Run Screenshots

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Included in this document are screenshots from 5 runs of our program. Each run consists of the hyperparameters, the starting plot output, and the ending plot output. The starting plot includes the plot of the best routes throughout the generations (which is empty) and the best route from the first generation plotted. The ending plot includes the plot of the best routes throughout the generations and the best route found from the generations plotted.

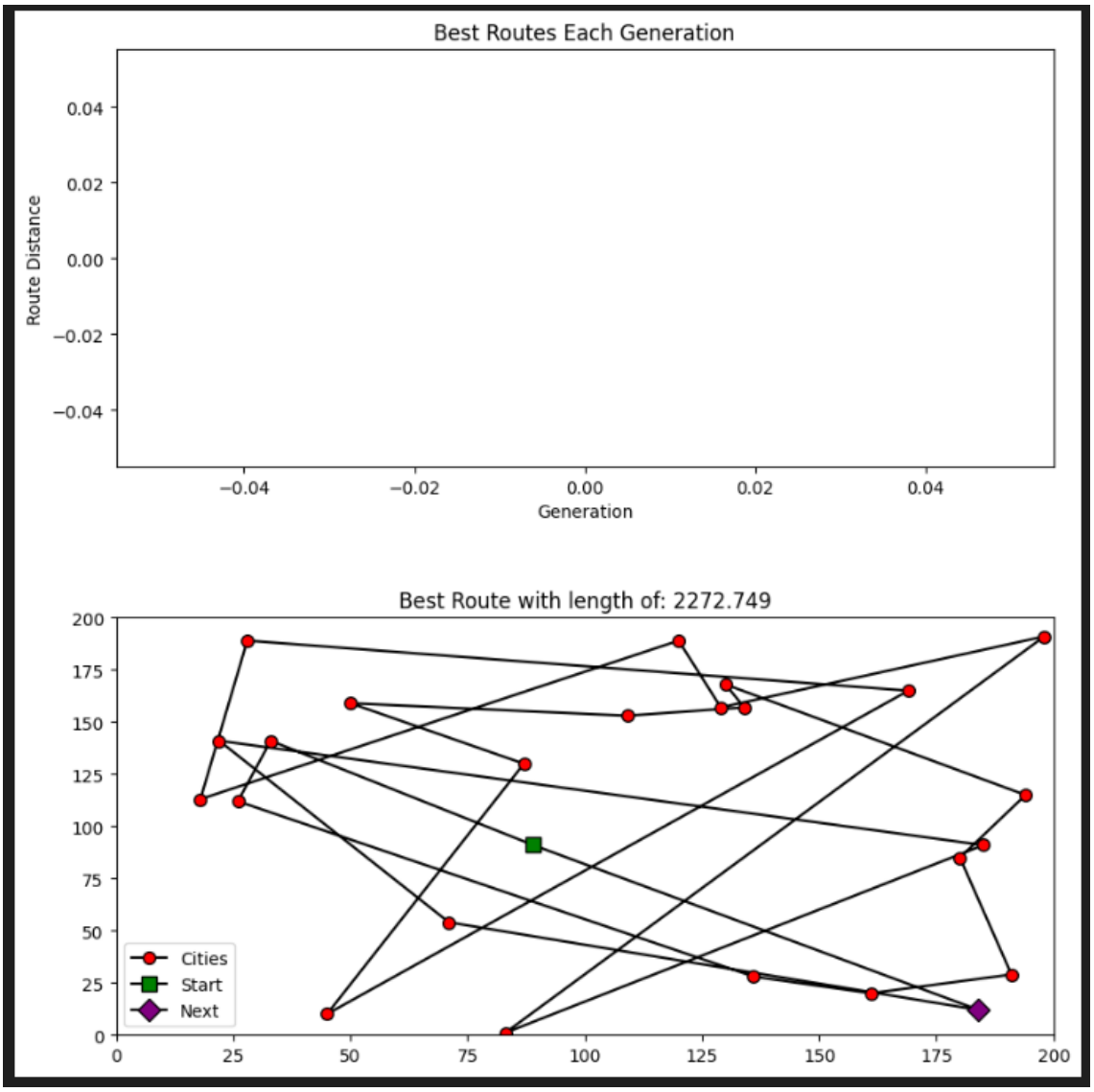
Run 1:

