A concurrent real-time system is a system of many components, that should deliver the result in a particular time interval. The design of such a system is generally complex, with high possibility of errors. Thus it is very important to be able to verify the correctness of the design itself, before going on to implementation stage.

Model-checking is a powerful approach to design verification which provides techniques for automatic determination of whether a design (model) of the system satisfies desired properties expressed in formal logic.

Main problems that model-checking algorithms have to address are:

- State space of any concurrent system grows exponentially with the number of components of the system - State Explosion problem

- Addition of time (for modeling real-time systems) means that there are infinitely many concrete states of the system.

Both of these mean that model-checking takes a long time and a lot of space. There is a number of approaches to model-checking providing partial solutions to these problems. However a lot of improvement is still desired to make practical model-checking of real systems feasible. Moreover, the more expressive the design technique is, and the more expressive the specification language is, the more complex becomes the problem of model-checking.

Current state of the art model-checkers have fairly simple modeling means and specification languages, thus restricting developer in their capabilities.

In this project a relatively new approach to model-checking is taken - the use of Abstract Game Theory, with the model-checking algorithm being implemented as an abstract game. In this approach reasoning is made over sets of states satisfying some properties, not individual states, thus reducing the size of the state-space to be searched. Also in this project the more expressive models of concurrent real-time systems and the more expressive specification logics are to be brought together to allow checking of complex properties of complex systems. A tangible deliverable will be a model-checking tool that should have a number of advantages over current state of the art model-checkers.