Rutas Óptimas
Algoritmo de Floyd

Grupo 40
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1   Floyd's Algorithm

This program consists of Floyd's algorithm to obtain the shortest path between any pair of nodes in a graph with weighted distances. Floyd's algorithm compares the distance between any two given nodes and by passing through another city in between, if the result is less than the original then it chooses the shortest one. After contemplating all nodes in the graph, the graph is guaranteed to have all the shortest distances between any two nodes in the graph. These changes are recorded in another matrix called P that helps determine the shortest path between any two nodes.

2   Robert W. Floyd (1936–2001)

Robert Willoughby Floyd was a computer scientist that lived from 1936 to 2001. He made great advances in computer science and developed an algorithm to find the shortest paths between any two nodes for a directed graph. He was awarded a Turing Award in 1978.

3   Initial Graph
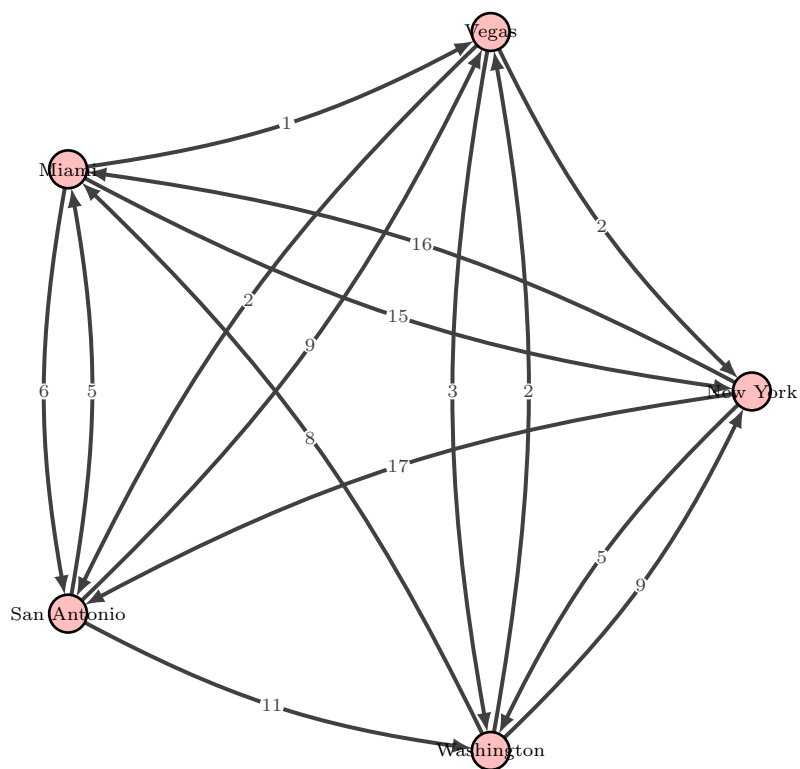
4   Table D_0

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	∞	16	17	5
Vegas	2	0	∞	2	3
Miami	15	1	0	6	∞
San Antonio	∞	9	5	0	11
Washington	9	2	8	∞	0

5   Table P_0

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	0	0	0	0
Vegas	0	0	0	0	0
Miami	0	0	0	0	0
San Antonio	0	0	0	0	0
Washington	0	0	0	0	0

6 Table D_1

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	∞	16	17	5
Vegas	2	0	18	2	3
Miami	15	1	0	6	20
San Antonio	∞	9	5	0	11
Washington	9	2	8	26	0

7 Table P_1

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	0	0	0	0
Vegas	0	0	1	0	0
Miami	0	0	0	0	1
San Antonio	0	0	0	0	0
Washington	0	0	0	1	0

8 Table D_2

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	∞	16	17	5
Vegas	2	0	18	2	3
Miami	3	1	0	3	4
San Antonio	11	9	5	0	11
Washington	4	2	8	4	0

