

4d TSP GA model output

Population Size = 10
Generation No = 2
Mutation Rate = .4
Crossover Rate = 0.6

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////_GENERATION: 1_//  
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////_POPULATION_//  
[  
0) [0, 2, 1] [1, 2, 0] [1, 0, 2] Cost = 132 Parents= ['NA', 'NA'],  
1) [1, 0, 2] [0, 2, 1] [2, 0, 1] Cost = 99 Parents= ['NA', 'NA'],  
2) [0, 2, 1] [1, 0, 2] [1, 2, 0] Cost = 100 Parents= ['NA', 'NA'],  
3) [2, 1, 0] [1, 2, 0] [1, 0, 2] Cost = 63 Parents= ['NA', 'NA'],  
4) [1, 2, 0] [2, 0, 1] [0, 1, 2] Cost = 91 Parents= ['NA', 'NA'],  
5) [2, 1, 0] [0, 1, 2] [0, 2, 1] Cost = 101 Parents= ['NA', 'NA'],  
6) [0, 1, 2] [1, 0, 2] [2, 1, 0] Cost = 98 Parents= ['NA', 'NA'],  
7) [1, 0, 2] [2, 1, 0] [2, 1, 0] Cost = 126 Parents= ['NA', 'NA'],  
8) [2, 0, 1] [0, 2, 1] [1, 2, 0] Cost = 84 Parents= ['NA', 'NA'],  
9) [2, 1, 0] [0, 1, 2] [2, 0, 1] Cost = 103 Parents= ['NA', 'NA']]
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////_SELECTION PROBABILITY OF POPULATION & CUMULATIVE  
PROBABILITY_//
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id	Fitness	Selection Probability	Cumulative Probability
0)	0.007575757575757576	0.07270828203889176	0.07270828203889176
1)	0.010101010101010102	0.0969443760518557	0.16965265809074748
2)	0.01	0.09597493229133713	0.2656275903820846
3)	0.015873015873015872	0.1523411623672018	0.4179687527492864
4)	0.01098901098901099	0.10546695856190895	0.5234357113111954
5)	0.009900990099009901	0.09502468543696746	0.6184603967481628
6)	0.01020408163265306	0.09793360437891543	0.7163940011270782
7)	0.007936507936507936	0.0761705811836009	0.792564582310679
8)	0.011904761904761904	0.11425587177540134	0.9068204540860804
9)	0.009708737864077669	0.09317954591391954	0.9999999999999999

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////_SELECTED PARENTS FOR CROSSOVER_//
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[
8) [2, 0, 1] [0, 2, 1] [1, 2, 0] Cost = 84 Parents= ['NA', 'NA'],
6) [0, 1, 2] [1, 0, 2] [2, 1, 0] Cost = 98 Parents= ['NA', 'NA'],
5) [2, 1, 0] [0, 1, 2] [0, 2, 1] Cost = 101 Parents= ['NA', 'NA'],
4) [1, 2, 0] [2, 0, 1] [0, 1, 2] Cost = 91 Parents= ['NA', 'NA'],
1) [1, 0, 2] [0, 2, 1] [2, 0, 1] Cost = 99 Parents= ['NA', 'NA'],
0) [0, 2, 1] [1, 2, 0] [1, 0, 2] Cost = 132 Parents= ['NA', 'NA']]

////// _____ CROSSOVER STARTED _____ //

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Parent chromosome A: 8) [2, 0, 1] [0, 2, 1] [1, 2, 0]
Parent chromosome B: 6) [0, 1, 2] [1, 0, 2] [2, 1, 0]

Parent A city string: [2, 0, 1]
Parent B city string: [0, 1, 2]
Random Point 1: 1
Random Point 2: 2
Sliced part from Parent 1: [0]
Rest elements from Parent 2: [1, 2]
Child 1: [0, 1, 2]
Sliced part from Parent 2: [1]
Rest elements from Parent 1: [2, 0]
Child 2: [1, 2, 0]

