UNIVERSIDAD AUTONÓMA DE NUEVO LEÓN

FACULTAD DE INGENIERÍA MECÁNICA Y ELÉCTRICA

COORDINACIÓN GENERAL DE CIENCIAS BÁSICAS

SUBJECT: **TSO**

SEMESTER: **JANUARY - JUNE 2024**

ACTIVITY: **Homework 4**

PROFESSOR: **Roger Zirahuén Ríos Mercados**

OP.	STUDENT ID	NAME	CLASS HOUR	Group	CAREER
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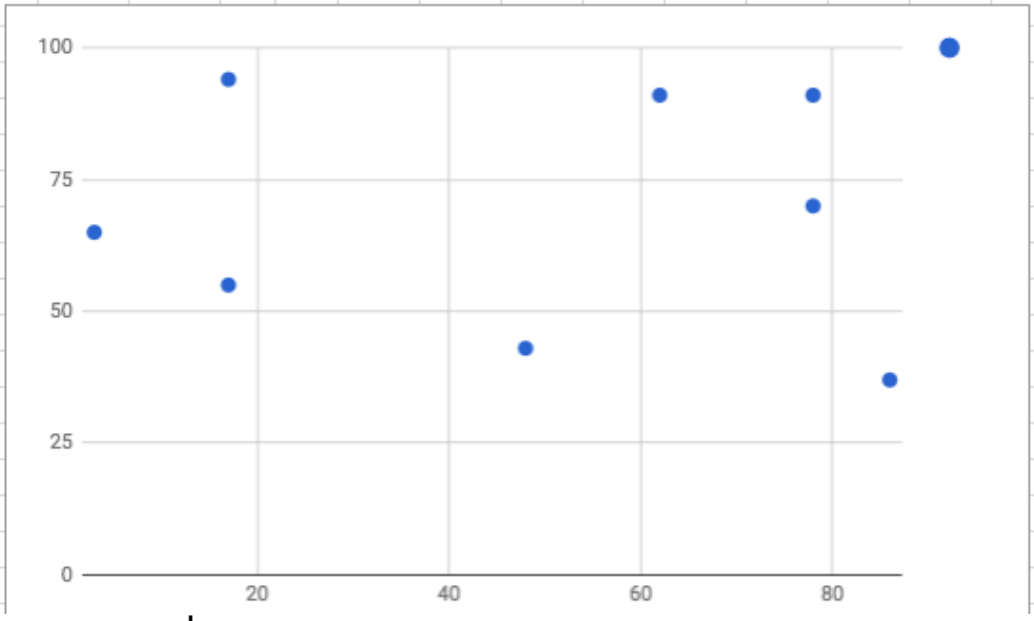
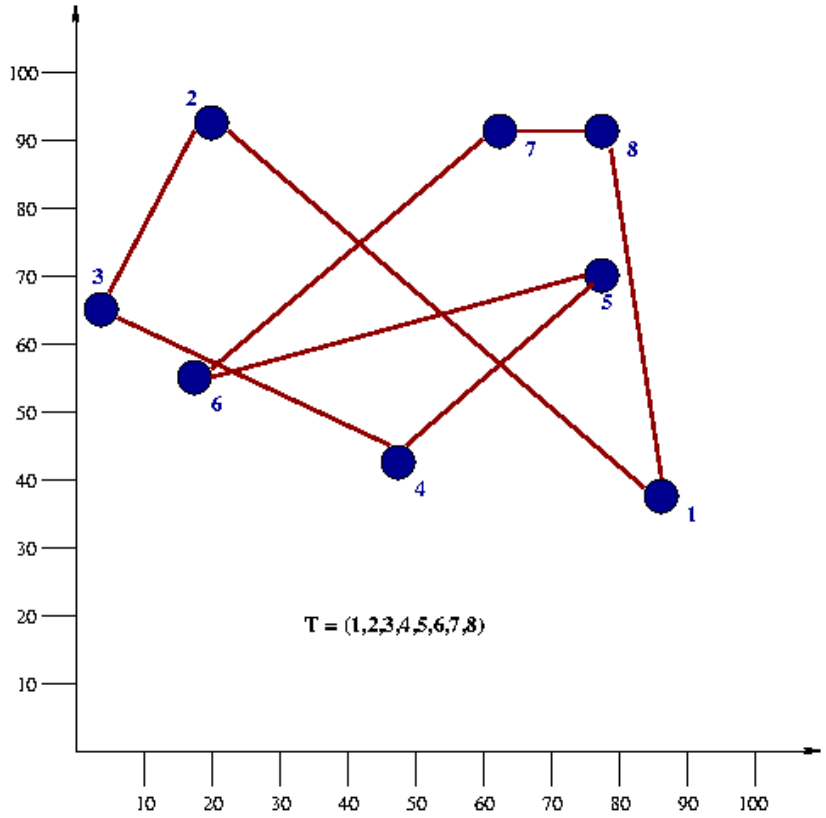
Data of the problem

	coordenadas										
	x	y		1	2	3	4	5	6	7	8
1	86	37	1	0							
2	17	94	2	89	0						
3	3	65	3	87	32	0					
4	48	43	4	38	59	50	0				
5	78	70	5	33	65	75	40	0			
6	17	55	6	71	39	17	33	62	0		
7	62	91	7	59	45	64	50	26	57	0	
8	78	91	8	54	61	79	56	21	70	16	0

