Abstract

Exam Timetabling problem is a problem which has different complexivity in every institutions depends on many factors, such as, the number of students, the number of Subjects, dan the number of constraints which are used to solve the problem. Basically, Exam timetable that is acceptable is the one which doesn't have any students who has 2 schedule in a time slot and also doesn't have any room which is used for more than one different schedules in the same time slot. Therefore, those two constraints became the standart constraints that have to be fulfilled in the Exam Timetabling problem.

On this Final Task, Island Model Genetic Algorithm added with Directed Mutation was used to solve the exam timetabling problem. Directed Mutation will guarantee that the mutated chromosome will not have worse fitness and mostly the fitness became better. Beside directed mutation, there is also a migration process for certain chromosome from their own island to the new island at some certain intervals of generations .

Datasets being used for testing the system are Academic data from odd semester and from even semester of ITTelkom Bandung. Based on own observations on some tests, it can be seen that the greater the probability of crossover is, the worse fitness, evaluated from the chromosomes, will more likely be. The Migration Size value which is almost the same with the total chromosome in a island is also more likely worsening the fitness value. As for The Migration Interval, there are differences in affecting the fitness value for dataset 1 and dataset 2.

The exam schedules, which were resulted from the system using parameters : *Migration Interval* 2, *Migration Size* 2, Crossover Probability 0.5, Total Islands 3, Total Chromosome on each Island 4, and Evolution Generation 15, had total violations of hard constrains by 0% and total violations of soft constrains by 1.05% using datasets of odd semester from year 2010/2011 IT Telkom. Meanwhile, using datasests of even semester from year 2010/2011 IT Telkom, the exam schedule, generated by the system using same parameters, had total violations of hard constrains by 0% and total violations of soft constrains by 0.29%.

Keywords: exam timetabling, Genetic Algorithm, Island Model Genetic Algorithm, *Migration Interval, Migration Size,* Probabilitas Crossover