Children chromosome A: 10) [0, 1, 2] [0, 2, 1] [1, 2, 0]
Children chromosome B: 11) [1, 2, 0] [1, 0, 2] [2, 1, 0]

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Parent chromosome A: 5) [2, 1, 0] [0, 1, 2] [0, 2, 1]
Parent chromosome B: 4) [1, 2, 0] [2, 0, 1] [0, 1, 2]

Parent A city string: [2, 1, 0]
Parent B city string: [1, 2, 0]
Random Point 1: 0
Random Point 2: 2
Sliced part from Parent 1: [2, 1]
Rest elements from Parent 2: [0]
Child 1: [2, 1, 0]
Sliced part from Parent 2: [1, 2]
Rest elements from Parent 1: [0]
Child 2: [1, 2, 0]

Children chromosome A: 12) [2, 1, 0] [0, 1, 2] [0, 2, 1]
Children chromosome B: 13) [1, 2, 0] [2, 0, 1] [0, 1, 2]

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Parent chromosome A: 1) [1, 0, 2] [0, 2, 1] [2, 0, 1]

Parent chromosome B: 0) [0, 2, 1] [1, 2, 0] [1, 0, 2]

Parent A city string: [1, 0, 2]

Parent B city string: [0, 2, 1]

Random Point 1: 0

Random Point 2: 2

Sliced part from Parent 1: [1, 0]

Rest elements from Parent 2: [2]

Child 1: [1, 0, 2]

Sliced part from Parent 2: [0, 2]

Rest elements from Parent 1: [1]

Child 2: [0, 2, 1]

Children chromosome A: 14) [1, 0, 2] [0, 2, 1] [2, 0, 1]

Children chromosome B: 15) [0, 2, 1] [1, 2, 0] [1, 0, 2]

////// _____ GENERATED CHILDREN FROM CROSSOVER _____ //

[
10) [0, 1, 2] [0, 2, 1] [1, 2, 0] Cost = 73 Parents= [8, 6],
11) [1, 2, 0] [1, 0, 2] [2, 1, 0] Cost = 73 Parents= [6, 8],
12) [2, 1, 0] [0, 1, 2] [0, 2, 1] Cost = 101 Parents= [5, 4],
13) [1, 2, 0] [2, 0, 1] [0, 1, 2] Cost = 91 Parents= [4, 5],
14) [1, 0, 2] [0, 2, 1] [2, 0, 1] Cost = 99 Parents= [1, 0],
15) [0, 2, 1] [1, 2, 0] [1, 0, 2] Cost = 132 Parents= [0, 1]]

////// _____ MUTATION STARTED _____ //

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Before Mutation: 12) [2, 1, 0] [0, 1, 2] [0, 2, 1]

Random point 1: 1

Random point 2: 2

After Mutation: 12) [2, 0, 1] [0, 2, 1] [0, 1, 2]

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Before Mutation: 13) [1, 2, 0] [2, 0, 1] [0, 1, 2]

Random point 1: 0

Random point 2: 1

After Mutation: 13) [2, 1, 0] [0, 2, 1] [1, 0, 2]

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Before Mutation: 14) [1, 0, 2] [0, 2, 1] [2, 0, 1]

Random point 1: 1

Random point 2: 0

After Mutation: 14) [0, 1, 2] [2, 0, 1] [0, 2, 1]

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Before Mutation: 15) [0, 2, 1] [1, 2, 0] [1, 0, 2]
 Random point 1: 0
 Random point 2: 2
 After Mutation: 15) [1, 2, 0] [0, 2, 1] [2, 0, 1]

