```
>> fa_tsp_chk_nt

time =

  344.1386

route
  Columns 1 through 17

    34    29    46    43     3    14    71    41   100    48    52    78    96     5
37    33    76

  Columns 18 through 34

    13    95    82    50    44     2    54    40    64    69    73    68    85     9
30    87    51

  Columns 35 through 51

    25    81    61    58    67    28    93     1    92     8    42    89    31    60
56    97    19

  Columns 52 through 68

    75    63     6    49    90    79    53     4    65    26    66    70    16    88
22    94    18

  Columns 69 through 85

    24    38    99    36    84    10    72    21    74    59    17    15    11    32
47    91    45

  Columns 86 through 100

    98    23    77    60    62    35    86    27    12    20    57     9     7    55
83

distance
       22348

difference from optimum solution
        1066

percentage error :
    5.0089


run =

     1
```

```
time =

  315.7872

route
  Columns 1 through 16

    62    60    45    32    11    15    17    59    74    21    72    10    84    36
99    38

  Columns 17 through 32

    24    18    88    16    94    22    70    66    26    65     4    97    56    80
31    89

  Columns 33 through 48

    42     8    92    75    19    53    79    90    49     6    63     1    47    91
98    23

  Columns 49 through 64

    77    87    51    58    93    28    67    61    25    81    69    64    40    54
2    44

  Columns 65 through 80

    73    50    82    95    13    76    33    37     5    96    78    52    48   100
41    71

  Columns 81 through 96

    14     3    43    46    29    30    39    85    68    34    83    55     7     9
57    20

  Columns 97 through 100

    12    27    86    35

distance
       22709

difference from optimum solution
        1427

percentage error :
    6.7052


run =
```

```
     2


time =

  317.7887

route
  Columns 1 through 16

    97    75    19    53    16    70    22    94    88    79    18    24    38    99
36    84

  Columns 17 through 32

    90    10    72    21    74    59    17    15    11    47    32    45    91    98
23    77

  Columns 33 through 48

    60    62    35    86    27    20    12    55    83    34     7     9    57    87
51    61

  Columns 49 through 64

    25    81    69    73    50    68    85    39    30    29    46    43     3    14
71    41

  Columns 65 through 80

   100    48    52    78    96     5    37    33    76    13    95    82    44     2
54    40

  Columns 81 through 96

    64    67    58    28    93     1    63     6    49    92     8    42    89    31
80    56

  Columns 97 through 100

    26    66    65     4

distance
       22537

difference from optimum solution
        1255

percentage error :
    5.8970
```

```
run =

     3


time =

  319.5095

route
  Columns 1 through 16

    29    34    83    55    12    20    27    86    35    62    60    77    23    98
91    45

  Columns 17 through 32

    32    11    15    17    59    74    21    72    10    84    36    99    38    24
18    79

  Columns 33 through 48

    53    88    16    94    22    70    66    26    65     4    19    75    97    56
80    31

  Columns 49 through 64

    89    42     8    92     6    49    90    63     1    47    93    28    67    58
61    51

  Columns 65 through 80

    87    57     7     9    85    68    50    44    73    81    25    69    64    40
54     2

  Columns 81 through 96

    82    95    13    76    33    37     5    52    78    96    39    30    48   100
41    71

  Columns 97 through 100

    14     3    43    46

distance
       21808

difference from optimum solution
   526
```

```
percentage error :
    2.4716


run =

     4


time =

  329.8856

route
  Columns 1 through 16

    62    60    23    98    91    45    32    11    15    17    59    74    21    12
10    84

  Columns 17 through 32

    36    99    38    24    18    79    88    16    94    22    70    66    26    65
4    97

  Columns 33 through 48

    56    80    31    89    42     8    92    75    19    53    90    49     6    63
1    47

  Columns 49 through 64

    93    28    67    58    61    25    81    69    64    40    54     2    44    73
68    85

  Columns 65 through 80

    50    82    95    13    76    33    37     5    96    39    30    78    52    48
100    41

  Columns 81 through 96

    71    14     3    43    46    29    34    83    55    27    35    86    20    14
7     9

  Columns 97 through 100

    57    87    51    77

distance
       21918
```

```
difference from optimum solution
   636

percentage error :
    2.9884


run =

     5


time =

  310.8522

route
