Fantasy Indian Premier League - An Optimization Problem

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Given a set of N players (around 180) $p_1, p_2, ...p_n$ where each player belongs to a team $p \in t \ \forall p \in P \ t \in T$ in a set of teams T such that $|T| \approx 8$, M matches $m_1, m_2, ..., m_M$ where a match m_i is between two teams $t_1(m_i)$ and $t_2(m_i)$devise a strategy $S(i) \rightarrow Q$ which before match i picks a set of 11 players Q such to maximize a reward function R and subject to various team constraints.

$$R(m_i) = \sum_{p_i \in t_1(m_i) t_2(m_i)} \text{performance}(p_i)$$

Where the function performance : $p \rightarrow \mathbb{I}$. Constraints for $p_i \in Q$ include

$$\sum_{p_i \in Q} 1_{\text{batsman} \in \text{skills}(p_i)} \geq 4$$

$$\sum_{p_i \in Q} 1_{\text{allrounder} \in \text{skills}(p_i)} \geq 1$$

$$\sum_{p_i \in Q} 1_{\text{bowler} \in \text{skills}(p_i)} \geq 2$$

$$\sum_{p_i \in Q} 1_{\text{keeper} \in \text{skills}(p_i)} \geq 1$$

$$\sum_{p_i \in Q} 1_{\text{bowler} \in \text{skills}(p_i)} + \sum_{p_i \in Q} 1_{\text{allrounder} \in \text{skills}(p_i)} \geq 5$$

$$\sum_{p_i \in Q} 1_{\text{keeper} \in \text{skills}(p_i)} \geq 1$$

$$\sum_{p_i \in Q} \text{isOverseas}(p_i) \leq 4$$

$$\sum_{p_i \in Q} \text{isUncapped}(p_i) \geq 1$$

$$\max_{t \in T} \sum_{p_i \in Q} 1_{p_i \in t} \leq 6$$

where skills : $p \rightarrow (s_1, s_2)$ where $s_1 \in \{\text{batsman}, \text{allrounder}, \text{bowler}, \text{keeper}\}$ and $s_2 \in \phi \cup \{\text{batsman}, \text{allrounder}, \text{bowler}, \text{keeper}\}$ such that $s_1 \neq s_2$. *isUncapped* and *isOverseas* are binary functions. More about the performance function can be read at **https://fantasy.iplt20.com/ifl/default/faq#earningpoints**.