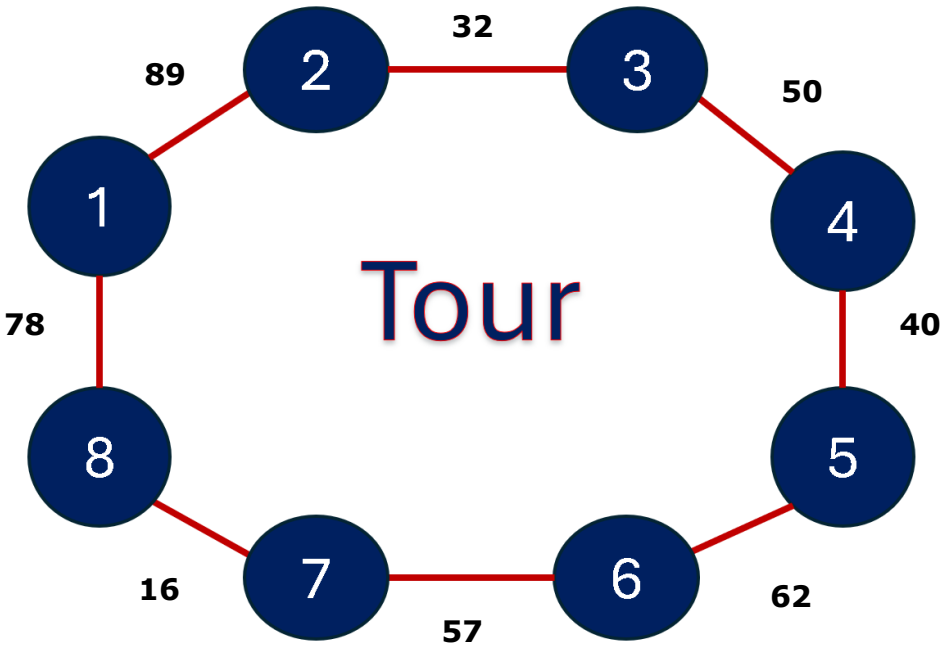




In base of this information, we must apply the 2-OPT until we find a local optimal solution, in this homework we´ll use the **First-found** and the **Best-found** strategies. We´ll use the next feasible solution:

T= (1,2,3,4,5,6,7,8)

Also, I'm going to graph a diagram that represents the feasible solution in a more intuitive and comprehensive way.



Best-Found strategy

The **BF** strategy is the one who will give us the optimal solution, but it will take a lot more time in comparison to the **First-Found** strategy to start this local search we are going to start making our first **move** which is the next one:

move1(**e1, e2**)

move1(**i, j; k, l**) = remove edges (**i,j**) and (**k,l**) and reconnect to form a tour (**i,k**) + (**j,l**) **NO ADJACENT** edges allowed.

$$\Delta z = -d_{i,j} - d_{k,l} + d_{i,k} + d_{j,l}$$

So now that we have declared our move, we are going to evaluate all the possible neighbors because we are in the best-found strategy. (the best-found will be the one with the **LOWEST** value).

Possible neighbors iteration 1 **Total neighbors = 20**

move1(**1, 2; 3, 4**) = -89-50+87+59 = 7 **NO**
move1(**1, 2; 4, 5**) = -89-40+38+65 = -26 **YES**

move1(**1**, **2**; **5**, **6**) = -89-62+33+39 = -79 **BEST**
move1(**1**, **2**; **6**, **7**) = -89-57+71+45 = -30 **YES**
move1(**1**, **2**; **7**, **8**) = -89-16+59+61 = 15 **NO**

---

move1(**2**, **3**; **4**, **5**) = -32-40+59+75 = 62 **NO**
move1(**2**, **3**; **5**, **6**) = -32-62+65+17 = -12 **YES**
move1(**2**, **3**; **6**, **7**) = -32-57+39+64 = 14 **NO**
move1(**2**, **3**; **7**, **8**) = -32-16+45+79 = 76 **NO**
move1(**2**, **3**; **8**, **1**) = -32-78+61+87 = 38 **NO**

---

move1(**3**, **4**; **5**, **6**) = -50-62+75+33 = -4 **YES**
move1(**3**, **4**; **6**, **7**) = -50-57+17+50 = -40 **YES**
move1(**3**, **4**; **7**, **8**) = -50-16+64+56 = 54 **NO**
move1(**3**, **4**; **8**, **1**) = -50-78+79+38 = -11 **YES**
move1(**3**, **4**; **1**, **2**) = -50-89+87+59 = 7 **NO**

---

move1(**4**, **5**; **6**, **7**) = -40-57+33+26 = -38 **YES**
move1(**4**, **5**; **7**, **8**) = -40-16+50+21 = 15 **NO**
move1(**4**, **5**; **8**, **1**) = -40-78+56+33 = -29 **YES**
move1(**4**, **5**; **1**, **2**) = -40-89+38+65 = -26 **YES**
move1(**4**, **5**; **2**, **3**) = -40-32+59+75 = 62 **NO**

---

move1(**5**, **6**; **7**, **8**) = -62-16+26+70 = 18 **NO**
move1(**5**, **6**; **8**, **1**) = -62-78+21+71 = -48 **YES**
move1(**5**, **6**; **1**, **2**) = -62-89+33+39 = -79 **BEST**
move1(**5**, **6**; **2**, **3**) = -62-32+65+17 = -12 **YES**
move1(**5**, **6**; **3**, **4**) = -62-50+75+33 = -4 **YES**

