Student – Victoria Marchuk (AS-37)
Lab 3

Traveling Salesperson Problem (TSP)

TSP with 25 cities of a fixed location

Exercise 12 1. Assume 25 cities as shown in the next page (start from Z and return to Z).

2. Calcurate distance matrix (25×25).

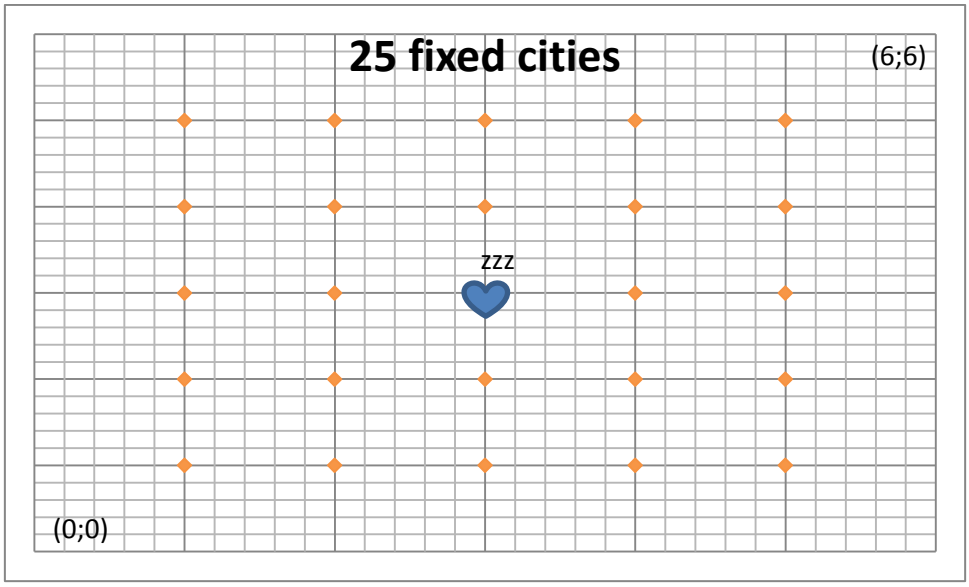
3. Apply GA and evolve chromosomes to be the tours of minimum length.

4. Also show

(5) the graph of fitness vs generation.

(6) The minimum tour in the 1st, two intermediate, and the final generation.