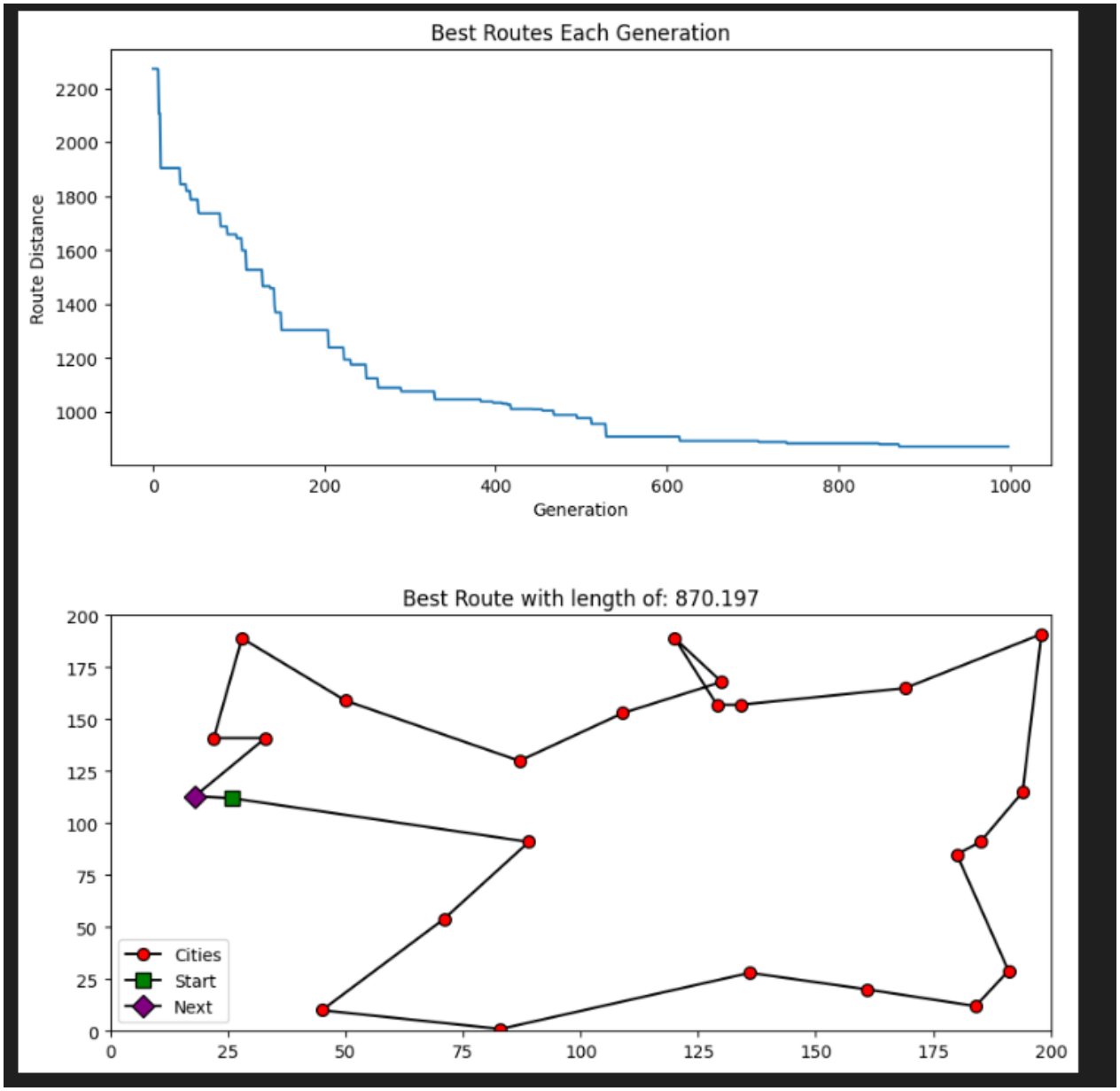
```python
def main():
    '''main function'''

    N_SIZE =25
    NUM_GENERATIONS = 1000
    POP_SIZE = 100

    BEST_ROUTE_LENGTH = 0
    BEST_ROUTE_LIST = []
    BEST_ROUTE = []

    MUTATION_RATE = 0.1
    KILL_RATE = 0.2
    NUM_CHILDREN = 20
```





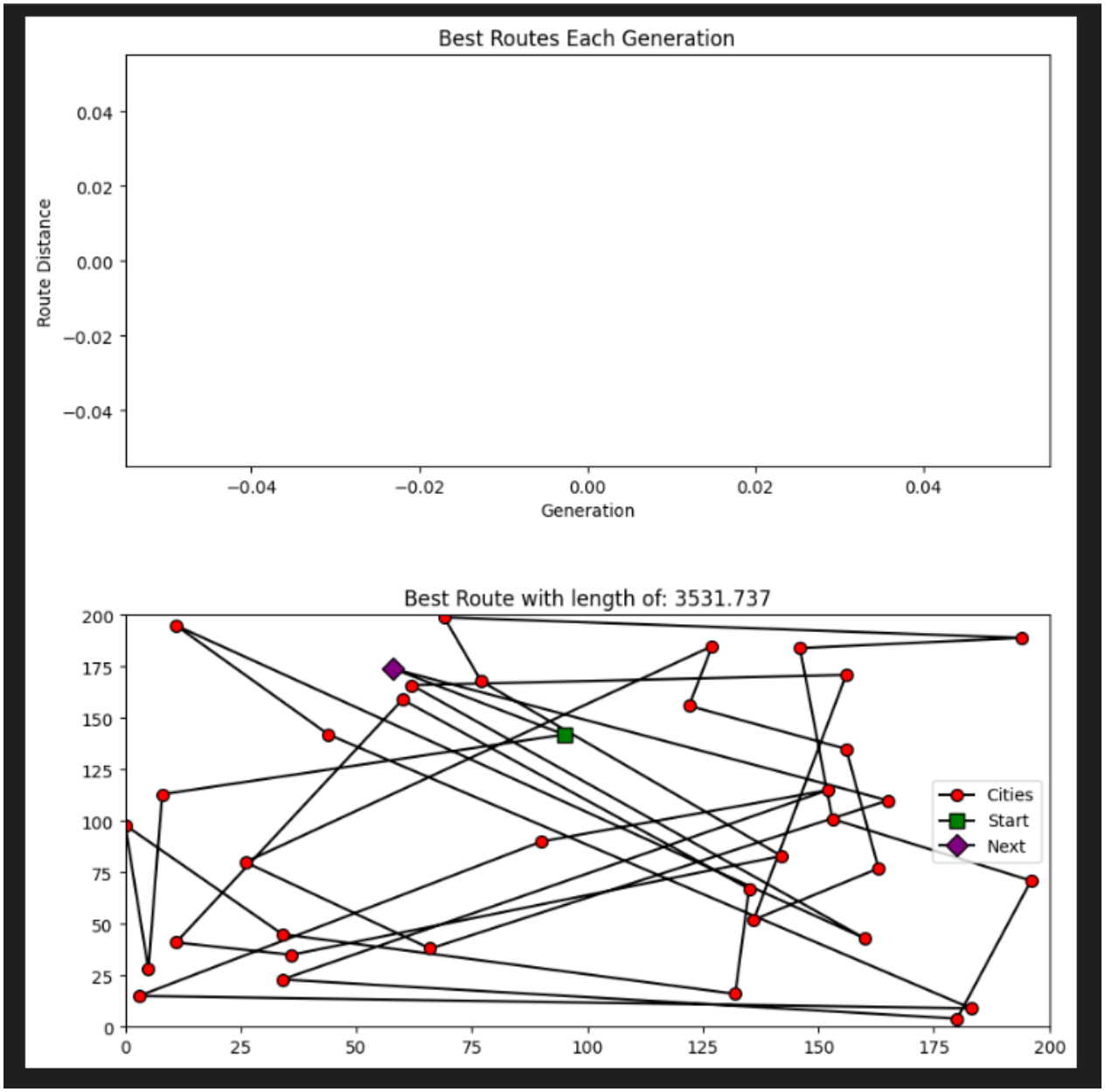
Run 2:

