National Institute of Technology, Rourkela

CS6475: Soft Computing Laboratory

ASSIGNMENT: 04

You are given a set of items, each with an associated weight and value. Your task is to maximize the total value of items you can select, while ensuring that the total weight does not exceed a given capacity.

• Knapsack Capacity: 10 units

• Number of Items: 5

Item	Weight	Value
A	2	10
B	3	7
C	4	15
D	5	10
E	7	3

Use a binary encoded genetic algorithm to find the optimal combination of items that maximizes the total value without exceeding the knapsack's capacity with the following instructions.

• Either an item is selected fully or not at all. Fractional amount of items can't be selected.

• Population Size: 50

• Termination Criteria: (Max Generations: 300 or rate of change of best solution <0.001)

• Mutation Rate: 0.15

• Crossover Rate: 0.7

• Crossover Scheme:

Single point crossover (If the first character of your name lies between A and H)

Two-Point crossover (If the first character of your name lies between I and R)

Uniform crossover (If the first character of your name lies between S and Z)

• Mutation Scheme: Flipping (If the last digit of your roll number is Odd)

Interchanging (If the last digit of your roll number is .even)

Also plot the convergence graph denoting the fitness of the best solution of every generation.