---

move1(**6**, **7**; **8**, **1**) = -57-78+70+59 = -6 **YES**
move1(**6**, **7**; **1**, **2**) = -57-89+71+45 = -30 **YES**
move1(**6**, **7**; **2**, **3**) = -57-32+39+64 = 17 **NO**
move1(**6**, **7**; **3**, **4**) = -57-50+17+50 = -40 **YES**
move1(**6**, **7**; **4**, **5**) = -57-40+33+26 = -38 **YES**

---

move1(**7**, **8**; **1**, **2**) = -16-89+59+61 = 15 **NO**
move1(**7**, **8**; **2**, **3**) = -16-32+45+79 = 76 **NO**
move1(**7**, **8**; **3**, **4**) = -16-50+64+56 = 54 **NO**
move1(**7**, **8**; **4**, **5**) = -16-40+50+21 = 15 **NO**
move1(**7**, **8**; **5**, **6**) = -16-62+26+70 = 18 **NO**

---

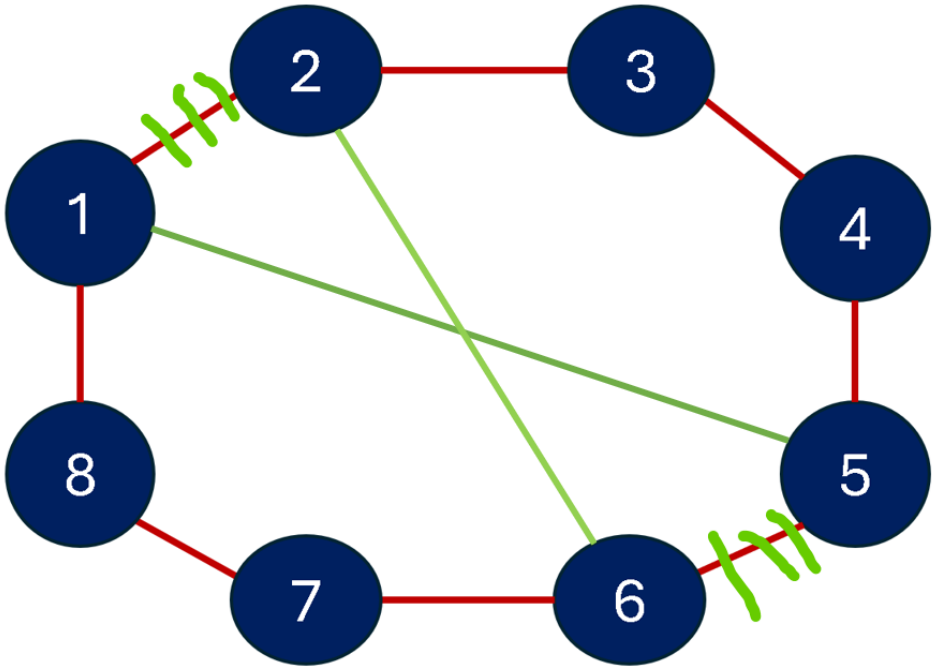
move1(**8**, **1**; **2**, **3**) = -78-32+61+87 = 38 **NO**
move1(**8**, **1**; **3**, **4**) = -78-50+79+38 = -11 **YES**
move1(**8**, **1**; **4**, **5**) = -78-40+56+33 = -29 **YES**
move1(**8**, **1**; **5**, **6**) = -78-62+21+71 = -48 **YES**

move1(**8**, **1; 6, 7**) = -78-57+70+59 = -6 **YES**

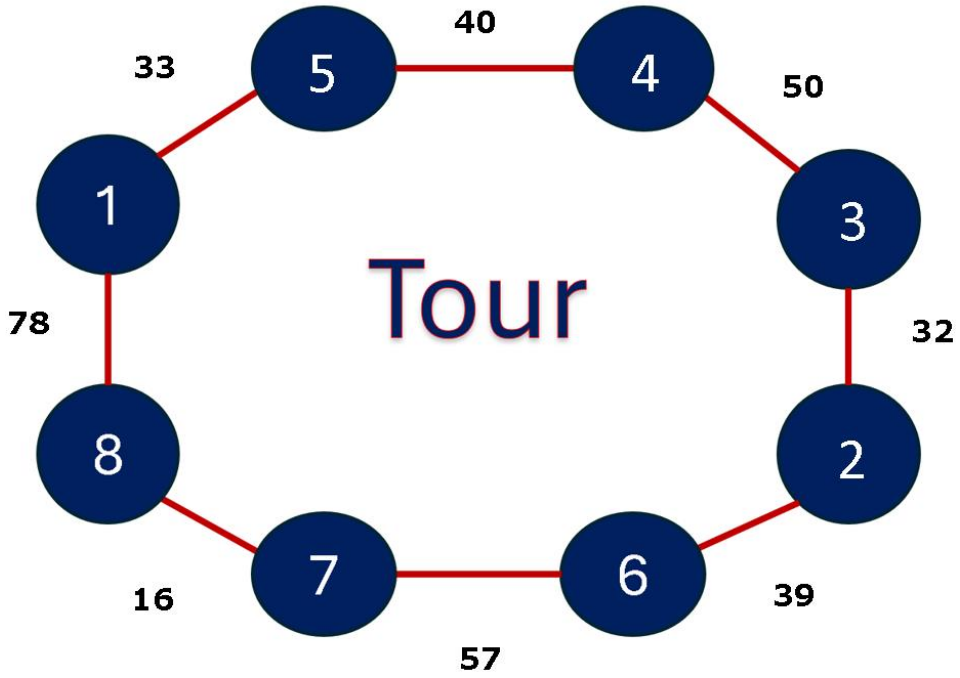
In this iteration we write the repeated neighbors because I use **the brute force method** (like in the high school) but in the next ones we are going to skip them.