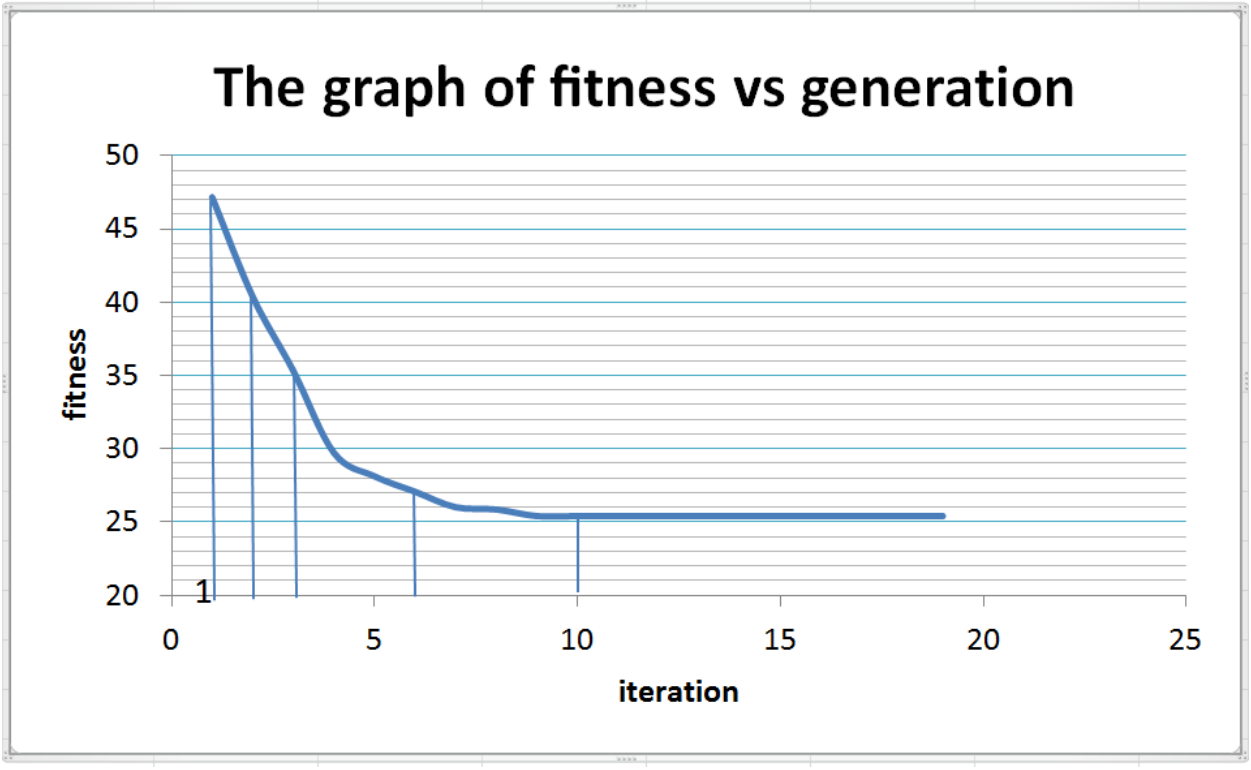
Map of cities of a fixed locatoin



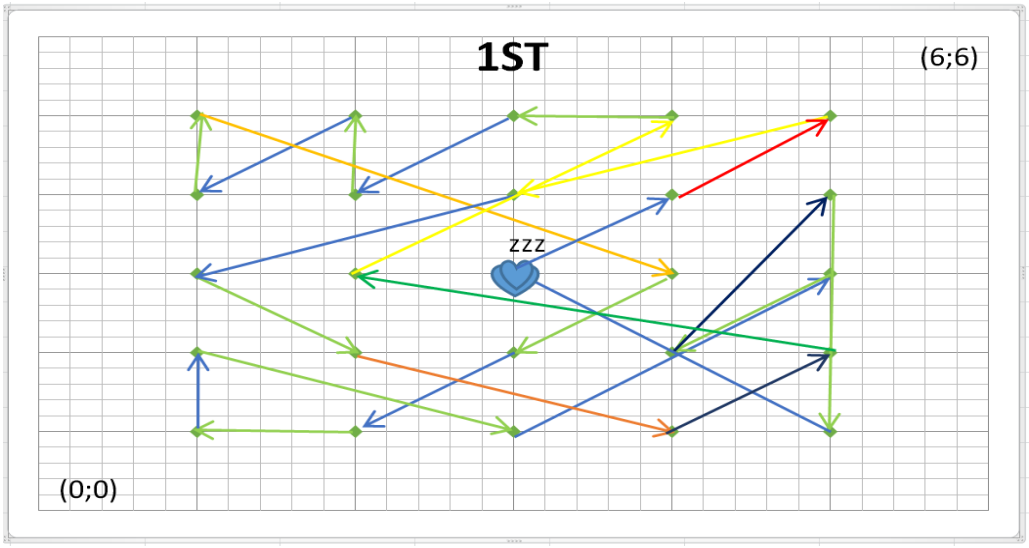
distance matrix

	A	B	C	D	E	F	G	H	I	J	K	L	ZZZ	M	N	O	P	Q	R	S	T	U	W	X	Y
A	0																								
B	1	0																							
C	2	1	0																						
D	3	2	1	0																					
E	4	3	2	1	0																				
F	1	1,41421	2,23607	3,16228	4,12311	0																			
G	1,41421	1	1,41421	2,23607	3,16228	1	0																		
H	2,23607	1,41421	1	1,41421	2,23607	2	1	0																	
I	3,16228	2,23607	1,41421	1	1,41421	3	2	1	0																
J	4,12311	3,16228	2,23607	1,41421	1	4	3	2	1	0															
K	2	2,23607	2,82843	3,60555	4,47214	1	1,41421	2,23607	3,16228	4,12311	0														
L	2,23607	2	2,23607	2,82843	3,60555	1,41421	1	1,41421	2,23607	3,16228	1	0													
ZZZ	2,82843	2,23607	2	2,23607	2,82843	2,23607	1,41421	1	1,41421	2,23607	2	1	0												
M	3,60555	2,82843	2,23607	2	2,23607	3,16228	2,23607	1,41421	1	1,41421	3	2	1	0											
N	4,47214	3,60555	2,82843	2,23607	2	4,12311	3,16228	2,23607	1,41421	1	4	3	2	1	0										
O	3	3,16228	3,60555	4,24264	5	2	2,23607	2,82843	3,60555	4,47214	1	1,41421	2,23607	3,16228	4,12311	0									
