

```
>> fa_tsp_chk_nt
```

```
time =
```

```
411.2204
```

```
route
```

```
Columns 1 through 17
```

```
122 33 25 26 38 39 42 34 43 40 41 36 37 35  
44 103 45
```

```
Columns 18 through 34
```

```
54 57 51 2 1 16 14 12 30 27 31 77 18 74  
68 73 67
```

```
Columns 35 through 51
```

```
8 72 19 23 4 22 21 17 20 108 15 106 6 24  
9 11 114
```

```
Columns 52 through 68
```

```
105 7 120 13 50 115 10 3 100 64 58 91 90 116  
60 61 62
```

```
Columns 69 through 85
```

```
59 125 89 92 99 65 113 66 55 124 52 5 121 56  
47 49 53
```

```
Columns 86 through 102
```

```
118 48 46 94 112 111 107 127 93 95 123 97 98 104  
102 83 82
```

```
Columns 103 through 119
```

```
126 81 84 63 119 96 109 88 87 86 85 104 110 74  
70 69 75
```

```
Columns 120 through 127
```

```
76 117 78 79 80 29 32 28
```

```
distance
```

```
126265
```

```
difference from optimum solution
```

```
18106
```

percentage error :

16.7402

run =

1

time =

410.7056

route

Columns 1 through 16

118	53	49	47	56	52	124	55	66	113	65	99	92	89
125	104												

Columns 17 through 32

110	85	86	87	88	109	96	119	63	102	101	83	82	126
81	84												

Columns 33 through 48

117	78	80	79	76	75	69	70	71	68	73	67	8	25
4	24												

Columns 49 through 64

9	11	6	114	120	7	1	105	106	15	108	22	19	72
74	77												

Columns 65 through 80

18	21	17	20	12	14	16	2	51	13	115	10	3	90
116	60												

Columns 81 through 96

59	62	61	91	58	64	100	50	5	121	57	54	45	108
44	35												

Columns 97 through 112

37	36	41	40	43	34	42	39	30	31	27	26	38	25
33	29												

Columns 113 through 127

```

    32    122    28    97    98    127    123    95    93    107    111    112    94    46
48

```

```

distance
    127176

```

```

difference from optimum solution
    19017

```

```

percentage error :
    17.5824

```

```

run =

```

```

    2

```

```

time =

```

```

    406.8875

```

```

route
Columns 1 through 16

```

```

    59    60    116    90    62    61    91    58    64    100    3    11    9    46
24    23

```

```

Columns 17 through 32

```

```

    4    22    21    17    20    108    15    106    105    114    120    10    115    54
13    7

```

```

Columns 33 through 48

```

```

    1    16    35    36    37    2    51    57    54    121    56    5    52    124
113    125

```

```

Columns 49 through 64

```

```

    89    92    99    65    66    55    47    49    53    118    48    46    94    112
111    107

```

```

Columns 65 through 80

```

```

    93    127    98    97    123    95    103    45    44    40    34    42    39    34
33    122

```

```

Columns 81 through 96

```

```
28 32 29 25 26 30 43 41 14 12 31 27 80 79
77 18
```

Columns 97 through 112

```
72 19 8 67 73 74 68 71 70 69 75 76 78 117
84 81
```

Columns 113 through 127

```
126 82 83 101 102 63 119 96 109 88 87 86 85 110
104
```

distance

126013

difference from optimum solution

17854

percentage error :

16.5072

run =

3

time =

406.3248

route

Columns 1 through 16

```
75 76 78 117 84 81 126 82 83 101 102 63 119 96
109 88
```

Columns 17 through 32

```
87 86 85 110 104 59 62 60 116 90 61 91 100 58
64 113
```

Columns 33 through 48

```
125 89 92 99 65 66 55 47 49 53 118 46 112 114
107 127
```

Columns 49 through 64

```
93 94 48 103 45 44 54 57 121 56 124 52 5 50
```

57 56 121 51 2 35 37 16 1 7 105 114 6 24

Columns 33 through 48

11	3	90	116	60	59	62	61	91	58	64	100	10	124	120
13	115													

Columns 49 through 64

50	5	52	124	55	66	113	65	99	92	89	125	104	114	110
85	86													

Columns 65 through 80

87	88	109	96	119	63	102	101	83	82	126	81	84	114	110
78	76													

Columns 81 through 96

75	69	70	71	68	73	74	77	18	67	8	72	19	4	4
22	17													

Columns 97 through 112

21	20	108	106	15	14	12	31	80	79	27	26	25	34	34
29	32													

Columns 113 through 127

122	28	38	39	42	34	43	30	41	36	40	44	45	104	104
93														

distance

123413

difference from optimum solution

15254

percentage error :

