Practice Problem #15 Completed RMC

5.9 Part (a) S-Sequence V=set of nodes not visited, yet

Start w/ Node 1

S = 1, V={2,3,4,5,6,7,8} Choose edge (1,5) w/ cost = 7

S=1→5 V={2,4,3,6,7,8} Choose (4,5) Cost = 7+8=15

S=1→5→4 V={2,3,6,7,8} Choose (2,4) Cost = 15+7=22

S=1→5→4→2, V={3,6,7,8} Choose (2,3) Cost = 22+5=27

S=1→5→4→2→3 V={6,7,8} Choose (3,6) Cost = 27+9=36

S=1→5→4→2→3→6 V={7,8} Choose (6,7) Cost = 36+8=44

S=1→5→4→2→3→6→7 V={8} Choose (7,8) Cost = 44+15=59

S=1→5→4→2→3→6→7→8 Total Cost = 59+21 = 80

Start w/ node 2 (14)

S = 2→3→1→5→4→6→7→8

5 + 8 +7 + 8 + 7 + 8 +15 +14 = 72 → Better than 80, so 72 is our new best solution

Start w/ node 3 8

S = 3→2→4→6→7→8→5→1

5 + 7 + 7 + 8 + 15 + 11 + 7 +8 = 68 Better than 72, so 68 is our new best Solution.

Start w/ node 4 9

S = 4→2→3→1→5→8→6→7

7 + 5 + 8 + 7 + 11 + 14 + 8 +9 = 69. 69>68, so no update

Start w/ node 5

$S = 5 \to 1 \to 3 \to 2 \to 4 \to 6 \to 7 \to 8$

Cost = $7 + 8 + 5 + 7 + 7 + 8 + 15 + 11 = 68$ $68 \geq 68$, so no update

Start w/ node 6

$S = 6 \to 4 \to 2 \to 3 \to 1 \to 5 \to 8 \to 7$

Cost = $7 + 7 + 5 + 8 + 7 + 11 + 15 + 8 = 68$ $68 \geq 68$, so no update.

Start w/ node 7

$S = 7 \to 6 \to 4 \to 2 \to 3 \to 1 \to 5 \to 8$

Cost = $8 + 7 + 7 + 5 + 8 + 7 + 11 + 15 = 68$ $68 \geq 68$, so no update

Start w/ node 8

$S = 8 \to 4 \to 2 \to 3 \to 1 \to 5 \to 6 \to 7$

Cost = $10 + 7 + 5 + 8 + 7 + 12 + 8 + 15 = 72$ $72 > 68$, so no update.

The best solution produced by the Nearest Neighbor Algorithm is the tour

$S = 3 \to 2 \to 4 \to 6 \to 7 \to 8 \to 5 \to 1$ w/ a total cost of 68.