9 Table P_2

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	0	0	0	0
Vegas	0	0	1	0	0
Miami	2	0	0	2	2
San Antonio	2	0	0	0	0
Washington	2	0	0	2	0

10   Table D_3

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	17	16	17	5
Vegas	2	0	18	2	3
Miami	3	1	0	3	4
San Antonio	8	6	5	0	9
Washington	4	2	8	4	0

11   Table P_3

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	3	0	0	0
Vegas	0	0	1	0	0
Miami	2	0	0	2	2
San Antonio	3	3	0	0	3
Washington	2	0	0	2	0

12   Table D_4

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	17	16	17	5
Vegas	2	0	7	2	3
Miami	3	1	0	3	4
San Antonio	8	6	5	0	9
Washington	4	2	8	4	0

13   Table P_4

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	3	0	0	0
Vegas	0	0	4	0	0
Miami	2	0	0	2	2
San Antonio	3	3	0	0	3
Washington	2	0	0	2	0

14 Table D_5

D	New York	Vegas	Miami	San Antonio	Washington
New York	0	7	13	9	5
Vegas	2	0	7	2	3
Miami	3	1	0	3	4
San Antonio	8	6	5	0	9
Washington	4	2	8	4	0

15 Table P_5

P	New York	Vegas	Miami	San Antonio	Washington
New York	0	5	5	5	0
Vegas	0	0	4	0	0
Miami	2	0	0	2	2
San Antonio	3	3	0	0	3
Washington	2	0	0	2	0

Current city: New York

New York —5— Washington —2→ Vegas

New York —5— Washington —8→ Miami

New York —5— Washington —2→ Vegas —2— San Antonio

New York —5— Washington

Current city: Vegas

Vegas —2— New York

Vegas —2— San Antonio —5→ Miami

Vegas —2— San Antonio

Vegas —3— Washington

Current city: Miami

Miami —1→ Vegas —2— New York

Miami —1→ Vegas

Miami —1→ Vegas —2— San Antonio

Miami —1→ Vegas —3— Washington
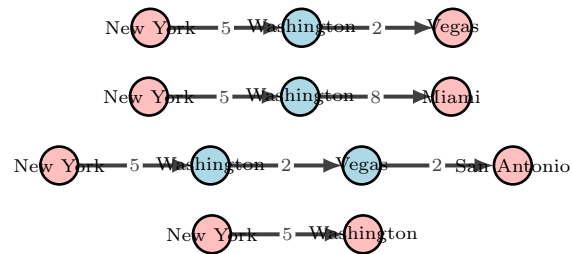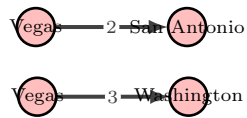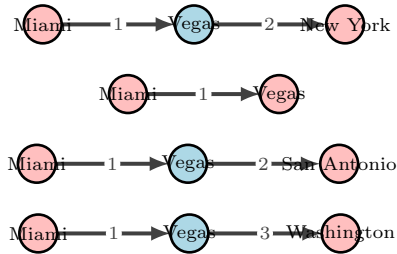
Current city: San Antonio

San Antonio —5→ Miami —1→ Vegas —2— New York

San Antonio —5→ Miami —1→ Vegas

San Antonio —5→ Miami

San Antonio —5→ Miami —1→ Vegas —3— Washington
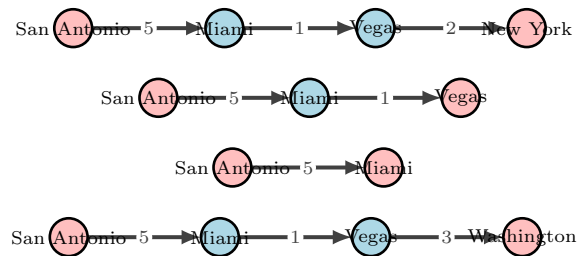
Current city: Washington

Washington —2→ Vegas —2— New York

Washington —2→ Vegas

Washington —8→ Miami

Washington —2→ Vegas —2— San Antonio