14.1033

run =

5

time =

405.7239

route

Columns 1 through 16

62	116	90	3	11	9	24	23	22	19	72	8	67	74
74	68												

Columns 17 through 32

71	70	69	75	81	84	117	76	78	80	79	77	18	24
17	4												

Columns 33 through 48

108	20	106	6	114	105	15	14	12	31	27	26	25	34
29	32												

Columns 49 through 64

122	28	38	39	42	34	40	43	30	41	36	37	35	44
103	45												

Columns 65 through 80

54	47	53	48	118	49	46	94	112	111	107	127	93	94
123	97												

Columns 81 through 96

98	101	102	83	82	126	63	119	96	109	88	87	86	84
110	104												

Columns 97 through 112

99	92	89	125	113	65	66	55	124	52	56	121	57	54
5	50												

Columns 113 through 127

115	13	2	16	1	7	120	10	100	64	58	91	61	64
59													

distance

124324

difference from optimum solution

16165

percentage error :

14.9456

run =

6

time =

406.7966

route

Columns 1 through 16

98	97	123	95	93	127	107	111	112	94	46	49	47	53
118	48												

Columns 17 through 32

45	103	44	54	57	40	43	42	28	122	33	32	29	25
26	38												

Columns 33 through 48

39	34	30	27	31	80	79	12	14	41	37	36	35	16
1	2												

Columns 49 through 64

51	50	13	115	10	120	7	105	15	106	6	114	11	49
24	23												

Columns 65 through 80

4	108	20	17	18	21	22	19	72	8	67	59	62	91
61	60												

Columns 81 through 96

116	90	3	100	58	64	52	5	121	56	124	55	66	114
65	99												

Columns 97 through 112

92	89	125	104	85	86	87	88	96	109	110	71	70	68
73	74												

Columns 113 through 127

77	76	78	117	84	81	83	82	126	75	69	119	63	102
101													

distance

128655

difference from optimum solution
20496

percentage error :
18.9499

run =

7

time =

406.7957

route

Columns 1 through 16

	37	36	41	30	34	39	38	42	43	40	35	2	51	54
54	44													

Columns 17 through 32

	45	103	123	95	93	127	107	111	112	94	46	118	48	49
53	47													

Columns 33 through 48

	56	121	50	5	52	124	55	66	113	65	99	92	89	125
104	110													

Columns 49 through 64

	85	86	87	88	109	96	119	63	69	70	75	117	84	84
126	82													

Columns 65 through 80

	83	102	101	98	97	28	122	33	32	29	25	26	27	34
14	12													

Columns 81 through 96

	79	80	78	76	68	71	67	73	74	77	18	72	8	149
21	17													

Columns 97 through 112

	23	24	4	22	20	108	6	106	15	105	114	11	9	116
--	----	----	---	----	----	-----	---	-----	----	-----	-----	----	---	----------------

[illegible]

69 63 119 96 109 88 87 86 85 110 71 70 68 ~~74~~

[illegible]

45 122 28 32 29 25 38 39 42 34 43 40 35 44 104

```

difference from optimum solution
15726

```

run =

9

time =

404.0123

[illegible][illegible]

116 60 61 91 62 59 104 125 89 92 99 65 113 66

Columns 49 through 64

53	49	46	112	111	107	94	118	48	54	57	56	124	52
121													

Columns 65 through 80

51	44	45	103	93	127	95	123	97	98	101	102	63	114
83													

Columns 81 through 96

126	81	84	117	78	76	75	69	70	96	109	88	87	86
110													

Columns 97 through 112

71	68	73	67	8	72	19	21	17	18	74	77	79	80
27													

Columns 113 through 127

26	25	33	29	32	122	28	38	39	42	34	43	40	35

distance

129859

difference from optimum solution

21700

percentage error :

20.0631

run =

10

time =

406.7102

route

Columns 1 through 16

87	86	85	110	104	125	89	92	99	65	113	64	58	100
91													

Columns 17 through 32

```
61 62 116 90 60 59 67 73 74 68 71 70 69 75
76 78
```

Columns 33 through 48

```
80 79 77 18 21 17 72 8 19 22 4 23 24 40
11 6
```

Columns 49 through 64

```
106 15 108 20 12 14 31 27 30 26 38 39 42 34
43 41
```

Columns 65 through 80

```
37 36 40 35 16 1 114 105 7 13 115 10 120 42
51 57
```

Columns 81 through 96

```
121 50 5 56 124 52 66 55 47 49 53 118 48 46
112 111
```

