Proving theorems about graphs

Theorem: Every finite simple graph has an even number of vertices of odd degree.

Recall *SUM* (sum of degrees) is even.

Let *ODD* denote the set of vertices of odd degree and *EVEN* denote the set of vertices of even degree.

$$SUM = \sum_{v \in ODD} deg(v) + \sum_{v \in EVEN} deg(v)$$

Since *SUM* is even and $\sum_{v \in EVEN} deg(v)$ is even, $\sum_{v \in ODD} deg(v)$ must also be even.

But then $|ODD|$ is even!

Q.E.D.