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Transition Systems over Games

This talk combines two areas of computer science.

(1) The notions of "labelled transition system" (a set of states, starting from which an action may be performed, leading to another state), "trace" (a possible sequence of actions from a starting state) and "bisimulation" (a relation that guarantees two states have matching behaviour) have provided a useful way of reasoning about computational systems.

(2) "Game semantics" is a compositional way of describing the behavior of higher-order programs employing private state, providing a high-level description in the sense that state is not mentioned. We want to represent game semantics using transition systems, but traditional systems are too rigid because they have a fixed set of actions. So instead we develop a version of transition system in which each state sits in a position of our game. The actions are the currently available moves. How do we make this compositional? We do it with a "transfer", a kind of program that converts moves between two games, giving an operation on strategies. The agreement between the transition systems and the transfer is given by a relation called a "stepped bisimulation".

(Joint work with Sam Staton)

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