Columns 97 through 112

```
107 127 93 94 54 44 45 103 95 123 98 97 28 122
25 33
```

Columns 113 through 127

```
29 32 117 84 81 126 82 83 101 102 63 119 96 104
88
```

distance

128421

difference from optimum solution

20262

percentage error :

18.7335

run =

11

time =

403.9968

route

Columns 1 through 16

81	126	82	83	101	102	63	119	96	109	88	87	86	85
110	71												

Columns 17 through 32

70	69	75	68	74	73	67	8	72	19	23	9	11	43
100	90												

Columns 33 through 48

116	60	59	62	61	91	58	64	113	125	104	89	92	99
65	66												

Columns 49 through 64

55	124	47	49	53	48	118	46	94	112	111	107	127	98
95	123												

Columns 65 through 80

97	98	32	29	28	122	33	25	26	38	39	42	34	42
30	27												

Columns 81 through 96

31	80	79	12	14	41	1	16	37	36	40	35	44	103
45	54												

Columns 97 through 112

57	121	56	52	5	51	2	50	13	115	10	120	7	105
114	106												

Columns 113 through 127

6	15	20	108	24	4	22	17	21	18	77	76	78	117
84													

distance

123770

difference from optimum solution

15611

percentage error :

14.4334

12

403.3292

Columns 1 through 16

Columns 17 through 32

Columns 33 through 48

Columns 49 through 64

Columns 65 through 80

Columns 81 through 96

Columns 97 through 112

Columns 113 through 127

19 9 4 22 23 24 8 72 18 79 80 77 74 73 67

113 64 58 91 61 62 59 60 116 90 100 115 50 14

Columns 97 through 112

	3	11	9	24	23	4	19	8	72	18	77	74	73	67
68	71													

Columns 113 through 127

	70	69	96	109	110	85	86	87	88	119	63	102	101	83
82														

distance

125141

difference from optimum solution

16982

percentage error :

15.7010

run =

14

time =

404.6923

route

Columns 1 through 16

	103	44	54	57	51	121	56	124	55	66	52	5	50	14
115	120													

Columns 17 through 32

	10	3	90	116	60	59	62	61	91	100	58	64	113	65
99	92													

Columns 33 through 48

	89	125	104	85	86	88	87	110	71	70	69	109	96	114
63	102													

Columns 49 through 64

	101	83	82	126	81	84	117	78	76	75	68	74	73	67
8	72													

Columns 65 through 80

```

    19    22     4    23   108    15   106     6    24     9    11   114   105
1    16

```

Columns 81 through 96

```

    2    35    37    36    41    14    12    31    20    17    21    18    77
80    27

```

Columns 97 through 112

```

    30    43    40    34    42    39    38    26    25    29    32    33   122
97    98

```

Columns 113 through 127

```

   123    95    93   127   107   111   112    94    46    49    47    53   118
45

```

```

distance
    124658

```

```

difference from optimum solution
    16499

```

```

percentage error :
    15.2544

```

```

run =

    15

```

```

time =

    404.9702

```

```

route
Columns 1 through 16

```

```

   101    98    97   123    95    93   127   107   111   112    94    46   118
53    49

```

Columns 17 through 32

```

    47    55    66   124    52    56   121     5    50    51    57    54    45
44    35

```

Columns 33 through 48

```

    40    42    39    34    43    41    14    36    37    2    13    115    100
58      64

```

```
Columns 49 through 64
```

```

    113    65    99    92    89    125    104    59    62    61    60    116    90
10     120

```

```
Columns 65 through 80
```

```

    7    1    16    105    15    20    108    6    106    114    11    9    24
8      72

```

```
Columns 81 through 96
```

```

    19    4    22    21    17    12    31    27    30    38    26    25    33
28     29

```

```
Columns 97 through 112
```

```

    32    117    76    78    80    79    77    18    74    73    67    68    70
110     85

```

```
Columns 113 through 127
```

```

    86    87    88    109    96    119    63    69    75    84    81    126    82
102

```

```

distance
    126275

```

```

difference from optimum solution
    18116

```

```

percentage error :
    16.7494

```

```

run =

    16

```

```

time =

    405.5967

```

```

route
Columns 1 through 16

```

```

    61    91    100    58    64    113    125    104    89    92    99    65    66

