The idea: Automatic Modeling

Our Vision
The ultimate goal of iGAME Software 2010 team is to promote synthetic biology throughout the world. To attract more people who do not have biology background to be interested in this area, we plan to develop a modeling-and-simulation game specially designed for synthetic biology users are taught to learn the basic knowledge in the area via constructing their genetic circuits as input to our software and try to understand the system behavior as output.

Problem and Solution
Problem → How to “KISS” to the Amateurs?
Solution → Automatic Modeling!

More Details of Our Modeling
For iGAME, the users are only required to provide the assembly of biological parts and other initial conditions and will obtain the network of the system as output. To implement this idea, we propose a novel idea structure. We call it the “Chain-Node Model,” to describe structure of complex Template Species.

Based on this, we further propose the concept of Template. It includes two kinds of templates: the first is a “species template”, which could represent a series of species containing the same structural pattern, in addition, a reaction occurring between several template species is a template reaction.

Our New Database Language: MoDel.

MoDel, (Standard Biological Part Automatic Modeling Database Language) is a database representation format for synthetic biology automatic modeling. This project of MoDel aims at providing a language and syntax standard for automatic modeling database used in synthetic biology models on a number of topics.

Standardization

BF MYTH: Standard Biological Part Automatic Modeling Database Language (MoDel) mainly describes the database language specifications of MoDel, with concrete examples, which provides enough information for serious database constructors to build up a database on his own. We also provide the XMLSchema, a Schema is perfect for MoDel, to allow software to perform check on syntax.

The Software: iGAME

The Demo
1. TOGGLE SWITCH
2. REPRESSION

Human Practice

The C Project
“The C Project”, as we call, consists of three parts: Curriculum, Communication and Community.

As an HEM team, we try to let people as many as possible to know what synthetic biology is. Therefore, advisors of our team, Junlu Li and Shenghong, have established a set of synthetic biology curriculum this summer. Following is the analysis of the results of the survey. The first chart shows students’ favorite game types for iGAME, and the second chart shows their knowledge of iGAME project. We have even drawn a Cluster Map to show the result of our survey!