  Columns 1 through 16

    51    87    25    81    69    64    40    54     2    44    73    68    85    50
82    95

  Columns 17 through 32

    13    76    33    37     5    52    78    96    39    30    48   100    41    71
14     3

  Columns 33 through 48

    43    46    29    34    83    55     7     9    57    20    12    27    86    35
62    60

  Columns 49 through 64

    77    23    98    45    91    47    32    11    15    17    59    74    21    72
84    36

  Columns 65 through 80

    99    38    24    18    10    90    63     6    49    19    53    79    94    88
16    22

  Columns 81 through 96

    70    66    26    65     4    75    97    56    80    31    89    42     8    92
1    93

  Columns 97 through 100

    28    67    58    61
```

```
distance
       22228

difference from optimum solution
   946

percentage error :
    4.4451


run =

     6


time =

  310.1143

route
  Columns 1 through 16

    99    36    59    74    21    72    84    10    90    79    53    19    75    49
6    63

  Columns 17 through 32

    47    32    11    17    15    45    91    98    23    77    60    62    35    86
27    12

  Columns 33 through 48

    20    57     9     7    55    83    34    29    46    43     3    14    71    41
100    48

  Columns 49 through 64

    52    78    96     5    37    33    76    13    95    82    39    30    85    68
73    50

  Columns 65 through 80

    44     2    54    40    64    69    81    25    87    51    61    58    67    28
93     1

  Columns 81 through 96

    92     8    42    89    31    80    56    97     4    65    26    66    70    24
16    88
```

```
  Columns 97 through 100

    94    18    24    38

distance
       21707

difference from optimum solution
   425

percentage error :
    1.9970


run =

     7


time =

  315.0351

route
  Columns 1 through 16

    39    30    29    34    46    43     3    14    71    41   100    48    52    78
96     5

  Columns 17 through 32

    37    33    76    13    95    82    50    73    44     2    54    40    64    69
58    67

  Columns 33 through 48

    28    93     1    92     8    42    89    31    80    56    26    66    65    4
97    75

  Columns 49 through 64

    19    90    49     6    63    10    84    79    53    88    16    70    22    94
18    24

  Columns 65 through 80

    38    99    36    72    21    74    59    17    15    11    32    47    91    45
98    23

  Columns 81 through 96
```

```
    77    60    62    35    86    27    20    12    83    55     7    57     9    87
51    61

  Columns 97 through 100

    25    81    68    85

distance
       22719

difference from optimum solution
        1437

percentage error :
    6.7522


run =

     8


time =

  309.9868

route
  Columns 1 through 16

    74    21    72    10    84    36    99    38    24    18    79    53    88    16
94    22

  Columns 17 through 32

    70    66    26    65     4    97    56    75    19    90    49     6    63     1
92     8

  Columns 33 through 48

    42    80    31    89    54    40    64    69    73    50    44     2    82    95
13    76

  Columns 49 through 64

    33    37     5    96    78    52    48   100    41    71    14     3    43    46
29    30

  Columns 65 through 80

    39    85    68    81    25    61    51    87    57     9     7    55    83    34
12    20
```

```
  Columns 81 through 96

    27    86    35    62    60    77    58    67    28    93    47    91    98    23
45    32

  Columns 97 through 100

    11    15    17    59

distance
       22390

difference from optimum solution
        1108

percentage error :
    5.2063


run =

     9


time =

  310.1115

route
  Columns 1 through 16

    96    78    52     5    37    33    76    13    95    82     2    54    40    64
44    50

  Columns 17 through 32

    85    68    73    69    81    25    61    51    87     9     7    57    77    23
98    91

  Columns 33 through 48

    47    93    28    58    67     1    92     8    42    89    31    80    56    97
4    65

  Columns 49 through 64

    26    66    19    75    63     6    49    90    79    53    88    16    70    22
94    18

  Columns 65 through 80
```

```
    24    38    99    36    84    10    72    21    74    59    17    15    11    32
45    60

  Columns 81 through 96

    62    20    86    35    27    12    55    83    34    29    46    43     3    14
71    41

  Columns 97 through 100

   100    48    30    39

distance
       22494

difference from optimum solution
        1212

percentage error :
    5.6950


run =

    10


time =

  314.0048

route
  Columns 1 through 16

