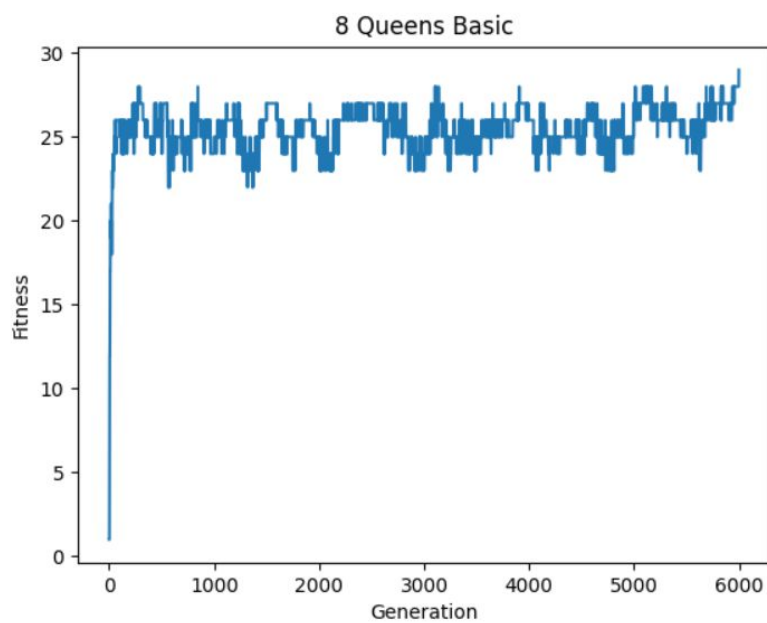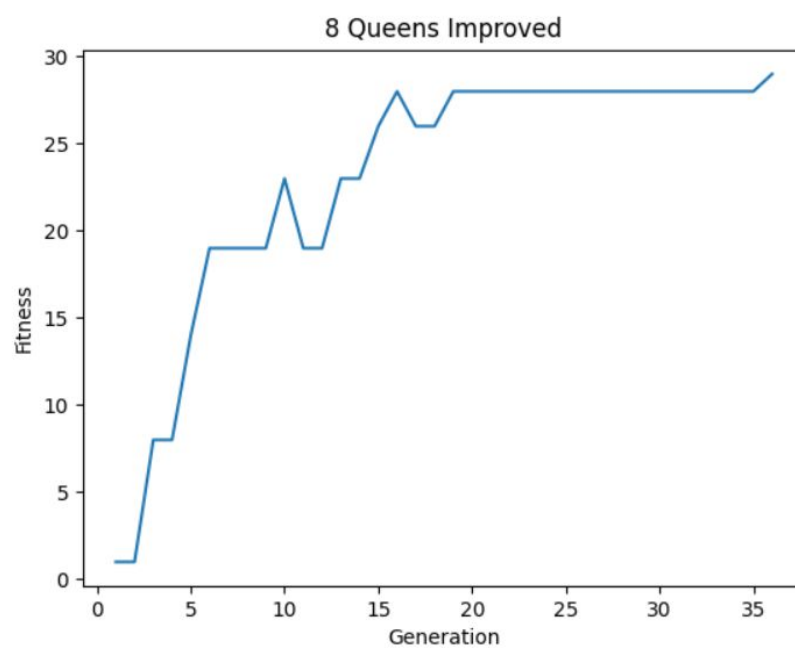# A.I. Assignment - 1