So, in base of the data gotten of the neighborhood 1 we know that the move1(**1**, **2; 5, 6**) is the best one in this case, so we proceed to make it.

move1(**1**, **2; 5, 6**) = remove edges (**1**,**2**) and (**5**,**6**) and reconnect to form a tour (**1**,**5**) + (**2**,**6**).



Now our solution will be **T= (1,5,4,3,2,6,7,8)**



Possible neighbors iteration 2 **Total neighbors = 20**

move2(**1**,**5**; **4**, **3**) = -33-50+33+75 = 25 **NO**
move2(**1**,**5**; **3**, **2**) = -33-32+87+65 = 87 **NO**
move2(**1**,**5**; **2**, **6**) = -33-39+89+62 = 79 **NO**
move2(**1**,**5**; **6**, **7**) = -33-57+71+26 = 7 **NO**
move2(**1**,**5**; **7**, **8**) = -33-16+59+21 = 31 **NO**

---

move2(**5**,**4**; **3**, **2**) = -40-32+75+59 = 62 **NO**
move2(**5**,**4**; **2**, **6**) = -40-39+65+33 = 19 **NO**
move2(**5**,**4**; **6**, **7**) = -40-57+62+50 = 15 **NO**
move2(**5**,**4**; **7**, **8**) = -40-16+26+56 = 26 **NO**
move2(**5**,**4**; **8**, **1**) = -40-78+21+38 = -59 **BEST**

---

move2(**4**,**3**; **2**, **6**) = -50-39+59+17 = -13 **YES**
move2(**4**,**3**; **6**, **7**) = -50-57+33+64 = -10 **YES**
move2(**4**,**3**; **7**, **8**) = -50-16+50+79 = 63 **NO**
move2(**4**,**3**; **8**, **1**) = -50-78+56+87 = 15 **NO**

---

move2(**3**,**2**; **6**, **7**) = -32-57+17+45 = -27 **YES**
move2(**3**,**2**; **7**, **8**) = -32-16+64+61 = 77 **NO**
move2(**3**,**2**; **8**, **1**) = -32-78+79+89 = 58 **NO**

---

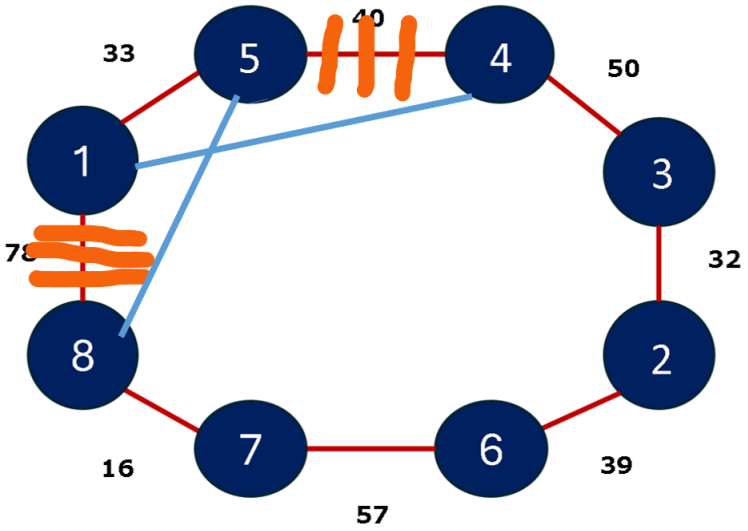
move2(**2**,**6**; **7**, **8**) = -39-57+45+70 = 19 **NO**
move2(**2**,**6**; **8**, **1**) = -39-16+61+71 = 77 **NO**

---

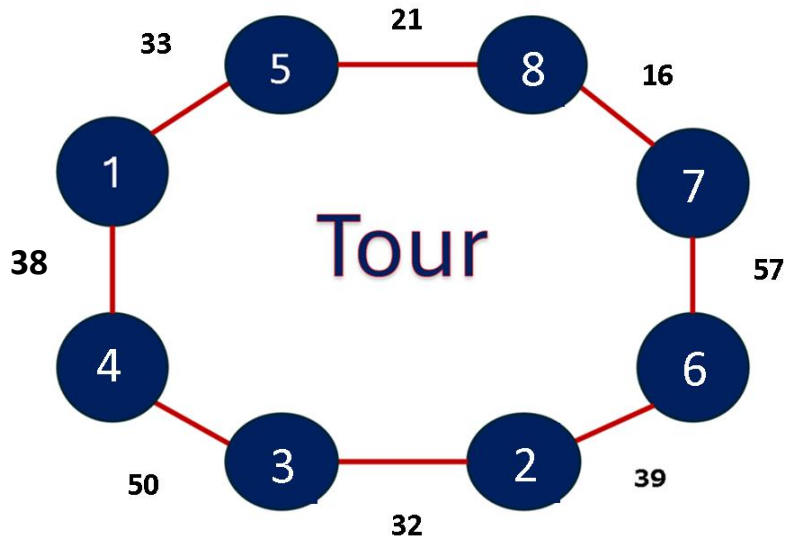
move2(**6**,**7** ; **8**, **1**) = -57-78+70+54 = -11 **YES**

So in base of the data gotten of the neighborhood 2 we know that the move2(**5**, **4**; **8**, **1**) is the best one in this case so, we proceed to make it.

move2(**5**, **4**; **8**, **1**) = remove edges (**5**,**4**) and (**8**,**1**) and reconnect to form a tour (**5**,**8**) + (**4**,**1**).



