

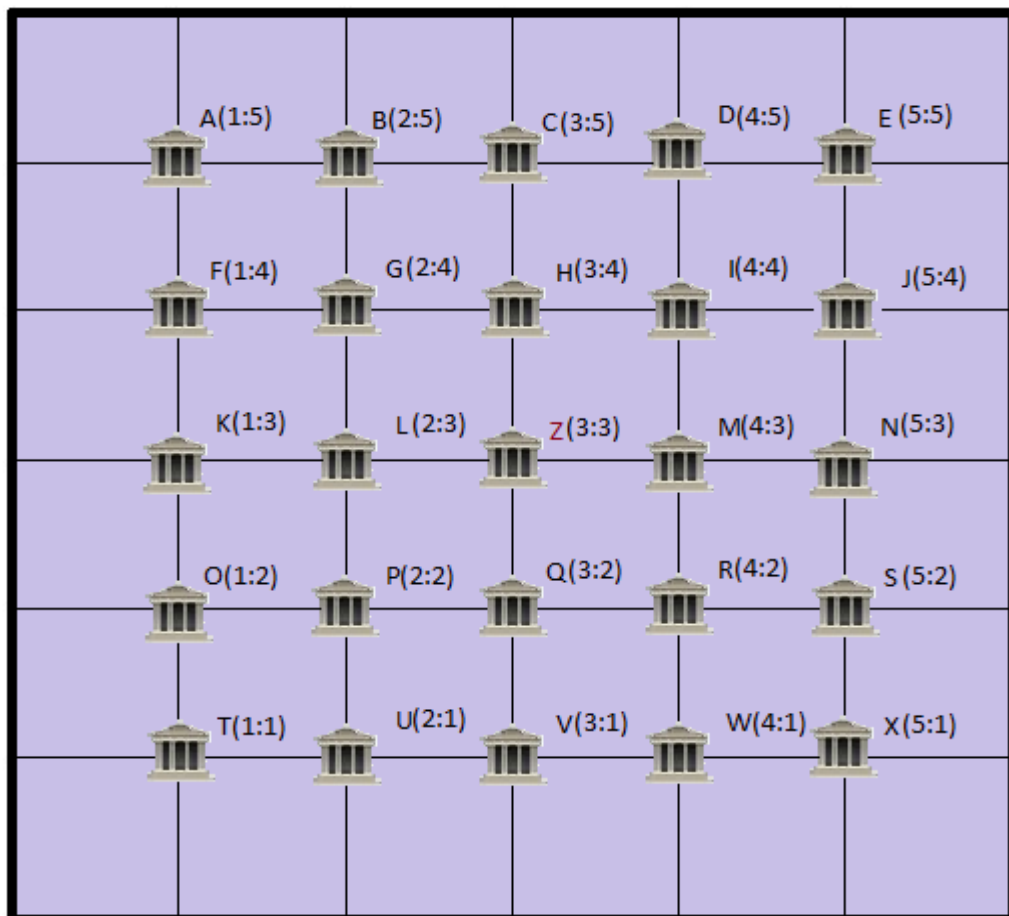
Modern intelligent IT
Lab 3 (08.04.2016)
Akira Imada
Student – Grinyuk Dmitry
Group – AS 37

TSP with 25 cities of a fixed location

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

(6:6)

