for intersection. Take care not to confuse the two.

Membership table for union:

A	B	A ∪ B
F	F	F
F	T	T
T	F	T
T	T	T

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

Answer:

where the two loops overlap (the region corresponding to 'Y' followed by 'Y'), is called the *intersection* of the sets *A* and *B*. It is denoted by *A* ∩ *B*. So we can define intersection as follows:

- The ***intersection*** of two sets *A* and *B*, written *A* ∩ *B*, is the set of elements that are in *A* **and** in *B*.

(Note that in symbolic logic , a similar symbol, , ∩ is used to connect two logical propositions with the **AND** operator.)

For example, if *A* = {1, 2, 3, 4} and *B* = {2, 4, 6, 8}, then *A* ∩ *B* = {2, 4}.

We can say, then, that we have combined two sets to form a third set using the *operation of intersection*.

Membership table for intersection:

A	B	A ∩ B
1	1	1
1	0	0
0	1	0
0	0	0

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

Answer:

- The ***difference*** of two sets *A* and *B* (also known as the ***set-theoretic difference*** of *A* and *B*, or the ***relative complement*** of *B* in *A*) is the set of elements that are **in** *A* **but not in** *B*.

This is written *A* - *B*, or sometimes *A* \ B.

For example, if *A* = {1, 2, 3, 4} and *B* = {2, 4, 6, 8}, then *A* - *B* = {1, 3}.

Membership table for Set difference:

A	B	C	$A \setminus C$	$B \setminus C$
1	1	1	0	0
1	1	0	1	1
1	0	1	0	0
1	0	0	0	0
0	1	1	0	0
0	1	0	0	1
0	0	1	0	0
0	0	0	0	0