P	3,16228	3	3,16228	3,60555	4,24264	2,23607	2	2,23607	2,82843	3,60555	1,41421	1	1,41421	2,23607	3,16228	1	0								
Q	3,60555	3,16228	3	3,16228	3,60555	2,82843	2,23607	2	2,23607	2,82843	2,23607	1,41421	1	1,41421	2,23607	2	1	0							
R	4,24264	3,60555	3,16228	3	3,16228	3,60555	2,82843	2,23607	2	2,23607	3,16228	2,23607	1,41421	1	1,41421	3	2	1	0						
S	5	4,24264	3,60555	3,16228	3	4,47214	3,60555	2,82843	2,23607	2	4,12311	3,16228	2,23607	1,41421	1	4	3	2	1	0					
T	4	4,12311	4,47214	5	5,65685	3	3,16228	3,60555	4,24264	5	2	2,23607	2,82843	3,60555	4,47214	1	1,41421	2,23607	3,16228	4,12311	0				
U	4,12311	4	4,12311	4,47214	5	3,16228	3	3,16228	3,60555	4,24264	2,23607	2	2,23607	2,82843	3,60555	1,41421	1	1,41421	2,23607	3,16228	1	0			
W	4,47214	4,12311	4	4,12311	4,47214	3,60555	3,16228	3	3,16228	3,60555	2,82843	2,23607	2	2,23607	2,82843	2,23607	1,41421	1	1,41421	2,23607	2	1	0		
X	5	4,47214	4,12311	4	4,12311	4,24264	3,60555	3,16228	3	3,16228	3,60555	2,82843	2,23607	2	2,23607	3,16228	2,23607	1,41421	1	1,41421	3	2	1	0	
Y	5,65685	5	4,47214	4,12311	4	5	4,24264	3,60555	3,16228	3	4,47214	3,60555	2,82843	2,23607	2	4,12311	3,16228	2,23607	1,41421	1	4	3	2	1	0

