Compulsory Problem 3

The MAX CUT problem is the following: Given an undirected graph $G = (V, E)$ with weights $w : E \to \Re^+$, find a partition of V into V_1, V_2 so that the weight $\sum_{i \in V_1, j \in V_2} w(i, j)$ of the cut is maximized. We previously showed this optimization problem to be **NP**-hard.

Give an efficient approximation algorithm for MAX CUT with an approximation ratio of 2 (that is, the algorithm always outputs a cut with a total weight which is at least 50% of the maximum possible).

Hint: Start with $V_1 = V_2 =$ and add each vertex to either V_1 or V_2 in a greedy fashion.