Now our solution will be **T= (1,5,8,7,6,2,3,4)**



Possible neighbors iteration 3 **Total neighbors = 20**

move3(**1,5; 8, 7**) = -33-16+54+26 = 31 **NO**
move3(**1,5; 7, 6**) = -33-57+59+62 = 31 **NO**
move3(**1,5; 6, 2**) = -33-39+71+65 = 64 **NO**
move3(**1,5; 2, 3**) = -33-32+89+75 = 99 **NO**
move3(**1,5; 3, 4**) = -33-50+87+40 = 44 **NO**

---

move3(**5,8; 7, 6**) = -21-57+26+70 = 18 **NO**
move3(**5,8; 6, 2**) = -21-39+62+61 = 63 **NO**
move3(**5,8; 2, 3**) = -21-32+65+79 = 91 **NO**
move3(**5,8; 3, 4**) = -21-50+75+56 = 60 **NO**
move3(**5,8; 4, 1**) = -21-38+40+54 = 35 **NO**

---

move3(**8,7; 6, 2**) = -16-39+70+45 = 60 **NO**
move3(**8,7; 2, 3**) = -16-32+61+64 = 77 **NO**
move3(**8,7; 3, 4**) = -16-50+79+50 = 63 **NO**
move3(**8,7; 4, 1**) = -16-38+56+59 = 61 **NO**

---

move3(**7,6; 2, 3**) = -57-32+45+17 = -27 **BEST**
move3(**7,6; 3, 4**) = -57-50+64+33 = -10 **YES**
move3(**7,6; 4, 1**) = -57-38+50+71 = 26 **NO**

---

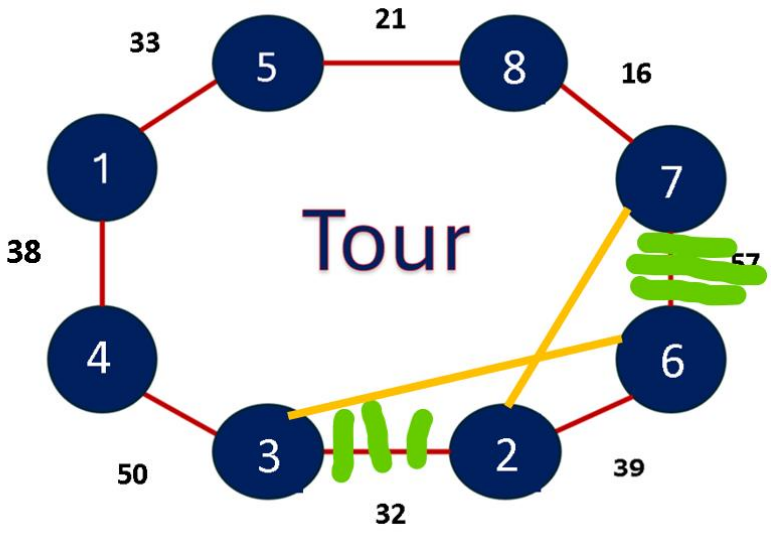
move3(**6,2; 3, 4**) = -39-50+17+59 = -13 **YES**
move3(**6,2; 4, 1**) = -39-38+33+38 = -6 **YES**

---

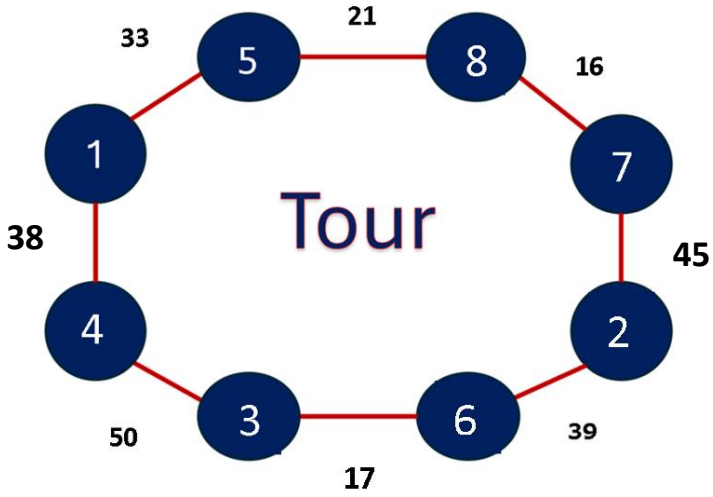
move3(**2,3; 4, 1**) = -32-38+59+87 = 60 **NO**

So in base of the data gotten of the neighborhood 3 we know that the move3(**7**, **6; 2, 3**) is the best one in this case so we proceed to make it.

move3(**7**, **6; 2, 3**) = remove edges (**7**,**6**) and (**2**,**3**) and reconnect to form a tour (**7**,**2**) + (**6**,**3**).



