3. (a) The formulas of *difference logic* are built from Boolean operators and predicates of the form $x - y \leq c$ where x and y are some integer variables and c is an integer constant.

Describe how to translate the following *job-shop scheduling problem* to the satisfiability problem for difference logic:

> We are given a finite set of n jobs, each of which consists of a chain of operations. There is a finite set of m machines, each of which can handle at most one operation at a time. Each operation needs to be performed during an uninterrupted period of given length on a given machine.
> We need to decide whether there exists a schedule, i.e. an allocation of the operations to time intervals on the machines, whose total length is smaller than or equal to a given constant. [15]

(b) How can the satisfiability problem for difference logic be solved efficiently? [20]