HW12

(1) $G = (V, E)$, $T = (V, E_o)$ → DFS
L : leaf node set. N : set of non leaf nodes.
⇒ If e is available to DFS, then DFS would have left u to explore a new vertex. u ⇒ non leaf
⇒ Check odd level non-leaf vertices and set of even level non-leaf vertices.
Thus A has at least $\frac{|N|}{2}$ vertices while our sol^n has $|N|$ vertices.
⇒ Hence it is 2-approximat^n in worst case.

(2) ⇒ Every edge has at least one of its end vertices in A
⇒ The size of A is twice the size of this matching.
→ With inequality we conclude:
size (A) $\leq$ 2 × minimum vertex cover.

(3) minimize $\sum_{(u,v) \in E} c(u,v) \cdot x_{(u,v)}$

Subject to:
$x_v - x_u + x_{(u,v)} \geq 0 \quad \forall (u,v) \in E$ (1)
$x_u \in \{0, 1\} \quad \forall \{u \in V : u \neq s, u \neq t\}$ (2)
$x_{(u,v)} \in \{0, 1\} \quad \forall (u,v) \in E$ (3)
$x_s = 1$ (4)
$x_t = 0$ (5)

Every mincut corresponds to feasible solution and vice-versa.