    91    45    32    11    15    17    59    74    21    72    10    84    36    99
38    24

  Columns 17 through 32

    18    94    22    70    16    88    53    79    90    49     6    75    19    66
26    65

  Columns 33 through 48

     4    97    56    80    31    89    42     8    92     1    63    47    93    28
67    58

  Columns 49 through 64

    61    51    87    25    81    69    73    68    85    50    44    64    40    54
```

```
2    82

  Columns 65 through 80

    95    13    76    33    37     5    52    78    96    39    30    48   100    41
71    14

  Columns 81 through 96

     3    43    46    29    34    83    55    12     7     9    57    20    27    86
35    62

  Columns 97 through 100

    60    77    23    98

distance
       21860

difference from optimum solution
   578

percentage error :
    2.7159


run =

    11


time =

  309.2860

route
  Columns 1 through 16

     2    44    82    95    13    76    33    37     5    39    96    78    52    48
100    71

  Columns 17 through 32

    41    14     3    43    46    29    30    85    68    50    73    81    25    54
87    57

  Columns 33 through 48

     9     7    34    83    55    12    27    35    86    20    62    60    77    23
98    91
```

```
  Columns 49 through 64

    45    32    11    15    17    59    74    21    72    36    99    38    24    18
84    10

  Columns 65 through 80

     6    49    90    79    53    88    16    94    22    70    66    26    65     4
19    75

  Columns 81 through 96

    97    56    80    31    89    42     8    92     1    63    47    93    28    67
58    61

  Columns 97 through 100

    69    64    40    54

distance
       22567

difference from optimum solution
        1285

percentage error :
    6.0380


run =

    12


time =

  312.0630

route
  Columns 1 through 16

    79    90    49     6    92     8    75    19    66    26    65     4    97    56
80    31

  Columns 17 through 32

    89    42    67    58    69    73    50    44    64    40    54     2    82    95
13    76

  Columns 33 through 48
```

```
    33    37     5    52    78    96    39    30    48   100    41    71    14     3
43    46

  Columns 49 through 64

    29    85    68    81    25    61    51    87    57     9     7    34    83    55
12    27

  Columns 65 through 80

    35    86    20    62    60    77    23    98    93    28     1    63    47    91
45    32

  Columns 81 through 96

    11    15    17    59    74    21    72    10    84    36    99    38    24    18
94    22

  Columns 97 through 100

    70    16    88    53

distance
       23344

difference from optimum solution
        2062

percentage error :
    9.6889


run =

    13


time =

  311.4649

route
  Columns 1 through 16

    31    80    56    97     4    65    26    66    70    22    16    88    94    18
79    53

  Columns 17 through 32

    19    75    63     6    49    90    10    84    24    38    99    36    72    21
74    59
```

```
  Columns 33 through 48

    17    15    11    32    45    91    98    23    77    60    62    20    86    35
27    12

  Columns 49 through 64

    55    83    34     7     9    57    87    51    61    25    81    69    73    68
85    39

  Columns 65 through 80

    30    29    46    43     3    14    71    41   100    48    52    78    96     5
37    33

  Columns 81 through 96

    76    13    95    82    50    44     2    54    40    64    67    58    28    93
47     1

  Columns 97 through 100

    92     8    42    89

distance
       22107

difference from optimum solution
   825

percentage error :
    3.8765


run =

    14


time =

  312.4780

route
  Columns 1 through 16

    54    40    64    69    81    25    51    61    58    28    67    42    89    31
80    56

  Columns 17 through 32
```

```
     8    92    75    19    97     4    65    26    66    70    22    94    16    48
53    79

  Columns 33 through 48

    18    24    38    99    36    84    10    90    49     6    63     1    93    47
72    21

  Columns 49 through 64

    74    59    15    17    11    32    45    91    98    23    77    60    62    35
86    27

  Columns 65 through 80

    12    20    57    87     9     7    55    83    34    46    43     3    29    14
71    41

  Columns 81 through 96

   100    48    30    96    78    52     5    37    33    76    13    95    82    39
85    68

  Columns 97 through 100

    73    50    44     2

distance
       22633

difference from optimum solution
        1351

percentage error :
    6.3481


run =

    15


time =

  315.0139

route
  Columns 1 through 16

    63     6    49    75    92     8    42    89    31    80    56    97     4    65