////// _____ APPLIED MUTATION ON CHILDREN _____ //

[
 10) [0, 1, 2] [0, 2, 1] [1, 2, 0] Cost = 73 Parents= [8, 6],
 11) [1, 2, 0] [1, 0, 2] [2, 1, 0] Cost = 73 Parents= [6, 8],
 12) [2, 0, 1] [0, 2, 1] [0, 1, 2] Cost = 104 Parents= [5, 4],
 13) [2, 1, 0] [0, 2, 1] [1, 0, 2] Cost = 98 Parents= [4, 5],
 14) [0, 1, 2] [2, 0, 1] [0, 2, 1] Cost = 100 Parents= [1, 0],
 15) [1, 2, 0] [0, 2, 1] [2, 0, 1] Cost = 90 Parents= [0, 1]]

////// _____ NEXT GENERATION _____ //

[
 2) [0, 2, 1] [1, 0, 2] [1, 2, 0] Cost = 100 Parents= ['NA', 'NA'],
 3) [2, 1, 0] [1, 2, 0] [1, 0, 2] Cost = 63 Parents= ['NA', 'NA'],
 7) [1, 0, 2] [2, 1, 0] [2, 1, 0] Cost = 126 Parents= ['NA', 'NA'],
 9) [2, 1, 0] [0, 1, 2] [2, 0, 1] Cost = 103 Parents= ['NA', 'NA'],
 10) [0, 1, 2] [0, 2, 1] [1, 2, 0] Cost = 73 Parents= [8, 6],
 11) [1, 2, 0] [1, 0, 2] [2, 1, 0] Cost = 73 Parents= [6, 8],
 12) [2, 0, 1] [0, 2, 1] [0, 1, 2] Cost = 104 Parents= [5, 4],
 13) [2, 1, 0] [0, 2, 1] [1, 0, 2] Cost = 98 Parents= [4, 5],
 14) [0, 1, 2] [2, 0, 1] [0, 2, 1] Cost = 100 Parents= [1, 0],
 15) [1, 2, 0] [0, 2, 1] [2, 0, 1] Cost = 90 Parents= [0, 1]]

////// _____ BEST CHROMOSOME SO FAR :

3) [2, 1, 0] [1, 2, 0] [1, 0, 2] Cost = 63 Parents= ['NA', 'NA'] _____ //

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////// _____ GENERATION: 2 _____ //

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////// _____ POPULATION _____ //

[
 2) [0, 2, 1] [1, 0, 2] [1, 2, 0] Cost = 100 Parents= ['NA', 'NA'],
 3) [2, 1, 0] [1, 2, 0] [1, 0, 2] Cost = 63 Parents= ['NA', 'NA'],
 7) [1, 0, 2] [2, 1, 0] [2, 1, 0] Cost = 126 Parents= ['NA', 'NA'],
 9) [2, 1, 0] [0, 1, 2] [2, 0, 1] Cost = 103 Parents= ['NA', 'NA'],
 10) [0, 1, 2] [0, 2, 1] [1, 2, 0] Cost = 73 Parents= [8, 6],
 11) [1, 2, 0] [1, 0, 2] [2, 1, 0] Cost = 73 Parents= [6, 8],
 12) [2, 0, 1] [0, 2, 1] [0, 1, 2] Cost = 104 Parents= [5, 4],
 13) [2, 1, 0] [0, 2, 1] [1, 0, 2] Cost = 98 Parents= [4, 5],
 14) [0, 1, 2] [2, 0, 1] [0, 2, 1] Cost = 100 Parents= [1, 0],
 15) [1, 2, 0] [0, 2, 1] [2, 0, 1] Cost = 90 Parents= [0, 1]]

//////_____ SELECTION PROBABILITY OF POPULATION & CUMULATIVE
PROBABILITY _____//

id	Fitness	Selection Probability	Cumulative Probability
2)	0.01	0.089408571796289	0.089408571796289
3)	0.015873015873015872	0.14191836793061746	0.23132693972690646
7)	0.007936507936507936	0.07095918396530873	0.3022861236922152
9)	0.009708737864077669	0.08680443863717378	0.389090562329389
10)	0.0136986301369863	0.12247749561135479	0.5115680579407438
11)	0.0136986301369863	0.12247749561135479	0.6340455535520986
12)	0.009615384615384616	0.08596978057335482	0.7200153341254534
13)	0.01020408163265306	0.0912332365268255	0.8112485706522788
14)	0.01	0.089408571796289	0.9006571424485679
15)	0.011111111111111112	0.09934285755143223	1.0

