Moldovan Vasilica
Group 258-2, SE

Lets see if the models are on time...

The card must induce the player that the CHES notion represented is the "Timed models".

In the right side of the card, a watch is drawn in order to make the player think about the concept of time. The gears represent models, and the remark about the models being on time should make the player think about the timed models, since these are not synchronized, but rely on global physical time for proper functioning. The gears should suggest the notion of models also because there are present different types of gears, or different models.

Moldovan Vasilica
Group 258-2, SE

Short question - Hybrid systems

Hybrid systems are systems that combine both continuous and discrete dynamics, often found in embedded systems like vehicles and robotic systems. These systems are modeled and analyzed using Stateflow and Simulink, commercial design tools that describe discretely updated variables and continuous-time dynamical systems. An extended state machine containing modes, switches, input, output and state variables (some of which being updated continuously, while others discretely), is used to represent hybrid processes. To specify the evolution of continuous state and output variables, differential and algebraic equations are used, while a boolean expression is used for imposing a constraint on how long the process can wait in a mode.

Moldovan Vasilica
Group 258-2, SE

Take Home Exam A

Long question - Synchronous vs Asynchronous models of computation

A synchronous model of computation is a type of concurrent computing model in which all processes or tasks are executed in a coordinated and synchronized manner. Every component runs through a sequence of rounds during which it reads its inputs, computes outputs, and updates its internal state. The synchronous reactive components have several properties, being finite-state, combinational, event-triggered, nondeterministic and input-enabled components.

The asynchronous model of computation is a type of concurrent computing model in which processes or tasks are executed independently, without the use of a global time. To indicate whether a task is ready to be executed, a guard condition is explicitly associated with it. The task is enabled in a certain state if it satisfies this condition, which is a boolean expression over state variables. When more tasks are enabled, one of them is nondeterministically chosen to be executed.

One similarity between synchronous and asynchronous models of computation is the fact that in both models, tasks and processes may run concurrently and they may communicate with each other. Also, both models involve the execution of multiple tasks and processes.

A difference between these two models of computation is that during one step, in the asynchronous model only one task is executed, while in the synchronous model, all tasks are executed during one step. Another difference is represented by the fact that synchronous models are tipically more predictable and deterministic than asynchronous models. Also, in synchronous models if one process blocks, all the other processes will also be blocked. In asynchronous models, processes can continue to execute even if other processes are blocked. However, deadlocks can appear in asynchronous models of computation too, making them get blocked.