Summer research projects for student from University of Toronto and University of British Columbia

Offers 2014

Arrival Day: May 5th, 2014
Start: May 6th, 2014
End: June 28th, 2014
Number of LU credits awarded: 12 credits

Project outline

Suitable for students in computer science

Number of students: 2

Implementation of a pruning algorithm for cumulative constraint in JaCoP solver

Description:

Constraint programming offers a way to define and solve, among others, scheduling problems. One of the main constraints used for scheduling is a cumulative constraint. This constraint enforces condition that at any time during the schedule execution the cumulative use of resources does not exceed a given limit. There exist different algorithms with different complexity to implement this. Recently a new algorithm has been proposed with complexity $O(kn \log n)$ [1,2]. It organizes the information on resource use in the binary tree and does a limited number of checks and updates achieving logarithmic computational complexity.

In this project, you will first study this algorithm and then implement it in JaCoP solver [3]. You will get a skeleton for the constraint and add a method that implements pruning of domains of task variables. This method will implement the algorithm. Finally, you will run a number of benchmarks to compare your implementation with a JaCoP existing implementation.

Prerequisites:

Good knowledge of Java programming, algorithms and data structures. The students would also benefit if they have knowledge of constraint programming.

Other:


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Department at LTH: Computer Science