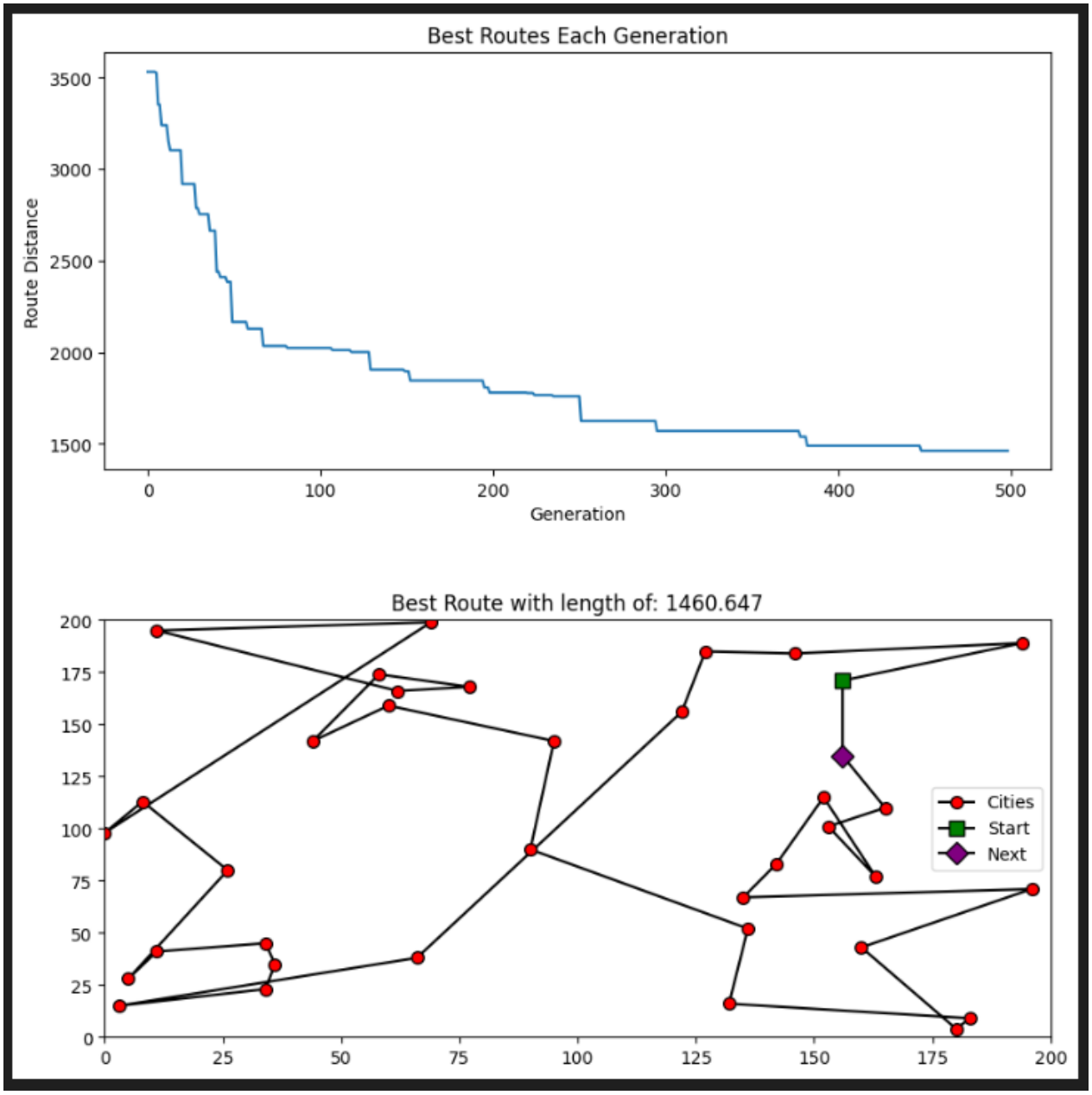
```python
def main():
    '''main function'''

    N_SIZE = 37
    NUM_GENERATIONS = 500
    POP_SIZE = 50

    BEST_ROUTE_LENGTH = 0
    BEST_ROUTE_LIST = []
    BEST_ROUTE = []

    MUTATION_RATE = 0.4
    KILL_RATE = 0.5
    NUM_CHILDREN = 50
```