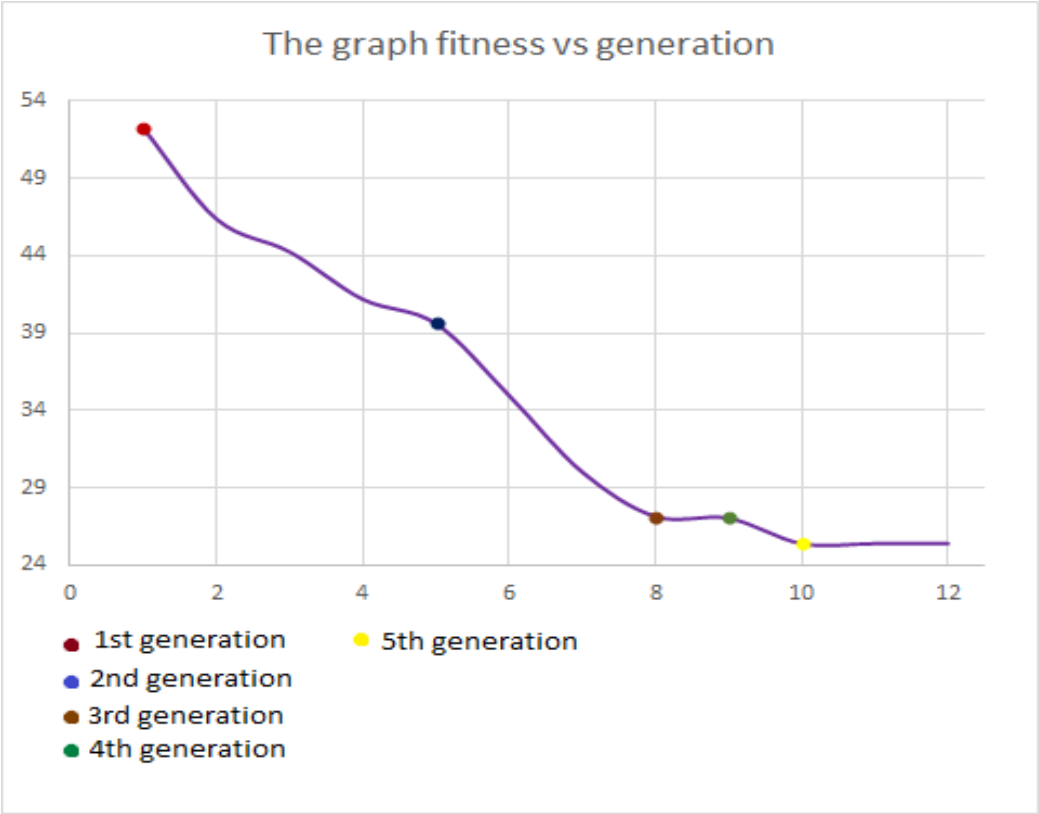


(0:0)

Distance matrix

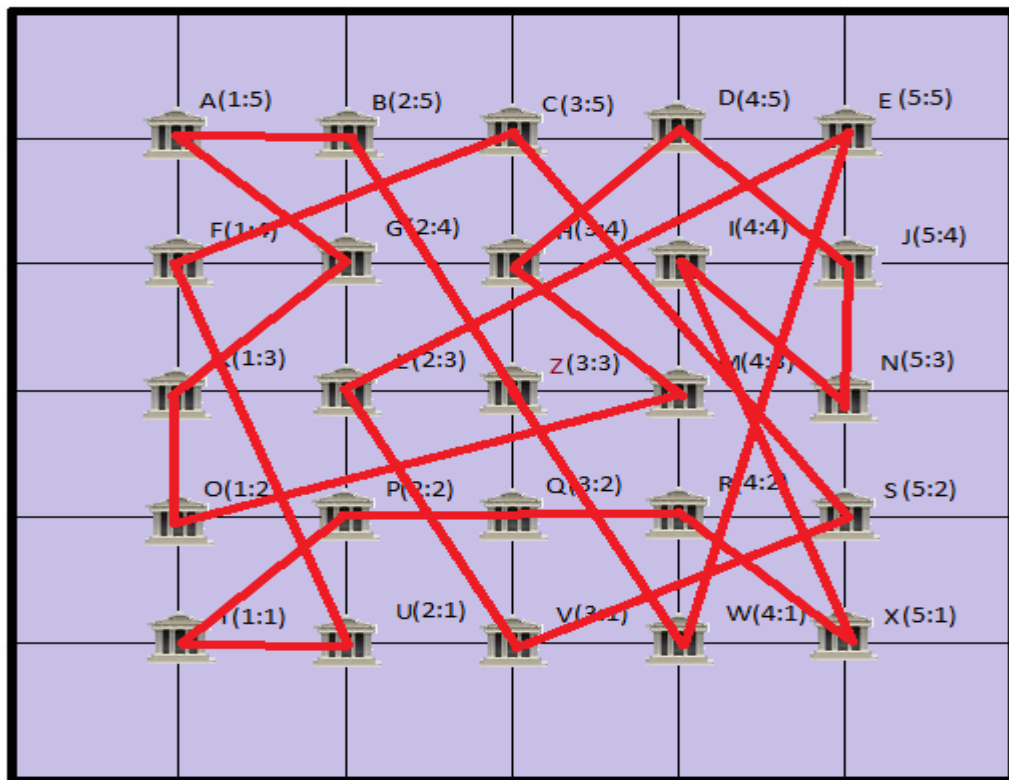
	A	B	C	D	E	F	G	H	I	J	K	L	Z	M	N	O	P	Q	R	S	T	U	V	W	X
A	0	1	2	3	4	1	1,41421	2,23607	3,16228	4,12311	2	2,23607	2,82843	3,60555	4,47214	3	3,16228	3,60555	4,24264	5	4	4,12311	4,47214	5	5,65685
B	1	0	1	2	3	1,41421	1	1,41421	2,23607	3,16228	2,23607	2	2,23607	2,82843	3,60555	3,16228	3	3,16228	3,60555	4,24264	4,12311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



