Definition : An order Set S is Said to be Least upper bound property ; if $E \subseteq S$, $E \neq \phi$ and E bounded above, sup (L.u.b) (E) exist in S.

Ex ① Let $S = \mathbb{R}$, $E = \{x : 0 < x < 1\}$.

$S = \mathbb{R}$ is least upper bound property

Since
1. $E \subseteq \mathbb{R}$.
2. $E \neq \phi$.
3. E is bounded above.
4. $\sup(E) = L.u.b(E) = 1$. exist in $\mathbb{R}$.

② $S = \mathbb{Q}$, $E = \{x \in \mathbb{Q}, x^2 < 2\}$.

E does not L.u.b in $\mathbb{Q}$.

$\therefore$ $\mathbb{Q}$ does not has Least-upper bound property.

Definition : An order Set S is Said to be greatest Lower bound property, if $E \subseteq S$, $E \neq \phi$, and E is bounded below, inf (g.L.b.)(E) exist in S.

Ex $S = \mathbb{R}$, $E = \{x : 0 \leq x \leq 1\}$.

$\mathbb{R}$ is greatest Lower bound proprty

Since 1. $E \subseteq \mathbb{R}$ 2. $E \neq \phi$, 3. E is bounded below.

4. $\inf(E) = g.L.b(E) = 0$ exist in $\mathbb{R}$.