Best Routes Each Generation
Route Distance
0.04
0.02
0.00
−0.02
−0.04
−0.04
−0.02
0.00
0.02
0.04
Generation
Best Route with length of: 3531.737
200
175
150
125
100
75
50
25
0
0
25
50
75
100
125
150
175
200
Cities
Start
Next



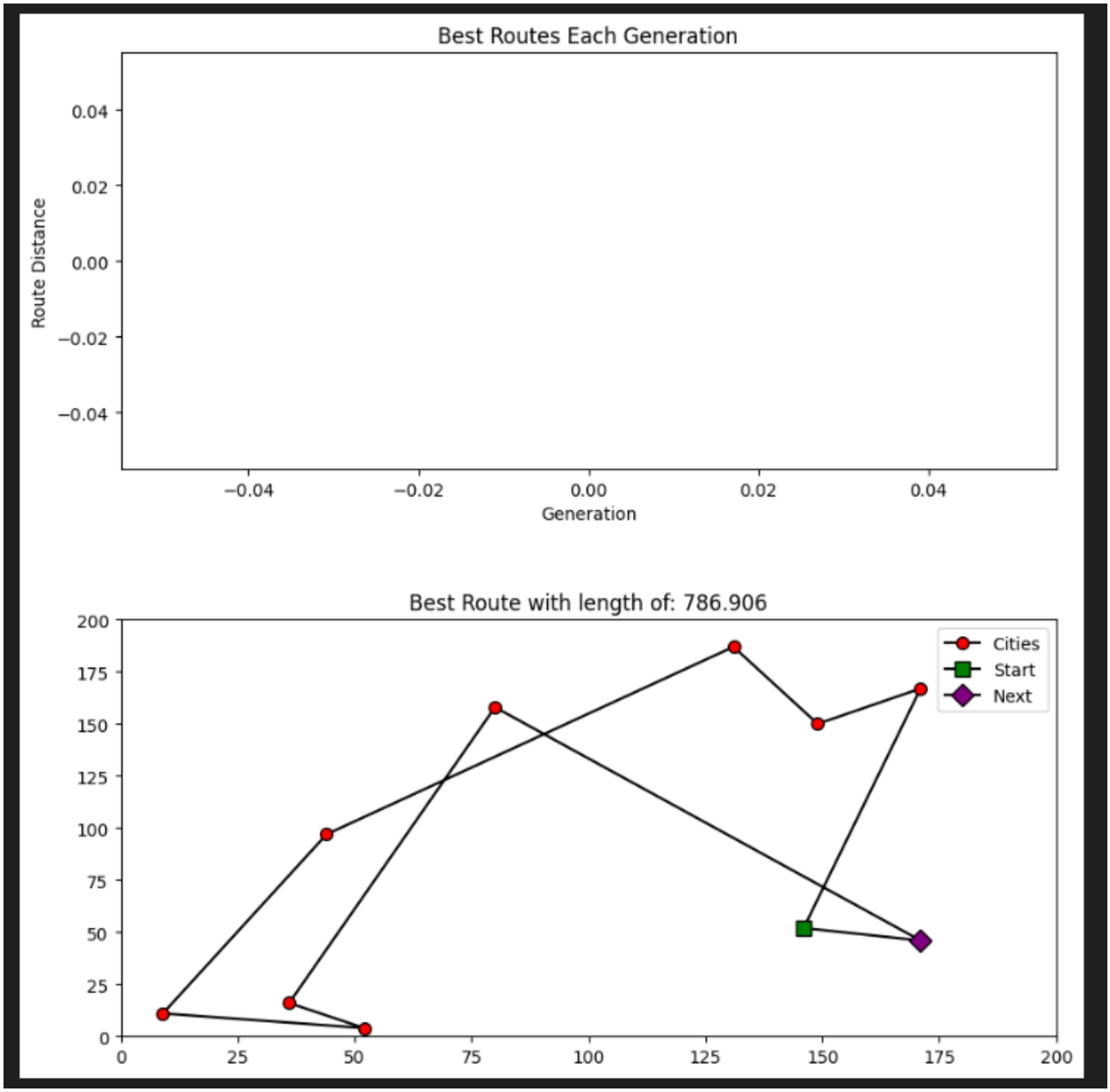
Run 3:

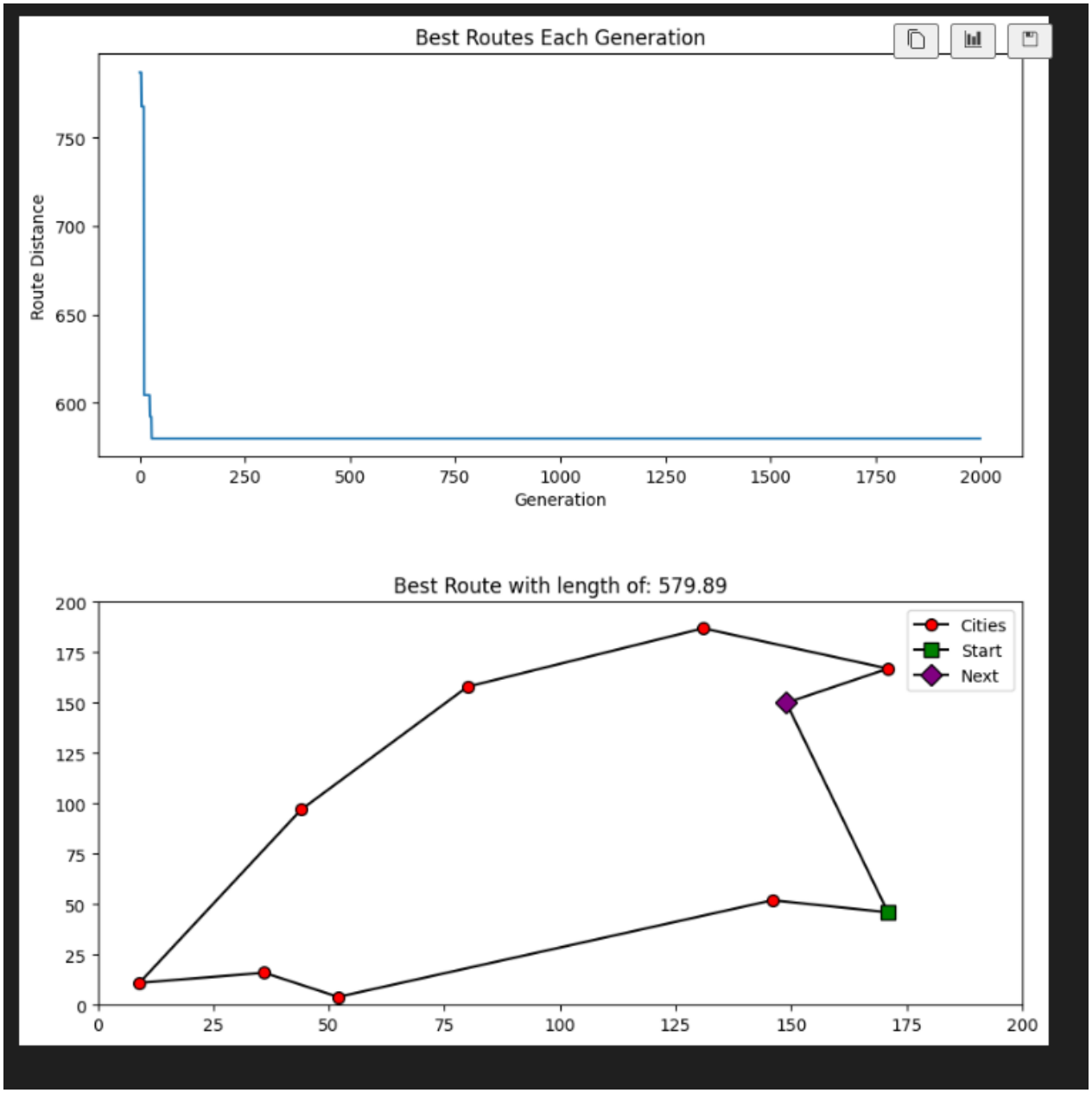
```python
def main():
    '''main function'''

    N_SIZE = 10
    NUM_GENERATIONS = 2000
    POP_SIZE = 100

    BEST_ROUTE_LENGTH = 0
    BEST_ROUTE_LIST = []
    BEST_ROUTE = []

    MUTATION_RATE = 0.1
    KILL_RATE = 0.7
    NUM_CHILDREN = 70
```


Best Routes Each Generation
Route Distance
0.04
0.02
0.00
−0.02
−0.04
−0.04
−0.02
0.00
0.02
0.04
Generation
Best Route with length of: 786.906
Cities
Start
Next
200
175
150
125
100
75
50
25
0
0
25
50
75
100
125
150
175
200