Tour in the 1st

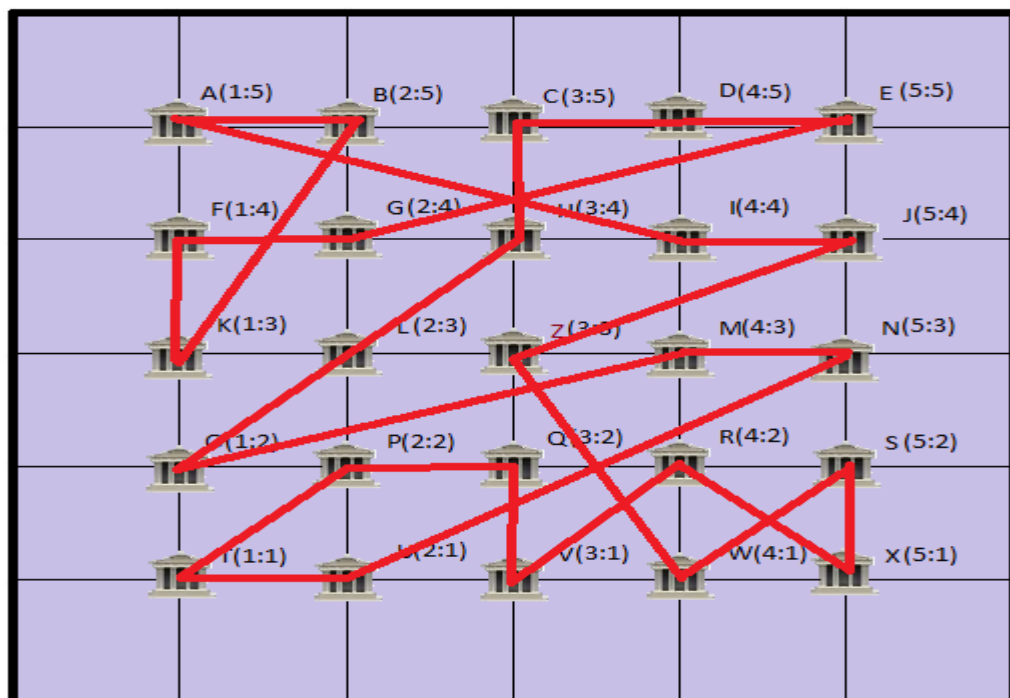
(6:6)



(0:0)

