Integer Programming COMP 567

Initial description of problems

The sports consultant for a busy and poor graduate student

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Introduction

As graduate students, we are busy doing taking course and doing research. However, our health condition is, if not more, as important as our study and research progress. A student's time is limited, and the classes make his schedule even less flexible. The student would not let sports time conflicts with study time and generally he would like to burn more calories in less amount of time. Moreover, a graduate student does not have much money and he wants to limit the expense in doing sports to certain amount. This business provides advice for each student on how to effectively manage one's time and money in doing sports. At the same time, the student will have maximized enjoyment and achieve better effects by burning more calories. The sports are assigned to different time units and the number of time units can only have integral values.

Objective:

Maximize the benefits of doing exercises. The benefit counts in your enjoyment in doing the exercise and the calories burnt by doing the exercise.

Constraints

Personal Schedule:

The student has classes every week. Therefore, we can not assign these timeslot to doing sports.

The variety of exercise:

One person may set a very big happy index to certain exercise so that he can do this exercise most of the time. However, for his own interest we should guarantee at least 2 kinds of sports are involved.

Total time spent on doing sports:

There should be an upper bound on the total time of doing sports since a student's

time is limited.

Necessary duration of doing sports:

Some sports can only do in a certain length of time. Some sports may have preparation time, for changing clothes or getting to gym. Therefore, you may want to do the sports once for longer time rather than dividing it into two times. Some sports can only be done during weekend and cost a whole day, like hiking or skiing.

Limit amount of money:

Some sports are more expensive than others. This may include fixed cost for purchasing equipment or the student may choose to rent the equipment every time he goes for the sports. In both cases, there is a limit on the expense.

Data

The data for the project is available on Internet, or, can be set by personal preference and personal schedule.
1. The amount of calories burnt by doing certain sports can be calculated on Internet. One example website is:
http://www.changingshape.com/resources/calculators/caloriesburnedcalculator.asp
2. The data concerning expenses for doing certain kind of sports can be collect from stores and gyms.
3. The time and money limitation is determined by the specific person
4. The student will assign the happy index for each sport according to his preference.