//////_____ SELECTED PARENTS FOR CROSSOVER _____//

[

10)	[0, 1, 2]	[0, 2, 1]	[1, 2, 0]	Cost = 73	Parents= [8, 6],
3)	[2, 1, 0]	[1, 2, 0]	[1, 0, 2]	Cost = 63	Parents= ['NA', 'NA'],
7)	[1, 0, 2]	[2, 1, 0]	[2, 1, 0]	Cost = 126	Parents= ['NA', 'NA'],
2)	[0, 2, 1]	[1, 0, 2]	[1, 2, 0]	Cost = 100	Parents= ['NA', 'NA'],
14)	[0, 1, 2]	[2, 0, 1]	[0, 2, 1]	Cost = 100	Parents= [1, 0],
15)	[1, 2, 0]	[0, 2, 1]	[2, 0, 1]	Cost = 90	Parents= [0, 1]]

//////_____ CROSSOVER STARTED _____//

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Parent chromosome A: 10) [0, 1, 2] [0, 2, 1] [1, 2, 0]
Parent chromosome B: 3) [2, 1, 0] [1, 2, 0] [1, 0, 2]

Parent A city string: [0, 1, 2]
Parent B city string: [2, 1, 0]
Random Point 1: 0
Random Point 2: 1
Sliced part from Parent 1: [0]
Rest elements from Parent 2: [2, 1]
Child 1: [0, 2, 1]
Sliced part from Parent 2: [2]
Rest elements from Parent 1: [0, 1]
Child 2: [2, 0, 1]

Children chromosome A: 16) [0, 2, 1] [0, 2, 1] [1, 2, 0]
Children chromosome B: 17) [2, 0, 1] [1, 2, 0] [1, 0, 2]

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Parent chromosome A: 7) [1, 0, 2] [2, 1, 0] [2, 1, 0]

Parent chromosome B: 2) [0, 2, 1] [1, 0, 2] [1, 2, 0]

Parent A city string: [1, 0, 2]

Parent B city string: [0, 2, 1]

Random Point 1: 1

Random Point 2: 2

Sliced part from Parent 1: [0]

Rest elements from Parent 2: [2, 1]

Child 1: [0, 2, 1]

Sliced part from Parent 2: [2]

Rest elements from Parent 1: [1, 0]

Child 2: [2, 1, 0]

Children chromosome A: 18) [0, 2, 1] [2, 1, 0] [2, 1, 0]

Children chromosome B: 19) [2, 1, 0] [1, 0, 2] [1, 2, 0]

//////////

Parent chromosome A: 14) [0, 1, 2] [2, 0, 1] [0, 2, 1]

Parent chromosome B: 15) [1, 2, 0] [0, 2, 1] [2, 0, 1]

Parent A city string: [0, 1, 2]

Parent B city string: [1, 2, 0]

Random Point 1: 1

Random Point 2: 2

Sliced part from Parent 1: [1]

Rest elements from Parent 2: [2, 0]

Child 1: [1, 2, 0]

Sliced part from Parent 2: [2]

Rest elements from Parent 1: [0, 1]

Child 2: [2, 0, 1]

Children chromosome A: 20) [1, 2, 0] [2, 0, 1] [0, 2, 1]

Children chromosome B: 21) [2, 0, 1] [0, 2, 1] [2, 0, 1]