Tour in the 2nd

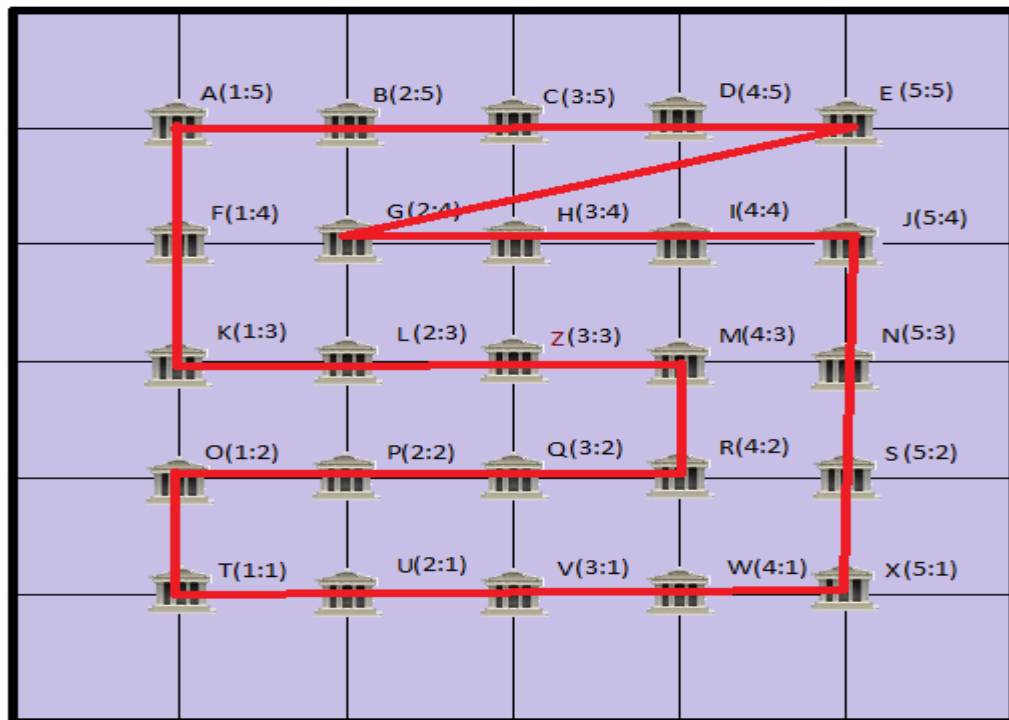
(6:6)



(0:0)

Tour in the 3rd

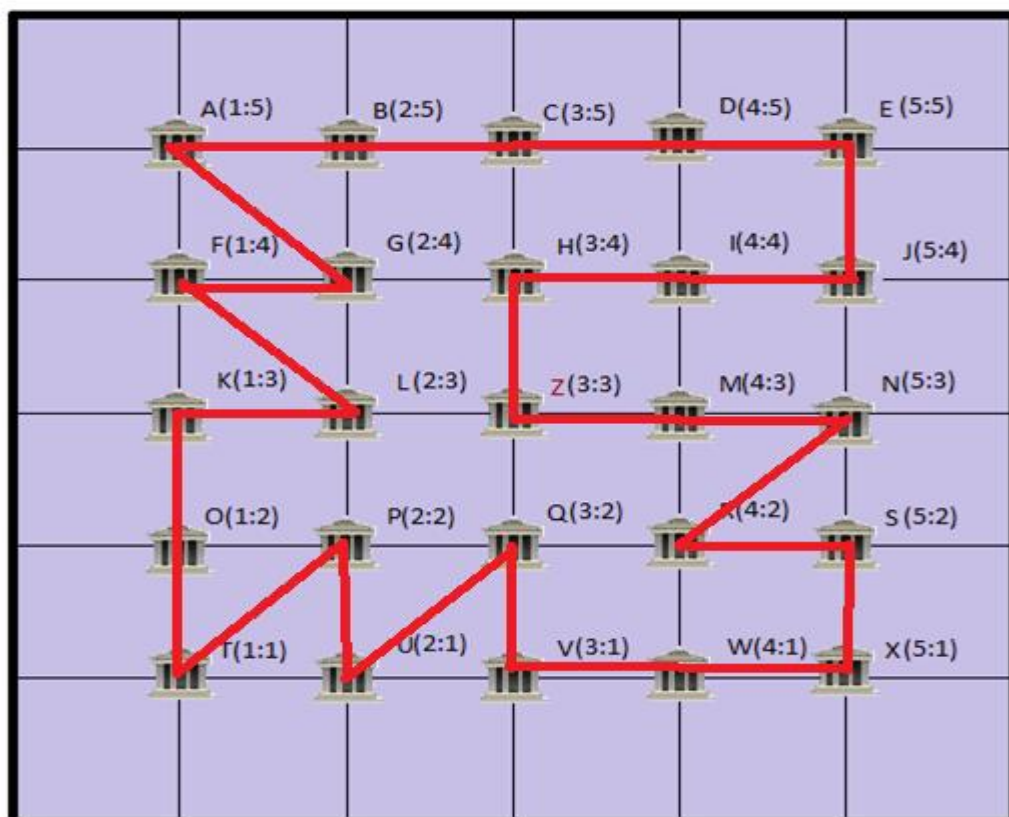
(6:6)