Now our solution will be **T= (1,5,8,7,2,6,3,4)**



Possible neighbors iteration 4 **Total neighbors = 20**

move4(**1**,**5; 8, 7**) = -33-16+54+26 = 31 **NO**
move4(**1**,**5; 7, 2**) = -33-45+59+65 = 46 **NO**
move4(**1**,**5; 2, 6**) = -33-39+87+62 = 77 **NO**
move4(**1**,**5; 6, 3**) = -33-17+71+75 = 96 **NO**

move4 (**1**,**5**; **3**, **4**) = -33-50+87+40 = 44 **NO**

---

move4 (**5**,**8**; **7**, **2**) = -21-45+26+61 = 19 **NO**
move4 (**5**,**8**; **2**, **6**) = -21-39+65+70 = 75 **NO**
move4 (**5**,**8**; **6**, **3**) = -21-17+62+79 = 103 **NO**
move4 (**5**,**8**; **3**, **4**) = -21-50+75+56 = 60 **NO**
move4 (**5**,**8**; **4**, **1**) = -21-38+40+54 = 35 **NO**

---

move4 (**8**,**7**; **2**, **6**) = -16-39+61+57 = 63 **NO**
move4 (**8**,**7**; **6**, **3**) = -16-17+70+64 = 101 **NO**
move4 (**8**,**7**; **3**, **4**) = -16-50+79+50 = 63 **NO**
move4 (**8**,**7**; **4**, **1**) = -16-38+56+54 = 55 **NO**

---

move4 (**7**,**2**; **6**, **3**) = -45-17+57+32 = 27 **NO**
move4 (**7**,**2**; **3**, **4**) = -45-50+64+59 = 28 **NO**
move4 (**7**,**2**; **4**, **1**) = -45-38+50+89 = 56 **NO**

---

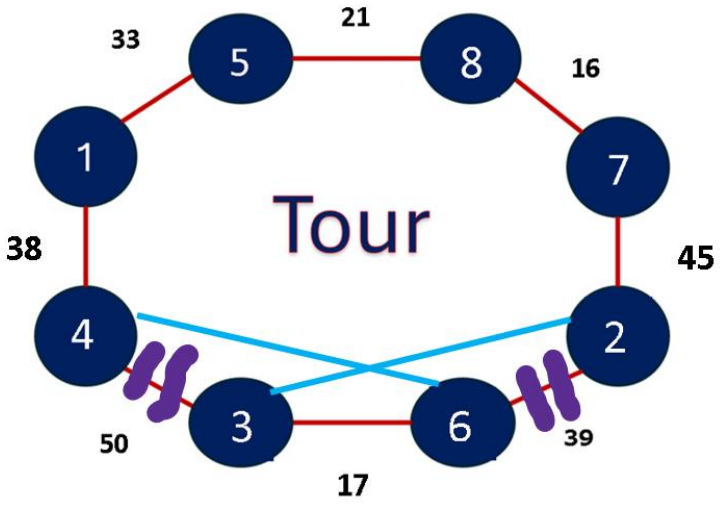
move4 (**2**,**6**; **3**, **4**) = -39-50+32+33 = -24 **BEST**
move4 (**2**,**6**; **4**, **1**) = -39-38+59+71 = 53 **NO**

---

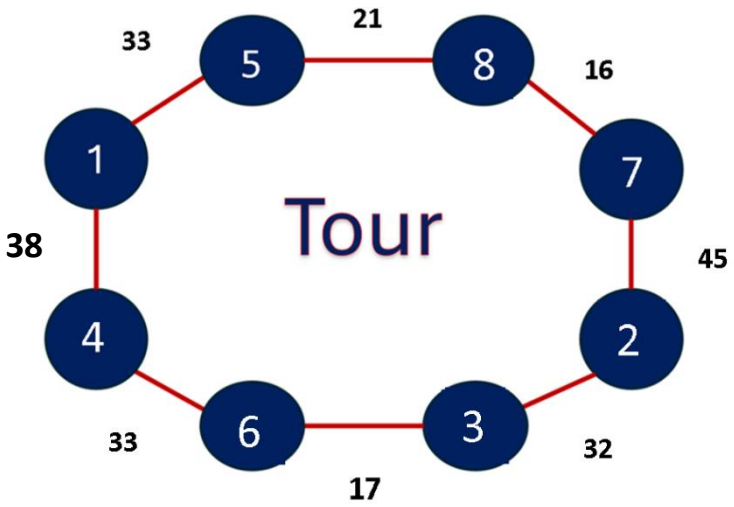
move4 (**6**,**3**; **4**, **1**) = -17-38+33+87 = 65 **NO**

So in base of the data gotten of the neighborhood 4 we know that the move4(**2**, **6**; **3**, **4**) is the best one in this case so we proceed to make it.

move4(**2**, **6**; **3**, **4**) = remove edges (**2**,**6**) and (**3**,**4**) and reconnect to form a tour (**2**,**3**) + (**6**,**4**).



