

CHAPTER II

LITERATURE STUDY

2.1 Data Structure

This application using array and tree as it's data structure and particle swarm optimization algorithm.

2.1.1 Array

This application use 2 types of arrays, there are : array of integer to store course's position, array of string to fetch data from database and fetch data from text files when the schedule need to be loaded again.

2.1.2 Binary Tree

There are many kinds of data structure tree, and the data structure tree that used in this application is a binary tree data structure. Binary tree in this application became the main data structure, because all of data is stored in binary tree such as: lecturers, courses, classes, and course's position in the schedule. And binary tree itself is a tree data structure in which each nodes has at most two children (referred to as the left child and the right child). Storing a lot of data would be complicated. That's why in this application, the contents of each nodes of binary tree is an array which is part of a data and redeclared into variables, so it makes easier when taking a certain data. When the application need to take data from binary tree, the application using in-order function to select data from binary tree.

2.2 Algorithm

2.2.1 Particle Swarm Optimization

*Particle Swarm Optimization (PSO) is a computational method that optimize a problem by iteratively trying to improve a candidate solution with regard to a given measure of quality**. Quality measures that used in this application is the smallest number of fitness. That means smaller number of fitness is getting good quality too. In this application the default number of fitness is the number of optimization terms used. The best quality of schedule optimization is with number of fitness = 0. If the number of fitness = 0, then it means there is no data subjects who violate the terms of optimization.

First algorithm step in this application is random all course's position which does not have fixed position. Then it will check with the terms of optimization, whether courses had an optimum position or not. If course's position is not optimum then the algorithm will changes all course's position. Then the algorithm will check with the terms of optimization again. And it will be repeated until all course's position is optimum or it reach the maximum of looping(all course's position not optimum).

* www.wikipedia.org/wiki/Particle_swarm_optimization(July 26th 2014 - 17:07WIB)