

# Take-home Assignment 5

The solutions are to be written **individually**, though a group discussion about the general strategy how to solve the problems is allowed. The students are expected to write down the solution in latex (as this will be a part of the semester report) and deliver it to Jiri or Kim latest by **December 14th**, 2007. You will then receive the corrected assignments within a week or so. As Jiri is abroad, you can either expect to get the feedback via email or you can talk with Kim.

Assume a finite digraph  $G$  where edges are labeled by integers (both positive and negative). For a given finite path in the graph we define its *weight* as the sum of all the labels on that path.

For each of these decision problems formalize precisely their definitions and determine the exact complexity (both containment and hardness).

- Given a  $G$  and a start node  $n_0$ , the question is whether there is an infinite path starting from  $n_0$  such that the limit of the weights of all finite prefixes of that path is equal to infinity.
- Given a  $G$ , a start node  $n_0$  and two integers  $L$  and  $U$ , the question is whether there is an infinite path starting from  $n_0$  such that the weight of any finite prefix of that path is strictly between  $L$  and  $U$ .