Now our solution will be **T= (1,5,8,7,2,3,6,4)**



Possible neighbors iteration 5 **Total neighbors = 20**

move5(**1,5; 8,7**) = -33-16+54+26 = 31 **NO**
move5(**1,5; 7,2**) = -33-45+59+65 = 46 **NO**
move5(**1,5; 2,3**) = -33-32+89+75 = 99 **NO**
move5(**1,5; 3,6**) = -33-17+87+62 = 99 **NO**
move5(**1,5; 6,4**) = -33-33+71+40 = 45 **NO**

---

move5(**5,8; 7,2**) = -21-45+54+26 = 31 **NO**
move5(**5,8; 2,3**) = -21-32+65+79 = 91 **NO**
move5(**5,8; 3,6**) = -21-17+75+70 = 107 **NO**
move5(**5,8; 6,4**) = -21-33+62+56 = 64 **NO**
move5(**5,8; 4,1**) = -21-38+40+54 = 35 **NO**

---

move5(**8,7; 2,3**) = -16-32+26+64 = 42 **NO**
move5(**8,7; 3,6**) = -16-17+79+57 = 103 **NO**
move5(**8,7; 6,4**) = -16-33+70+50 = 71 **NO**
move5(**8,7; 4,1**) = -16-38+56+54 = 56 **NO**

---

move5(**7,2; 3,6**) = -45-32+64+39 = 26 **NO**
move5(**7,2; 6,4**) = -45-17+57+65 = 60 **NO**
move5(**7,2; 4,1**) = -45-38+50+89 = 56 **NO**

---

move5(**3,6; 4,1**) = -17-38+50+71 = 100 **NO**
move5(**3,6; 1,5**) = -17-33+38+62 = 50 **NO**

---

move5(**6,4; 1,5**) = -33-33+71+40 = 45 **NO**

In base of the data gotten of the neighborhood 5 we know that there's not a feasible solution that minimizes the solution, so our local optimal is:

T= (1,5,8,7,2,3,6,4) = 33+21+16+45+32+17+33+38 = 235
T= (1,2,3,4,5,6,7,8) = 89+32+50+40+62+57+16+78 = 424

In comparison to the feasible solution of the start of the problem we improve the solution, and we get the local optimum which gives us the value of 235.

First-Found strategy

The **FF** strategy will give us a better solution, but it probably won't give us the local optimal, this strategy is very useful when we want a better solution in a short amount of time.

In the **first-found** strategy our goal is to achieve the best possible solution in the shortest amount of time, so in every iteration the first neighbor that improve the solution will be the one picked and we´ll start the next iteration.

move1(**e1, e2**)

move1(**i**, **j; k, l**) = remove edges (**i,j**) and (**k,l**) and reconnect to form a tour (**i,k**) + (**j,l**) **NO ADJACENT** edges allowed.

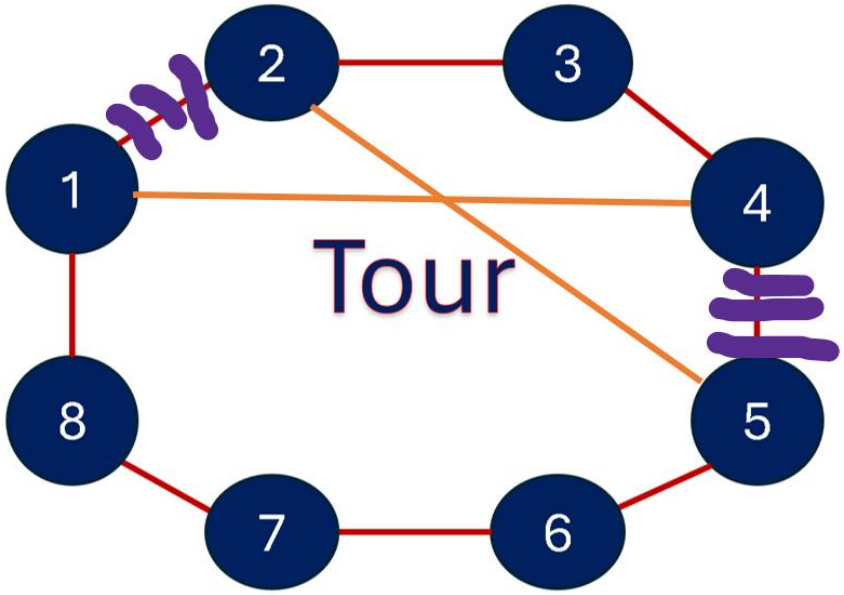
$$\Delta z = -d_{i,j} - d_{k,l} + d_{i,k} + d_{j,l}$$

Possible neighbors iteration 1 **Total neighbors = 2**

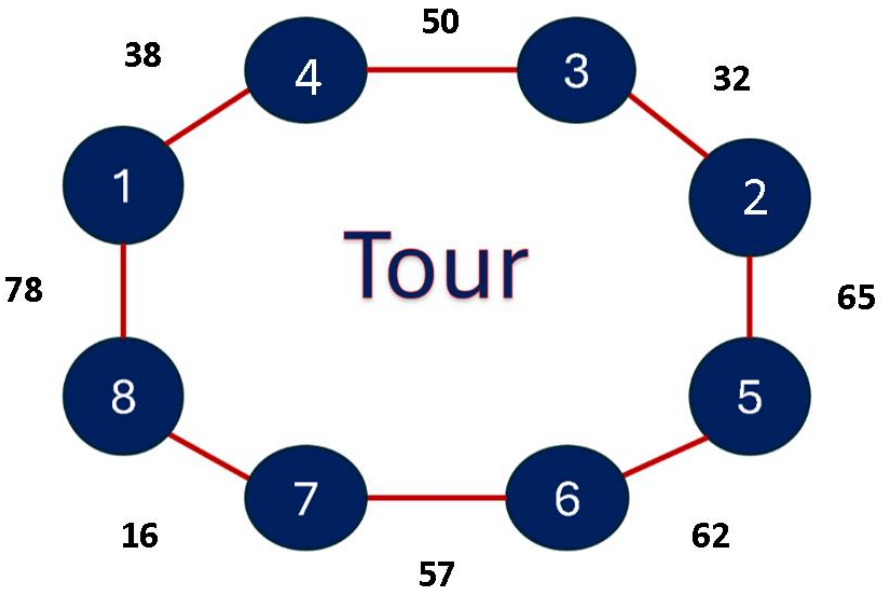
move1(**1**, **2; 3, 4**) = -89-50+87+59 = 7 **NO**
move1(**1**, **2; 4, 5**) = -89-40+38+65 = -26 **YES**