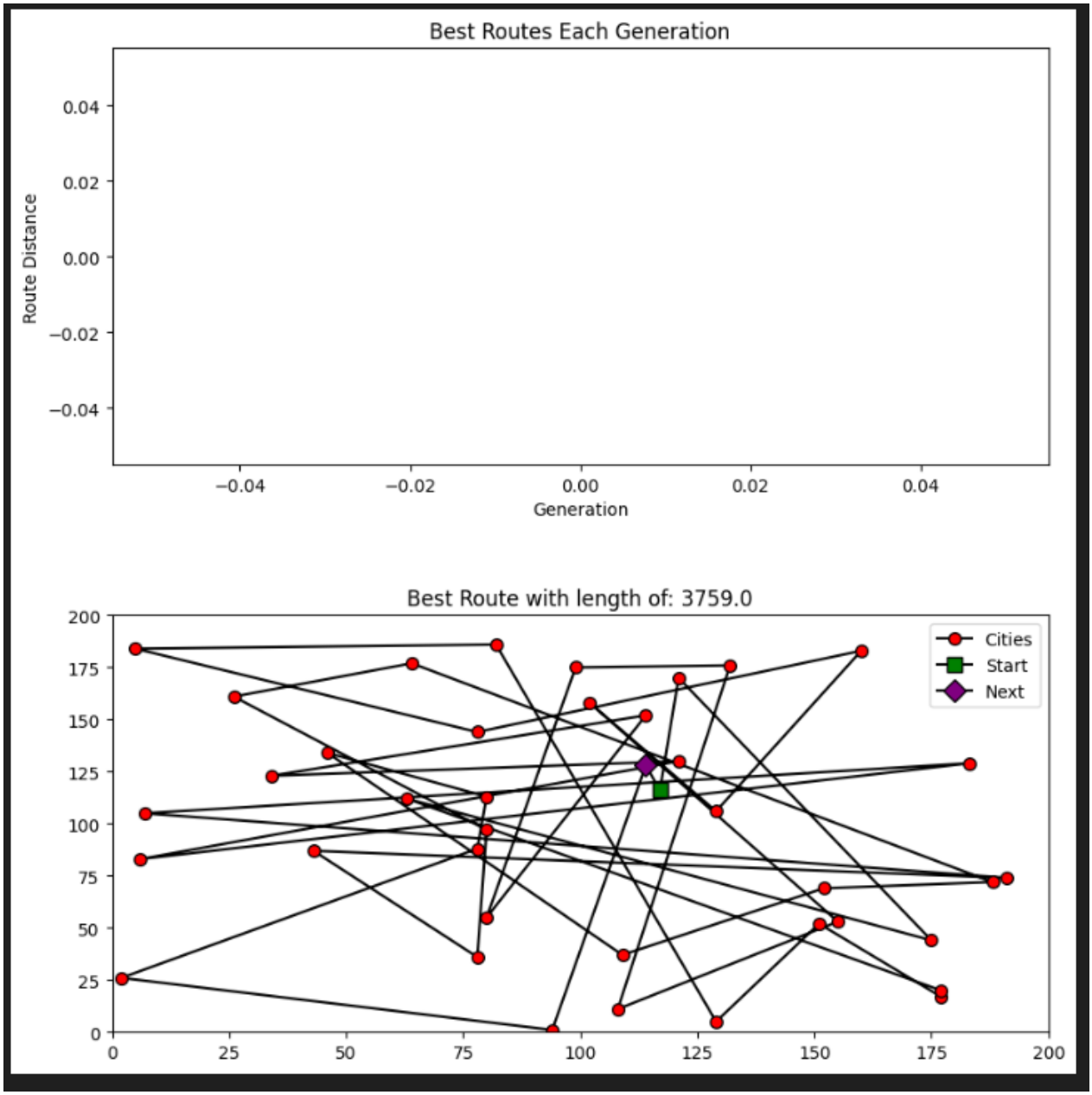
Run 4:

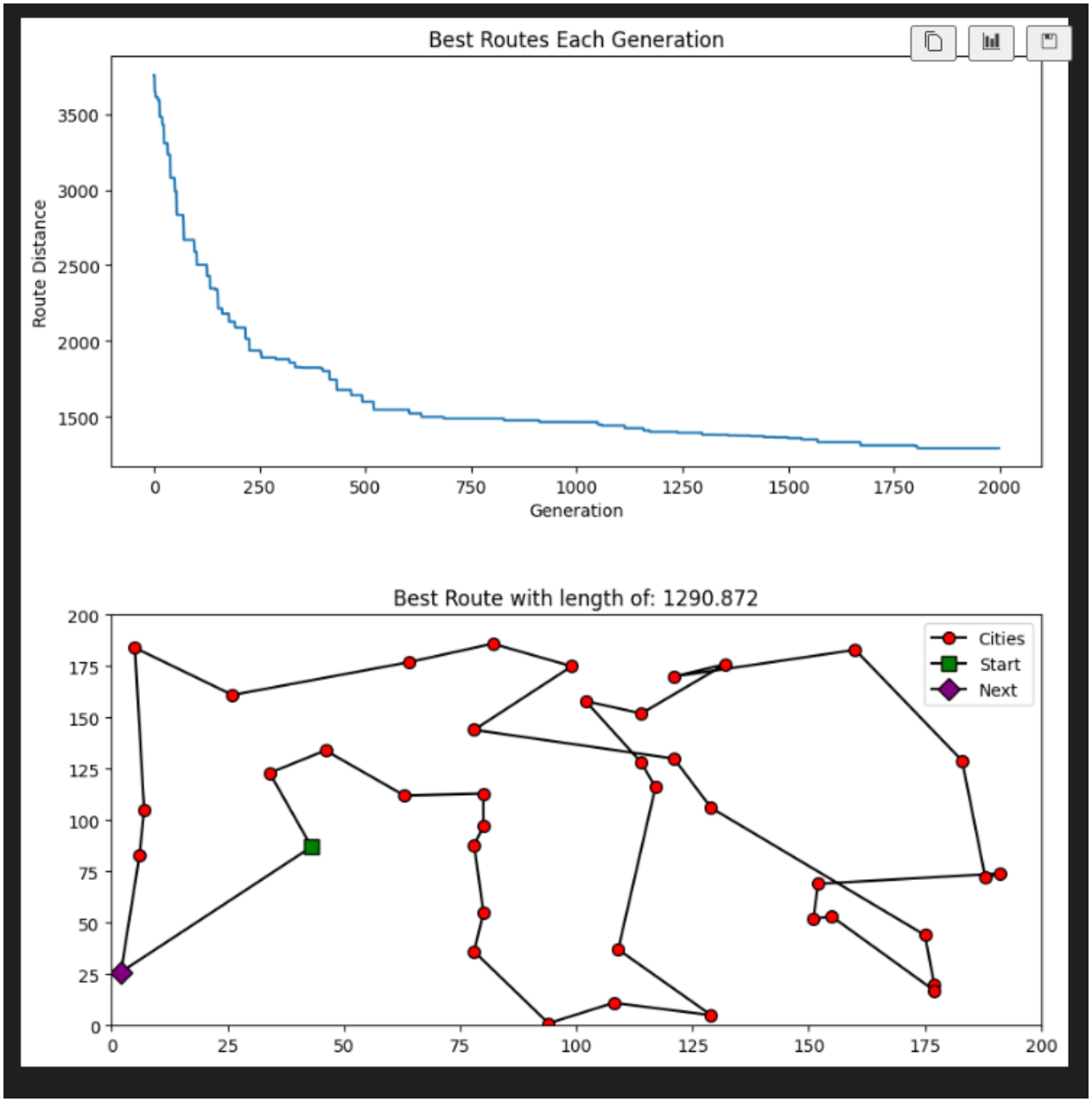
```
def main():
    '''main function'''

    N_SIZE = 40
    NUM_GENERATIONS = 2000
    POP_SIZE = 10

    BEST_ROUTE_LENGTH = 0
    BEST_ROUTE_LIST = []
    BEST_ROUTE = []

    MUTATION_RATE = 0.1
    KILL_RATE = 0.2
    NUM_CHILDREN = 20
```


