(1) Choose i, must choose j

$$x_i \leq x_j$$

(2) we must choose both i and j, or neither

$$x_i = x_j$$

(3) Choose at most t items from a set S

$$\sum_{i \in S} x_i \leq t$$

(4) Choose any one item in a set S_i must choose item k ($k \notin S$)

$$x_j \leq x_k \quad \forall j \in S$$

(5) Choose all items in S, must choose k.

$$x_k \geq \frac{1}{|S|} \sum_{j \in S} x_j$$

$$x_k \geq \sum_{j \in S} x_j - (|S| - 1)$$