COL 750 **March 7, 2022**

Assignment 2

Instructor: Subodh Sharma **Due: March 18, 2022**

Refer to the paper: Dynamic Partial Order Reduction. Implement the DPOR algorithm as an API that can be invoked from a test driver.

The general structure of the program is assumed to have the following:

- The dependence relation consists of either data racing events or events from the same process that are in program order (PO).
- For all shared memory variables, the initial value is considered to be 0.
- The program events belong to the set: $\{Rx[?], Wx[v], L(x), UL(x)\}$ where $Rx[?]$ is the read of shared variable x. The symbol ? is a placeholder for the value written by the last write to x. $Wx[v]$ denotes a write of value v to x. $L(x)$ and $UL(x)$ respectively denote lock and unlock of shared variable x.

The input format is as follows:

- A **PO** relation containing per-process program order. For instance, if the program contains two threads
  $P1 : t_{01} : x := 1; t_{02} : x := 2$
  $P2 : t_{11} : y := 1; t_{12} : x := 3$
  then the PO relation is $\{(t_{01}, t_{02}), (t_{11}, t_{12})\}$. The starting instruction labels for each process i can be assumed to be t_{i1}.

The output format is:

- Show the output *execution tree* as a dot graph.
- Print out a summary indicating the total number of executions explored by the DPOR algorithm, time taken and the memory consumed.