Let a graph $G = (V, E)$ be given with positive weights $w(e)$ for every edge $e \in E$. For any subset X of V the *weight* of that subset is the sum of the weights of edges (u, v) with $u \in X$ and $v \notin X$. The goal is to find the maximum weight possible over all subsets X, i.e.,

$$\max_{X \subseteq V} \sum_{(u,v) \in \{(u,v) \in E \mid u \in X, v \notin X\}} w(u, v).$$

Describe a decision diagram for this problem:

1. What is the state space?

2. What is the transition function, or how does a parent node (state) depend on the children nodes for the available choices?

3. What is the cost of a transition/choice?

4. What is the value for the root?

What is a possibly useful relaxation of this decision diagram? Define a state merging operator.