Evolutionary Computation Theory and Application
Assignment 2: Traveling Salesman Problem

Arun Prabhu, Dharmin B.

May 17, 2018

1 Solution

Parameter	**Value**
Population size	100
Crossover Rates	0.01, 0.1, 0.99, **0.98**
Mutation Rates	0.01, 0.1, 0.99, **0.25**
Repetitions	30
Generations	1000
Average best fitness	58.8038
Best fitness	53.6009

Table 1: Parameters for Experiments

Parameter	**Value**
Population size	100
Fitness	50.7048
Generations	3000
Crossover rate	0.99
Mutation rate	0.1

Table 2: Parameters for Absolute best result

2 Results

Figure 1: Absolute best map

2.1 Different crossover rates

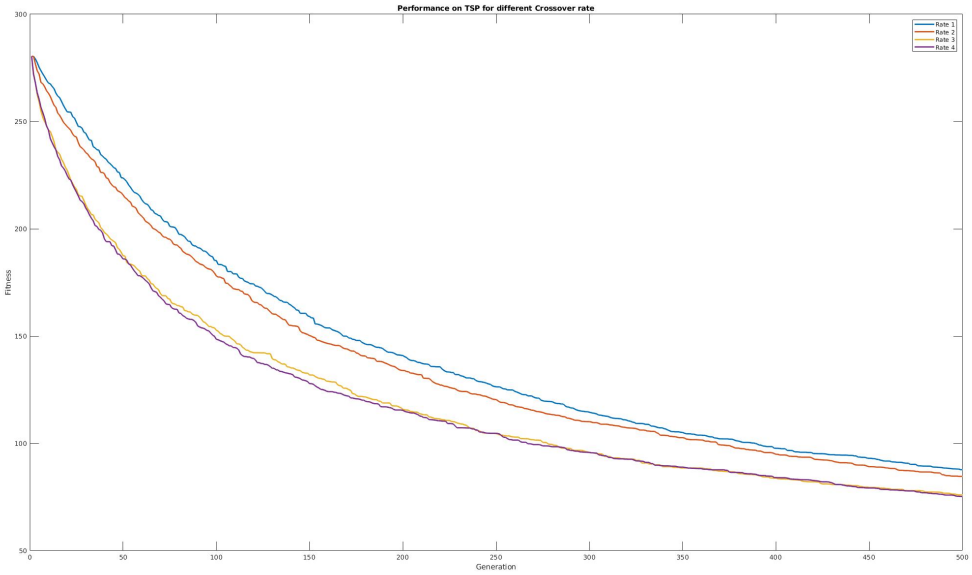

Figure 2: Crossover rate comparision

Describe and explain the different mutation rates and how they influence the learning behaviour. Please remember to also focus on why, not only on what. Also elaborate on the mutation rate you have chosen as best mutation rate.

- We perform single point crossover.
- We choose `sp` individuals and select one with best fitness as father. We choose the mother in the same way.
- We select a `crossPoint` at random and select `1:crossPoint` genes from father's genotype and remaining genes are added in the order in which they appear in mother's genotype.
- We have discovered that crossover rate of 98% performs best.
- As the crossover rate increases, the means fitness becomes better and better.

2.2 Different mutation rates

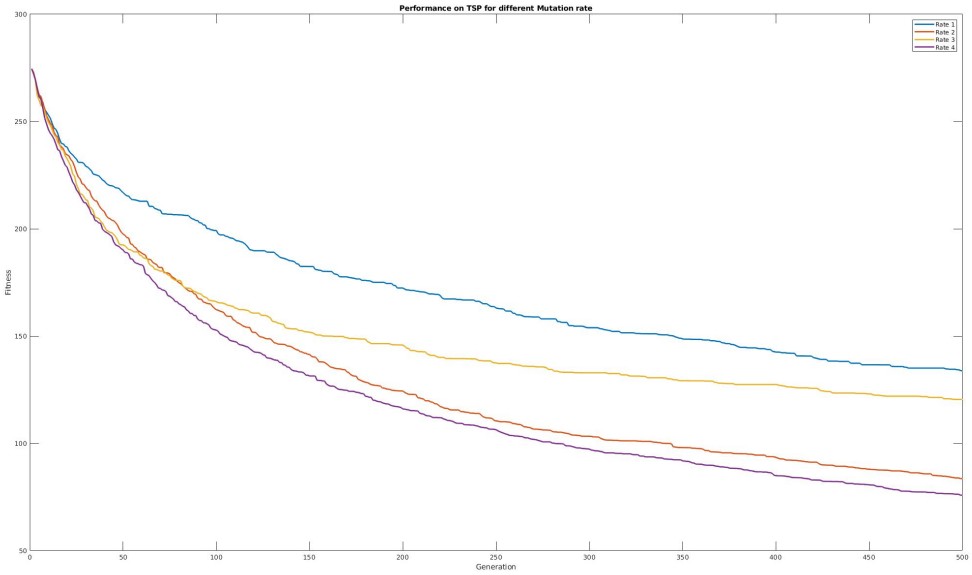

Figure 3: Mutation rate comparision

Describe and explain the different crossover rates and how they influence the learning behaviour. Please remember to also focus on why, not only on what. Also elaborate on the crossover rate you have chosen as best mutation rate.

- We perform *partial shuffle mutation*.
- We mutate an individual with `mutProb` probability.
- We select two points i,j. We reverse the gene string between i and j.
- We have discovered that mutation rate of 25% performs best.

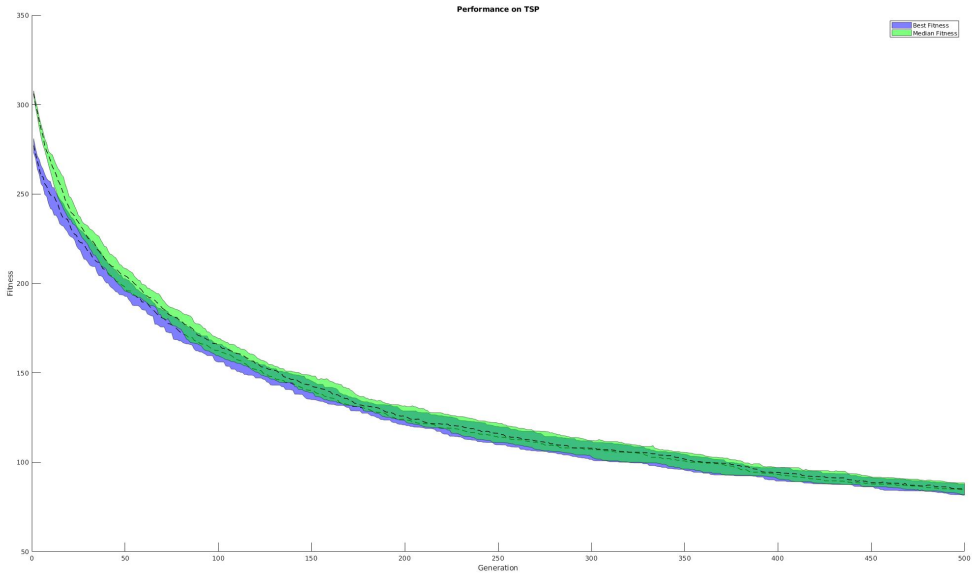

Figure 4: Best and median fitness over 30 Experiments