

0904 Class Activity

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1. $K_{m,n}$ 의 edge의 개수는?

Proof) The number of edges in $K_{m,n}$ is mn . We want to use the handshaking lemma to prove this. First, let V, E be the vertex set and the edge set of the $K_{m,n}$. By definition of the $K_{m,n}$, we can partition V into two disjoint vertex sets V_1, V_2 ; $|V_1| = m, |V_2| = n$. Since each vertex in V_1 is connected to all of the vertices in V_2 , $v \in V_1$ has degree n . Similarly, $v \in V_2$ has degree m . Hence, $\sum_{v \in V} \deg(v) = \sum_{v \in V_1} \deg(v) + \sum_{v \in V_2} \deg(v) = \sum_{v \in V_1} n + \sum_{v \in V_2} m = mn + nm = 2mn = 2|E|$. Therefore, $|E| = mn$.

2. $K_{m,n}$ 이 regular graph가 되기 위한 필요충분조건은?

All vertices in a regular graph have the same degree. Let $V = V_1 \cup V_2; V_1 \cap V_2 \neq \emptyset$. As I wrote above, $v \in V_1$ has degree n and $v \in V_2$ has degree m . So, $m = n$ has to be satisfied to $K_{m,n}$ be a regular graph, and vice versa.