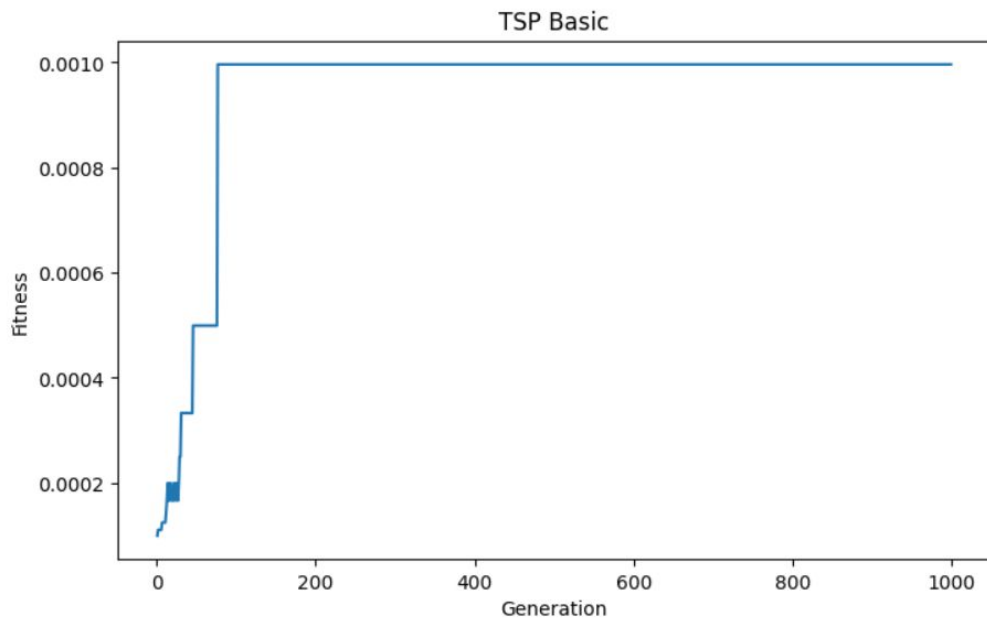1) 8 queens problem:

Basic algorithm:
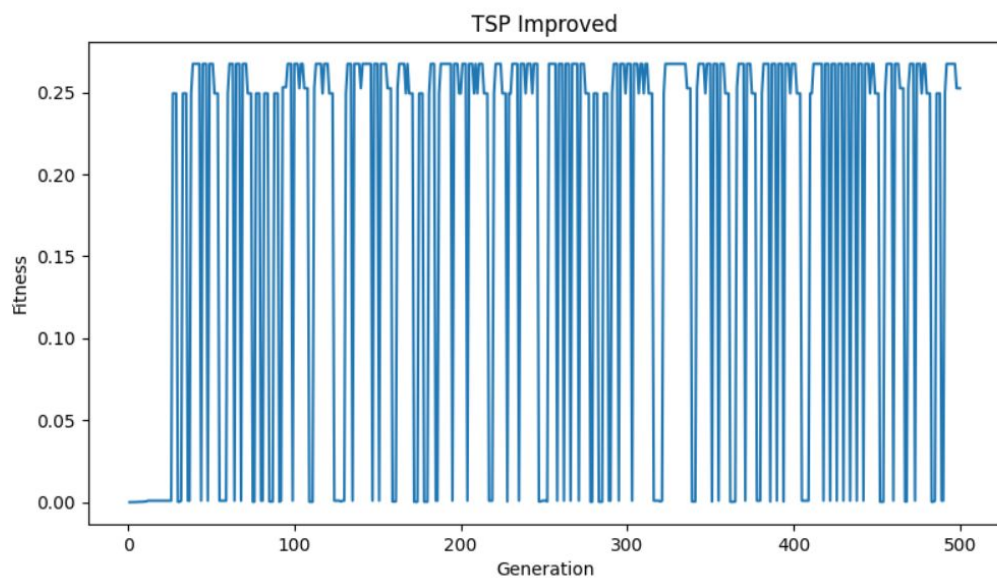


Improved Algorithm:

Improvements Done:

- Mutate function: implemented hill climb for choosing which neighbour to mutate to. The functions will check all the neighbors and find the neighbor with best fitness, if best fitness is greater than current fitness then it will mutate to that neighbour, if it finds that best fitness is less than the current state then it will randomly select the next neighbour.
- Reproduce function:Implemented hill climb for which child to produce. The function will calculate which crossover to use to get a child with maximum fitness, if there is no child with fitness greater than the parent than the crossover will be random.
- Mutate probability: It will check if the fitness of previous 2 generations, if the fitness is same then it will increase mutation probability, if the fitness is different then the mutation probability will be reseted.

## 2) Travelling Salesman problem:

## Basic Algorithm:



## Improved Algorithm:

Improvements done:

- Mutate function: implemented hill climb for choosing which neighbour to mutate to. The functions will check all the neighbors and find the neighbor with best fitness, if best fitness is greater than current fitness then it will mutate to that neighbour, if it finds that best fitness is less than the current state then it will randomly select the next neighbour.
- Reproduce function:Implemented hill climb for which child to produce. The function will calculate which crossover to use to get a child with maximum fitness, if there is no child with fitness greater than the parent than the crossover will be random.
- Mutate probability: It will check if the fitness of previous 2 generations, if the fitness is same then it will increase mutation probability, if the fitness is different then the mutation probability will be reseted. This is gone so that the child is not stuck at a local maxima. If it gets stuck we increase the probability to mutate.