Closure Set

Definition :- The closure is essentially the full set of attributes that can be determined from a set of known attributes, for a given database, using its functional dependencies.

Closure of Attributes :- The closure of an attribute can be defined as a set of attributes that can be functionally determined from it.

- It is denoted by X^+
- X^+ is the set of all attributes that can be determined using the given set X (attributes)

How to find Closure ?

Q :→ Relation R (ABCD), FD are :- $A \to B$, $B \to C$, $C \to D$, $D \to A$

find the Closure of D? D^+

Sol :-

$D^+ = \{D, A, B, C\}$.

Qus 2

R (A B C D)

FD :- $A \rightarrow BC$

$B \rightarrow CD$

find A^+, B^+, C^+, D^+

Sol :-

$A^+ = \{A, B, C, D\}$

$B^+ = \{B, C, D\}$

$C^+ = \{C\}$

$D^+ = \{D\}$.

* Testing if functional dependency in closure ?

R (A B C D)

FD $\{A \rightarrow B, B \rightarrow C, C \rightarrow D\}$

$A^+ = \{A, B, C, D\}$

↑ itself

$B^+ = \{B, C, D\}$

$C^+ = \{C, D\}$

$D^+ = \{D\}$

↑ only itself

Candidate key = $\{A\}$.