```

```
26    66

  Columns 17 through 32

    70    22    16    88    94    18    79    53    19    90    10    84    24    38
99    36

  Columns 33 through 48

    72    21    74    59    17    15    11    32    45    91    98    23    60    62
77    87

  Columns 49 through 64

     9     7    57    20    86    35    27    12    55    83    34    29    46    45
3    14

  Columns 65 through 80

    71    41   100    48    52    78     5    37    96    30    39    85    68    73
50    44

  Columns 81 through 96

    82    13    33    76    95     2    54    40    64    69    81    25    51    61
58    67

  Columns 97 through 100

    28    93    47     1

distance
       22652

difference from optimum solution
        1370

percentage error :
    6.4374


run =

    16


time =

  312.3840

route
```

```
  Columns 1 through 16

     5    52    78    96    39    85    30    48   100    41    71    14    29    13
43    46

  Columns 17 through 32

    34    83    55    12    20    27    86    35    62    60    77    23    98    91
45    32

  Columns 33 through 48

    47     1    92    63     6    49    90    10    72    21    74    11    15    17
59    36

  Columns 49 through 64

    99    38    24    84    18    79    53    88    16    94    22    70    66    26
65     4

  Columns 65 through 80

    19    75    97    56    80    31    89    42     8    67    28    93    58    61
51    57

  Columns 81 through 96

     7     9    87    25    81    68    73    69    64    40    54     2    44    50
82    95

  Columns 97 through 100

    13    76    33    37

distance
       22998

difference from optimum solution
        1716

percentage error :
    8.0632


run =

    17


time =
```

```
  313.0483

route
  Columns 1 through 16

     1    63     6    49    92     8    75    19    90    10    84    72    21    74
59    36

  Columns 17 through 32

    99    38    24    18    79    53    16    88    94    22    70    66    26    65
4    97

  Columns 33 through 48

    56    80    31    89    42    67    28    93    58    61    25    81    69    68
85    73

  Columns 49 through 64

    64    40    54     2    44    50    82    95    13    76    33    37     5    52
78    96

  Columns 65 through 80

    39    30    48    41    71   100    14     3    43    46    29    34    83    55
7     9

  Columns 81 through 96

    87    51    57    20    12    27    86    35    62    60    77    23    98    45
15    17

  Columns 97 through 100

    11    32    91    47

distance
       22669

difference from optimum solution
        1387

percentage error :
    6.5172


run =

    18
```

```
time =

  312.5532

route
  Columns 1 through 16

   100    41    71    14     3    43    46    29    34    83    55    12    27    35
86    20

  Columns 17 through 32

    62    60    45    32    11    15    17    59    74    21    72    63     6    49
90    10

  Columns 33 through 48

    84    36    99    38    24    18    79    88    16    94    22    70    66    26
65     4

  Columns 49 through 64

    53    19    97    75    92     8    42    56    80    31    89    67    58    28
93     1

  Columns 65 through 80

    47    91    98    23    77    57     7     9    87    51    61    25    81    60
85    50

  Columns 81 through 96

    44    73    69    64    40    54     2    82    95    13    76    33    37     5
52    78

  Columns 97 through 100

    96    39    30    48

distance
       23034

difference from optimum solution
        1752

percentage error :
    8.2323


run =
```

```
    19


time =

  312.4961

route
  Columns 1 through 16

    45    32    11    15    17    59    74    21    72    47    63     6    49    90
10    84

  Columns 17 through 32

    36    99    38    24    18    79    53    88    16    94    22    70    66    26
65     4

  Columns 33 through 48

    97    19    75    56    80    31    89    42     8    92     1    93    28    67
58    61

  Columns 49 through 64

    73    68    85    39    30    29    34    83    55    46    43     3    14    71
41   100

  Columns 65 through 80

    48    52    78    96     5    37    33    76    13    95    82    50    44    12
40    54

  Columns 81 through 96

    64    69    81    25    51    87     9     7    57    20    12    27    86    35
62    60

  Columns 97 through 100

    77    23    98    91

distance
       22196

difference from optimum solution
   914

percentage error :
    4.2947
```

```
run =

    20


avgTime =

  315.4001


avgDist =

   2.2446e+04


bestDist =

       21707


stdDeviation =

  433.2217

>>
```