

CSCI 4560/6560 Evolutionary Computation

Assignment Number 1: Due Tuesday 9/13/2005 (in class)

1. [10 points] Solve Problem 1 Page 35 of the text book.
2. [10 points] Solve Problem 3 Page 35 of the text book.
3. [10 points] Solve Problem 4 Page 35 of the text book.
4. [20 points] The $subset_{21}$ problem is stated as follows. Given a set of N positive integers $X = \{x_1, x_2, \dots, x_n\}$. Find a subset P of the set X such that the sum of the elements of P is equal to 21. For example, if $N=5$ and the set $X = \{12, 17, 3, 24, 6\}$, the set $P = \{12, 3, 6\}$ is a valid solution for the $subset_{21}$ problem in this example.

Formulate the $subset_{21}$ problem as a Genetic Algorithm optimization. You may use binary representation, OR any representation that you think is more appropriate. you should specify:

- A fitness function. Give 3 examples of individuals and their fitness values if you are solving the above example (i.e. $X = \{12, 17, 3, 24, 6\}$).
- A set of mutation and/or crossover and/or repair operators. Intelligent operators that are suitable for this particular domain will earn more credit.
- A termination criterion for the Genetic Algorithm optimization which insures that you terminate with a valid solution for the $subset_{21}$ problem if a solution exists.