```

47 49

Columns 17 through 32

53	48	118	46	94	112	111	107	127	93	95	103	45	44
54	57												

Columns 33 through 48

121	5	56	124	52	115	13	50	51	2	7	105	6	106
15	20												

Columns 49 through 64

22	17	21	18	77	76	84	81	117	78	79	80	27	31
12	1												

Columns 65 through 80

16	14	41	36	37	35	40	43	30	34	42	39	38	26
25	33												

Columns 81 through 96

29	32	122	28	123	97	98	101	102	83	82	126	63	114
88	87												

Columns 97 through 112

86	85	110	109	96	69	75	70	71	68	74	73	67	48
72	19												

Columns 113 through 127

23	4	108	24	9	11	114	120	10	3	90	116	60	59
62													

distance

126522

difference from optimum solution

18363

percentage error :

16.9778

run =

17

time =

402.9002

route

Columns 1 through 16

66	113	65	99	92	89	125	104	59	62	61	91	58	64
100	52												

Columns 17 through 32

124	56	121	5	50	115	10	13	51	57	54	45	103	44
40	35												

Columns 33 through 48

37	36	41	43	34	42	28	122	33	32	29	25	80	79
31	27												

Columns 49 through 64

26	38	39	30	12	14	16	2	1	7	120	114	105	106
6	15												

Columns 65 through 80

108	20	17	21	22	19	72	8	23	4	24	9	11	43
90	116												

Columns 81 through 96

60	67	73	68	74	18	77	76	78	117	84	81	126	83
82	75												

Columns 97 through 112

69	70	71	110	86	85	87	88	109	96	119	63	102	104
98	97												

Columns 113 through 127

123	95	93	127	107	111	112	94	46	48	118	53	49	47
55													

distance

126038

difference from optimum solution

17879

```
percentage error :  
16.5303
```

```
run =  
  
18
```

```
time =  
  
402.6288
```

```
route  
Columns 1 through 16
```

```
20 15 106 105 114 6 108 4 23 24 9 11 3 90  
116 60
```

```
Columns 17 through 32
```

```
59 62 61 91 58 64 100 10 120 7 1 13 115 50  
5 52
```

```
Columns 33 through 48
```

```
124 56 121 54 57 51 2 16 12 14 41 37 35 36  
43 34
```

```
Columns 49 through 64
```

```
39 38 42 40 44 45 103 123 95 93 127 107 111 112  
94 46
```

```
Columns 65 through 80
```

```
48 118 53 49 47 55 66 113 65 99 92 89 125 104  
110 85
```

```
Columns 81 through 96
```

```
86 87 88 109 96 119 63 69 70 71 68 75 76 78  
117 84
```

```
Columns 97 through 112
```

```
81 126 82 83 102 101 98 97 28 122 32 29 33 25  
26 30
```

```
Columns 113 through 127
```

```

    27    31    80    79    77    18    74    73    67    8    72    19    22    21
17

```

```

distance
    124175

```

```

difference from optimum solution
    16016

```

```

percentage error :
    14.8078

```

```

run =

    19

```

```

time =

    402.5673

```

```

route
Columns 1 through 16

```

```

    87    86    85   110    71    70    68    73    74    77    18    21    17    22
19    72

```

```

Columns 17 through 32

```

```

    8    67    59    62    91    61    60   116    90    3   100    58    64   125
104    89

```

```

Columns 33 through 48

```

```

    92    99    65   113    66    55   124    52    5    50   115    10   120   13
7   114

```

```

Columns 49 through 64

```

```

   106     6    11     9    24    23     4   108    20    15   105     1    16    4
51    44

```

```

Columns 65 through 80

```

```

   103    45    54    57   121    56    47    53    49   118    48    46    94   114
111   107

```

```

Columns 81 through 96

```

```
127 93 95 123 97 98 32 29 25 33 122 28 38 34
42 34
```

Columns 97 through 112

```
43 40 35 37 36 41 12 14 30 26 27 31 80 74
76 75
```

Columns 113 through 127

```
78 117 84 81 126 82 83 101 102 63 119 69 96 104
88
```

```
distance
127144
```

```
difference from optimum solution
18985
```

```
percentage error :
17.5529
```

```
run =
20
```

```
avgTime =
405.4595
```

```
avgDist =
1.2601e+05
```

```
bestDist =
123413
```

```
stdDeviation =
1.7207e+03
```

```
>>
```