Super Keys

→ How to find total no. of Superkeys in a table :→

Case 1 → Suppose we have a table $\{a_1, a_2, a_3 \dots a_n\}$

& a_1 is the CK.

⇒ Then total no. of Super keys are 2^{n-1}.

Case 2 ⇒ Suppose we have a table $\{a_1, a_2, a_3 \dots a_n\}$

& (a_1, a_2, a_3) is the CK.

⇒ Total no. of Super keys are $\left(2^{n-3}\right)$

Case 3 ⇒ Suppose we have a table $\{a_1, a_2, a_3 \dots a_n\}$

& $\{a_1 \ \& \ a_2\}$ 2 CK.

⇒ Total no. of Super keys are

Superkeys of (a_1) + Superkeys of (a_2) −

Superkeys of $(a_1 \ \& \ a_2)$.

$\{2^{n-1} + 2^{n-1} - 2^{n-2}\}$

ex ⇒ (a_1, a_2, a_3)

CK $\begin{cases} a_1 \\ a_2 \end{cases}$

Superkeys of a_1 ⇒ (a_1, a_2)
(a_1)
(a_1, a_3)
(a_1, a_2, a_3)

Super keys of a_2 = (a_1, a_2)
(a_2)
(a_2, a_3)
(a_1, a_2, a_3)

Super keys of a_1 & a_2 ⇒ (a_1, a_2)
(a_1, a_2, a_3)

⇒ $4 + 4 - 2$ ⇒ ⑥

Case 4 ⇒ $R = \{a_1, a_2, a_3 \dots a_n\}$

$CK_1 = (a_1)$
$CK_2 = (a_2, a_3)$

Superkey of (a_1) + Superkey of (a_2, a_3) − Superkey of $(a_1) \ \& \ (a_2, a_3)$ both.

$\left\{ 2^{n-1} + 2^{n-2} - 2^{n-3} \right\}$

Case 5 ⇒ $R = \{a_1, a_2, a_3 \dots a_n\}$

$CK_1 = (a_1, a_2)$
$CK_2 = (a_3, a_4)$

Superkey of (a_1, a_2) + Super key of (a_3, a_4) − Super key of (a_1, a_2, a_3, a_4)

$\left(2^{n-2} + 2^{n-2} - 2^{n-4} \right)$

Case 6 ⇒ $R = \{a_1, a_2, a_3 \dots a_n\}$

$CK_1 = (a_1, a_2)$
$CK_2 = (a_1, a_3)$

Sk of (a_1, a_2) + Sk of (a_1, a_3) − Sk of (a_1, a_2, a_3)

$\left\{ 2^{n-2} + 2^{n-2} - 2^{n-3} \right\}$

Case 7 → $R = \{a_1, a_2, a_3 \ldots a_n\}$

$Ck_1 = a_1,$

$Ck_2 = a_2,$ $Ck_3 = a_3$

$Sk(a_1) + Sk(a_2) + Sk(a_3) - Sk(a_1, a_2) -$

$Sk(a_2, a_3) - Sk(a_1, a_3) + Sk(a_1, a_2, a_3)$

Q ⟹ $R = \{eid, ename, dob\}$

$Ck = eid$

no. of $Sk = 2^{3-1} = 2^2 = 4$

Q ⟹ $R = \{eid, Pid, h\_rate\}$

$Ck (eid, Pid)$

no. of $Sk = 2^{3-2} = 2^1 = 2$

Q ⟹ $Emp = \{mob, email, ename\}$

$Ck = mob$

$Ck = email$

$Sk(mob) + Sk(email) - Sk(mob, email)$

no. of $Sk = 2^{3-1} + 2^{3-1} - 2^{3-2} = 8 - 2 = 6$

Q ⟹ $Emp(eid, mob, email, name)$

$Ck = eid$

$Ck = (ename, mob)$

$Sk(eid) + Sk(ename, mob) - Sk(eid, ename, mob)$

$2^{4-1} + 2^{4-2} - 2^{4-3}$

$8 + 4 - 2 = \underline{10}$

Q ⟹ $R = \{ename, mob, email, did\}$

$Ck_1 = ename, mob$

$Ck_2 = ename, email$

$2^{4-2} + 2^{4-2} - 2^{4-3}$

$4 + 4 - 2 = \underline{6}$

Q ⟹ $R = \{ename, mob, email, did, eid\}$

$Ck = eid$ $Ck = mob$ $Ck = mail$

$2^{5-1} + 2^{5-1} + 2^{5-1} - 2^{5-2} - 2^{5-2} - 2^{5-2} + 2^{5-3}$

$16 + 16 + 16 - 8 - 8 - 8 + 4 = \underline{28}$