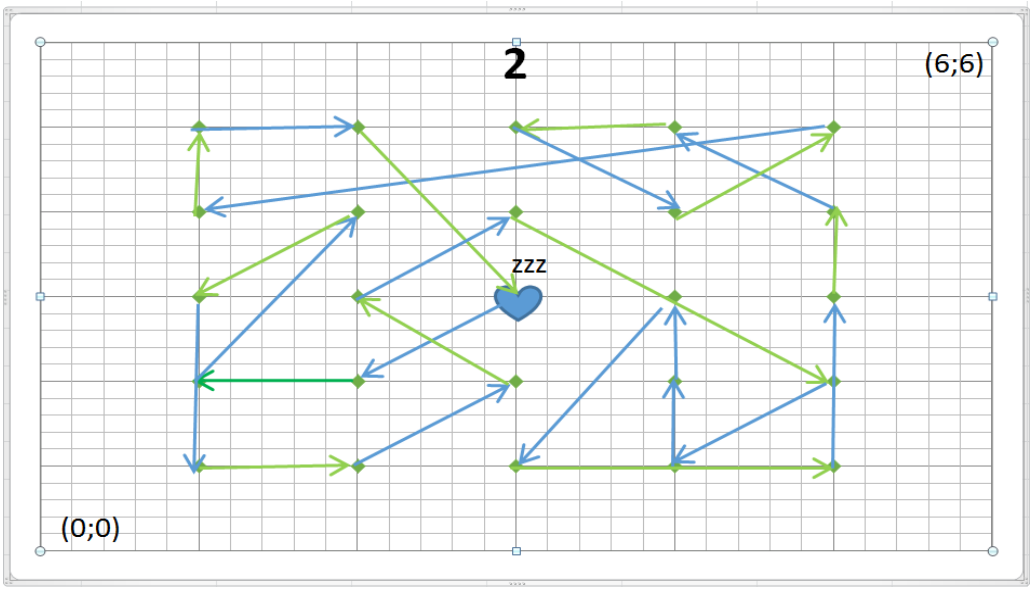
the graph of fitness vs generation



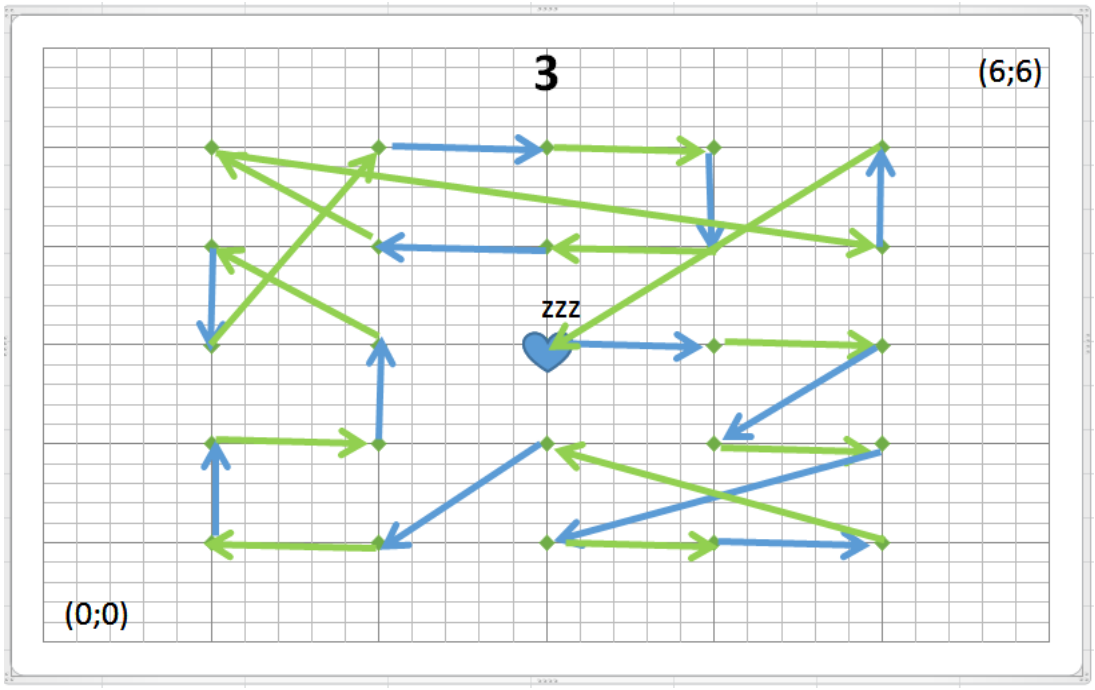
1ST GENERATION (distance 47,16)



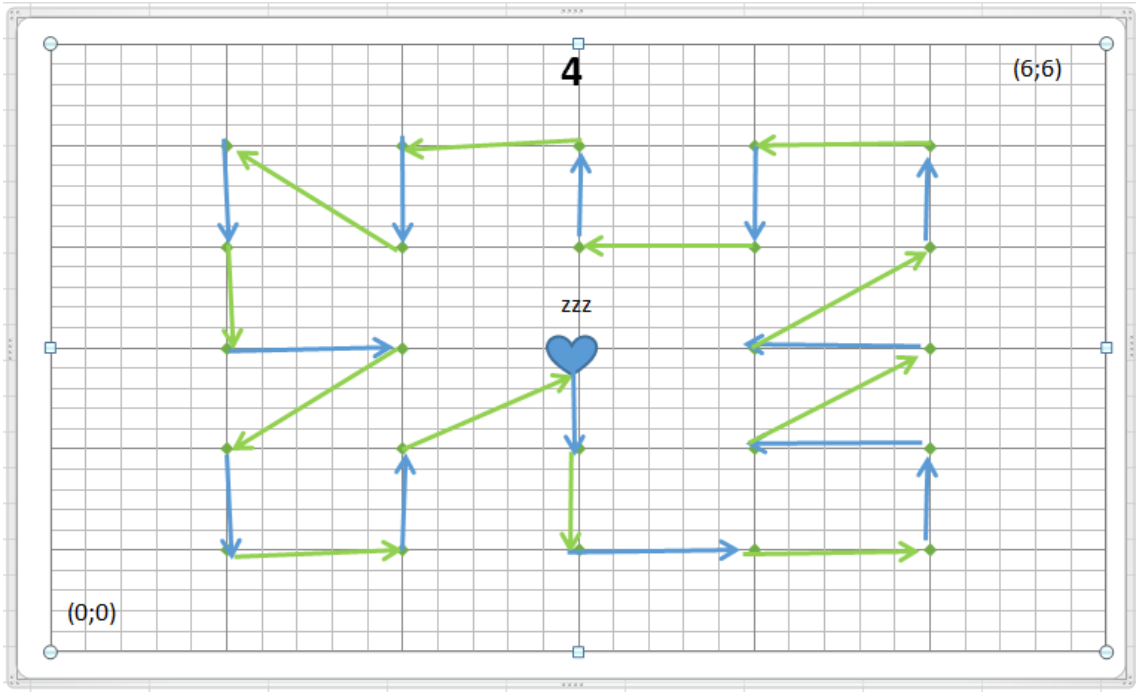
2st GENERATOIN (IM) (DISTANCE 40,38)



3st GENERATION (im) (distance 35,31)



4st GENERATION(im) (distance 27,07)



The best distance 25,41