Best Routes Each Generation
Route Distance
0.04
0.02
0.00
−0.02
−0.04
−0.04
−0.02
0.00
0.02
0.04
Generation
Best Route with length of: 3759.0
Cities
Start
Next
0
25
50
75
100
125
150
175
200

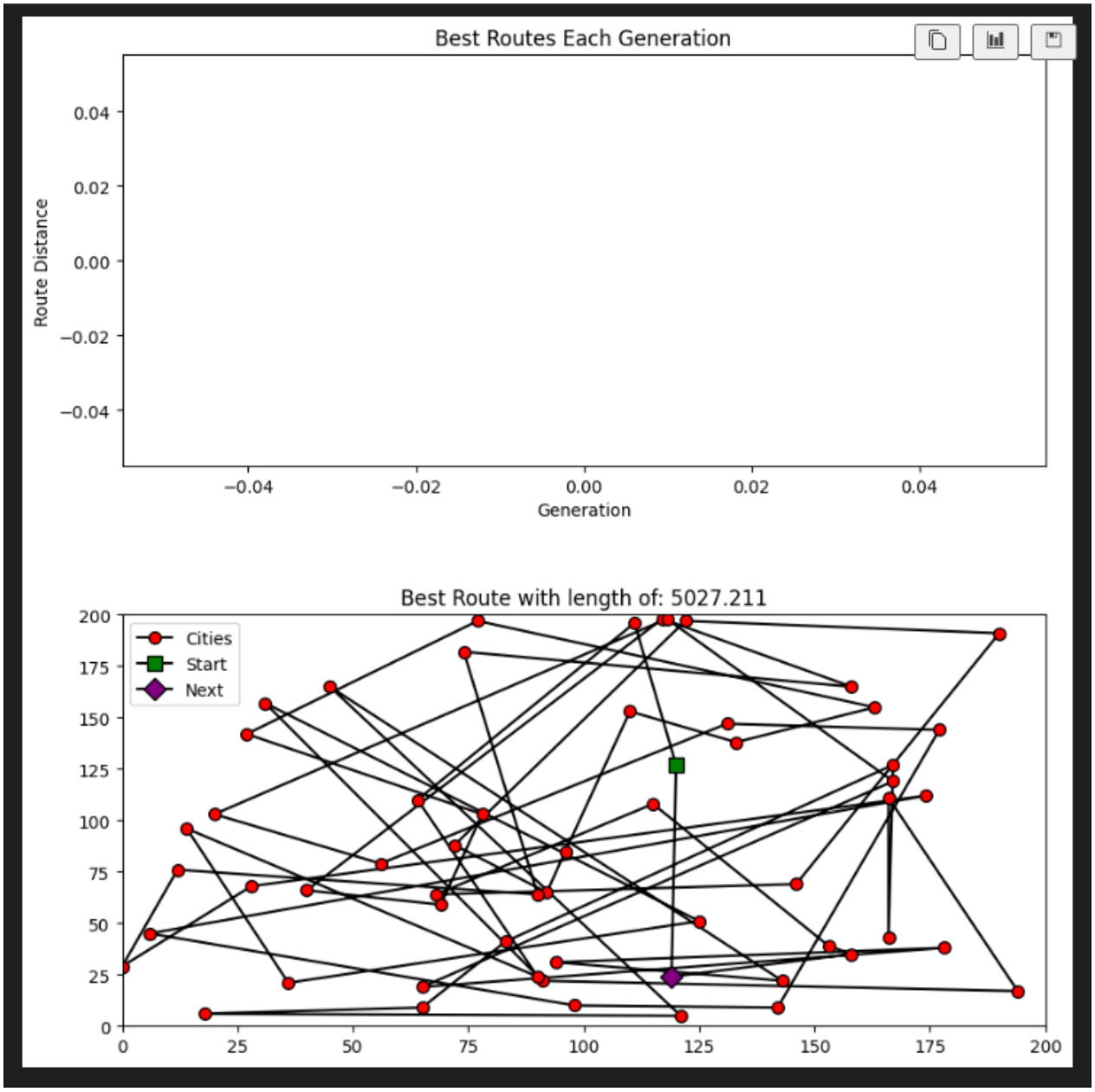


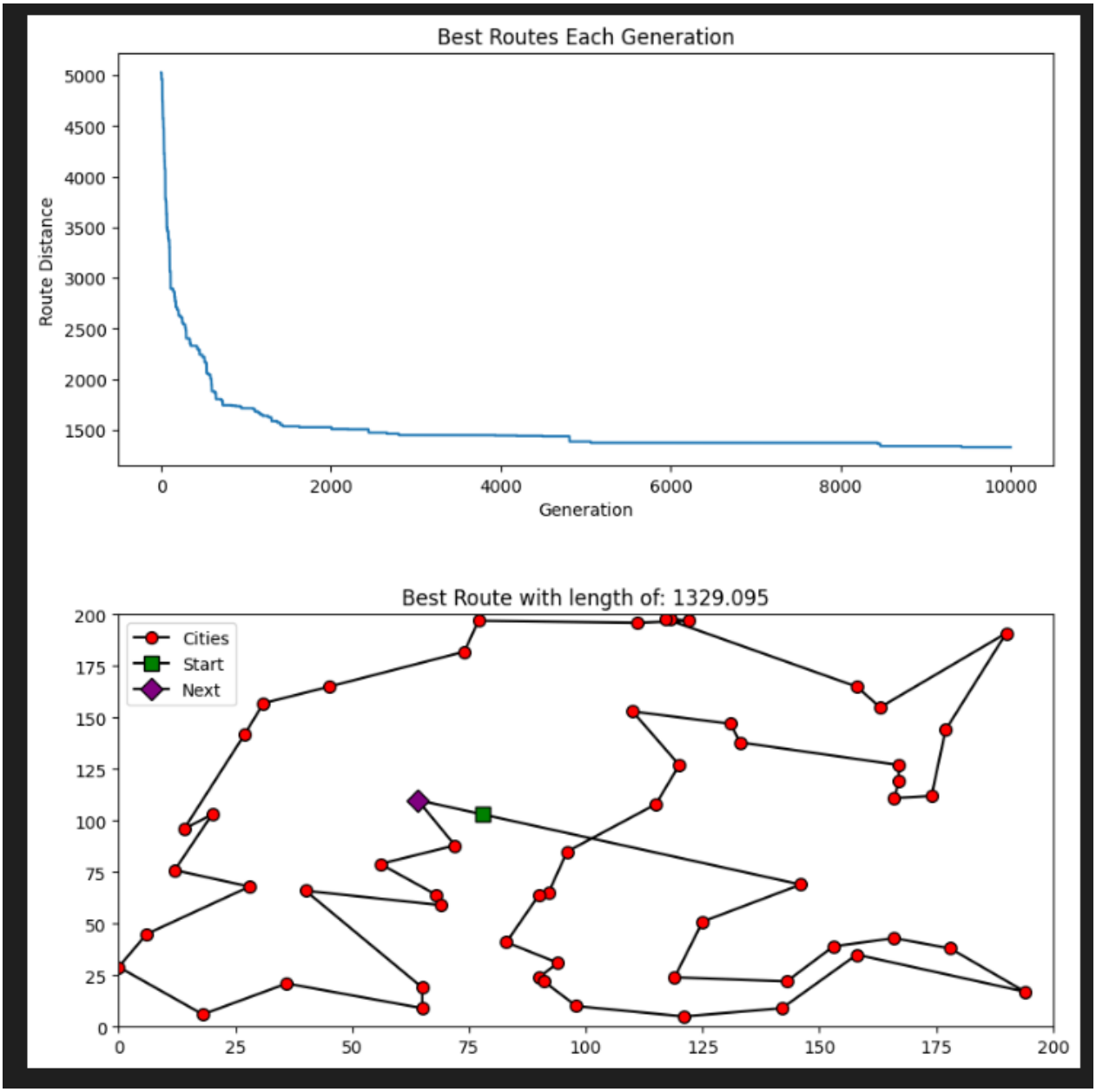
Run 5:

```
N_SIZE = 58
NUM_GENERATIONS = 10000
POP_SIZE = 500

BEST_ROUTE_LENGTH = 0
BEST_ROUTE_LIST = []
BEST_ROUTE = []

MUTATION_RATE = 0.1
KILL_RATE = 0.5
NUM_CHILDREN = 50
```


Best Routes Each Generation
Route Distance
0.04
0.02
0.00
−0.02
−0.04
−0.04
−0.02
0.00
0.02
0.04
Generation
Best Route with length of: 5027.211
Cities
Start
Next
200
175
150
125
100
75
50
25
0
0
25
50
75
100
125
150
175
200


Best Routes Each Generation
Route Distance
Generation
5000
4500
4000
3500
3000
2500
2000
1500
0
2000
4000
6000
8000
10000
Best Route with length of: 1329.095
Cities
Start
Next
200
175
150
125
100
75
50
25
0
0
25
50
75
100
125
150
175
200