////// _____ GENERATED CHILDREN FROM CROSSOVER _____ //

[

16)	[0, 2, 1]	[0, 2, 1]	[1, 2, 0]	Cost = 85	Parents= [10, 3],
17)	[2, 0, 1]	[1, 2, 0]	[1, 0, 2]	Cost = 100	Parents= [3, 10],
18)	[0, 2, 1]	[2, 1, 0]	[2, 1, 0]	Cost = 95	Parents= [7, 2],
19)	[2, 1, 0]	[1, 0, 2]	[1, 2, 0]	Cost = 99	Parents= [2, 7],
20)	[1, 2, 0]	[2, 0, 1]	[0, 2, 1]	Cost = 86	Parents= [14, 15],
21)	[2, 0, 1]	[0, 2, 1]	[2, 0, 1]	Cost = 63	Parents= [15, 14]]

////// _____ MUTATION STARTED _____ //

//////////

Before Mutation: 16) [0, 2, 1] [0, 2, 1] [1, 2, 0]
Random point 1: 1
Random point 2: 0
After Mutation: 16) [2, 0, 1] [2, 0, 1] [2, 1, 0]

//////////

Before Mutation: 18) [0, 2, 1] [2, 1, 0] [2, 1, 0]
Random point 1: 1
Random point 2: 2
After Mutation: 18) [0, 1, 2] [2, 0, 1] [2, 0, 1]

//////////

Before Mutation: 19) [2, 1, 0] [1, 0, 2] [1, 2, 0]
Random point 1: 1
Random point 2: 2
After Mutation: 19) [2, 0, 1] [1, 2, 0] [1, 0, 2]

//////////

Before Mutation: 20) [1, 2, 0] [2, 0, 1] [0, 2, 1]
Random point 1: 0
Random point 2: 1
After Mutation: 20) [2, 1, 0] [0, 2, 1] [2, 0, 1]

//////_____ APPLIED MUTATION ON CHILDREN _____//

[
16) [2, 0, 1] [2, 0, 1] [2, 1, 0] Cost = 71 Parents= [10, 3],
17) [2, 0, 1] [1, 2, 0] [1, 0, 2] Cost = 100 Parents= [3, 10],
18) [0, 1, 2] [2, 0, 1] [2, 0, 1] Cost = 126 Parents= [7, 2],
19) [2, 0, 1] [1, 2, 0] [1, 0, 2] Cost = 100 Parents= [2, 7],
20) [2, 1, 0] [0, 2, 1] [2, 0, 1] Cost = 100 Parents= [14, 15],
21) [2, 0, 1] [0, 2, 1] [2, 0, 1] Cost = 63 Parents= [15, 14]]

//////_____ NEXT GENERATION _____//

[
9) [2, 1, 0] [0, 1, 2] [2, 0, 1] Cost = 103 Parents= ['NA', 'NA'],
11) [1, 2, 0] [1, 0, 2] [2, 1, 0] Cost = 73 Parents= [6, 8],
12) [2, 0, 1] [0, 2, 1] [0, 1, 2] Cost = 104 Parents= [5, 4],
13) [2, 1, 0] [0, 2, 1] [1, 0, 2] Cost = 98 Parents= [4, 5],
16) [2, 0, 1] [2, 0, 1] [2, 1, 0] Cost = 71 Parents= [10, 3],
17) [2, 0, 1] [1, 2, 0] [1, 0, 2] Cost = 100 Parents= [3, 10],
18) [0, 1, 2] [2, 0, 1] [2, 0, 1] Cost = 126 Parents= [7, 2],
19) [2, 0, 1] [1, 2, 0] [1, 0, 2] Cost = 100 Parents= [2, 7],
20) [2, 1, 0] [0, 2, 1] [2, 0, 1] Cost = 100 Parents= [14, 15],
21) [2, 0, 1] [0, 2, 1] [2, 0, 1] Cost = 63 Parents= [15, 14]]

//////_____ BEST CHROMOSOME SO FAR :

21) [2, 0, 1] [0, 2, 1] [2, 0, 1] Cost = 63 Parents= [15, 14] _____//