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Case Problem

The Tennessee Pterodactyls

The Tennessee Pterodactyls is a new professional basketball franchise in Nashville. The team's general manager, Jerry East, and coach, Phil Riley, are trying to develop a roster of players. They drafted seven players from a pool to which the other teams in the league contributed two players each. However, the general manager and coach perceive these acquisitions to be no more than role players. They believe that the nucleus of their new team must come from the free agents who are currently available on the market. The team is well under the salary cap, and the owner has made $50 million per year available to them to sign players. The coach and general manager have put together the following list of 12 free agents, with important statistics for each, including their rumored asking price in terms of annual salary:

		Per-Game Averages				Annual Salary Projected ($1,000,000s)
Player	Position	*Points*	*Rebounds*	*Assists*	*Minutes*	
1. Mack Madonna	Back court	14.7	4.4	9.3	40.3	$ 8.2
2. Darrell Boards	Front court	12.6	10.6	2.1	34.5	6.5
3. Silk Curry	Back court	13.5	8.7	1.7	29.3	5.2
4. Ramon Dion	Back court	27.1	7.1	4.5	42.5	16.4
5. Joe Eastcoast	Back court	18.1	7.5	5.1	41.0	14.3
6. Abdul Famous	Front court	22.8	9.5	2.4	38.5	23.5
7. Hiram Grant	Front court	9.3	12.2	3.5	31.5	4.7
8. Antoine Roadman	Front court	10.2	12.6	1.8	44.4	7.1
9. Fred Westcoast	Front court	16.9	2.5	11.4	42.7	15.8
10. Magic Jordan	Back court	28.5	6.5	1.3	38.1	26.4
11. Barry Bird	Front court	24.8	8.6	6.9	42.6	19.5
12. Grant Hall	Front court	11.3	12.5	3.2	39.5	8.6

Jerry and Phil want to sign five free agents. They would like the group they sign to average at least 80 points per game (16 points per player), pull down an average of 40 rebounds per game (8 per player), dish out an average of 25 assists, and have averaged 190 minutes (38 minutes per player) per game in the past. Furthermore, they do not want to sign more than two front court and three back court players. Their immediate objective is to identify the players who as a group will meet their objectives at the minimum cost.

A. Formulate an integer linear programming model to help the general manager and coach determine which players they should sign and solve it by using the computer.
B. Is the money provided by the owner sufficient to sign the group of players identified in (A)? If not, reformulate the model so that the available funds are a constraint and the objective is to maximize the average points of the group.