(0:0)

Tour in the 4th

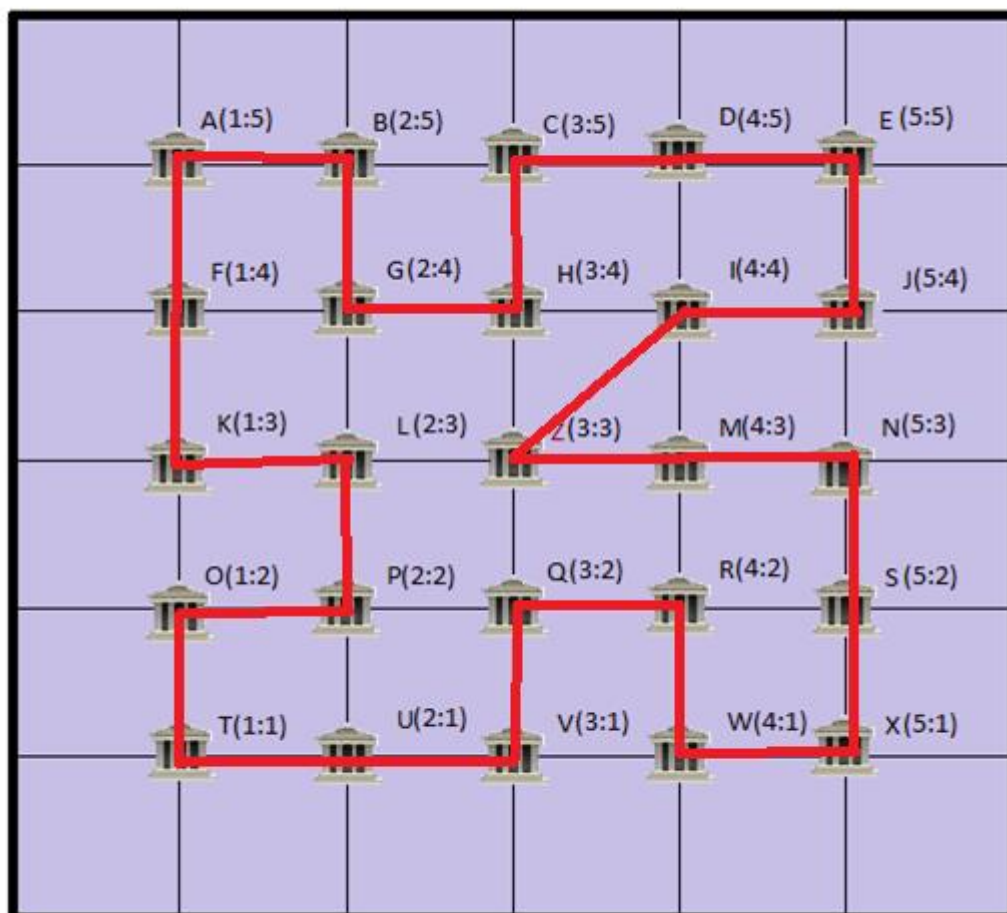
(6:6)



(0:0)

The final generation

(6:6)



(0:0)