move1(**1**, **2; 4, 5**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move1(**1**, **2; 4, 5**) = remove edges (**1**,**2**) and (**4**,**5**) and reconnect to form a tour (**1**,**4**) + (**2**,**5**).



Now our solution will be **T= (1,4,3,2,5,6,7,8)**

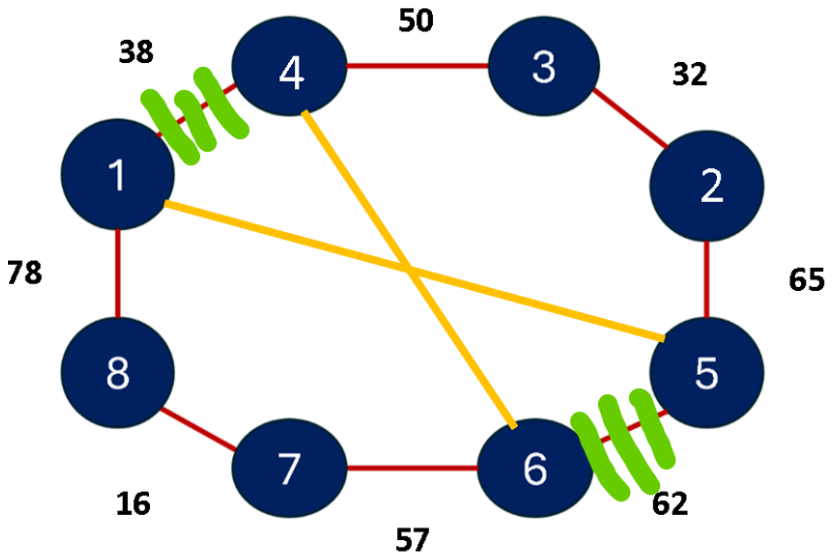


Possible neighbors iteration 2 **Total neighbors = 3**

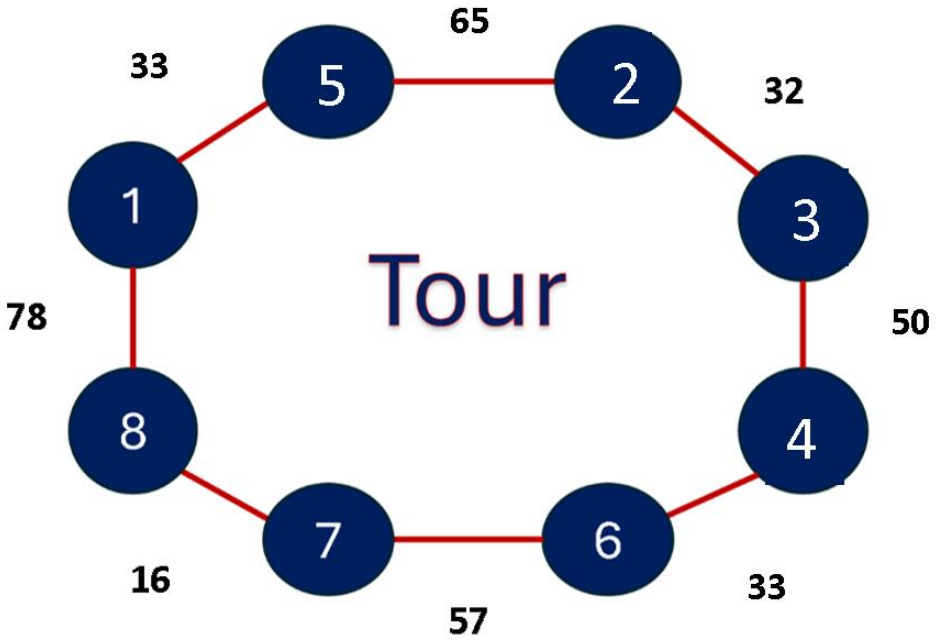
move2(**1**, **4; 3, 2**) = -38-32+87+59 = 76 **NO**
move2(**1**, **4; 2, 5**) = -38-65+89+40 = 26 **NO**
move2(**1**, **4; 5, 6**) = -38-62+33+33 = -34 **YES**

move2(**1**, **4; 5, 6**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move2(**1**, **4; 5, 6**) = remove edges (**1**,**4**) and (**5**,**6**) and reconnect to form a tour (**1**,**5**) + (**4**,**6**).



Now our solution will be **T= (1,5,2,3,4,6,7,8)**



Possible neighbors iteration 3 **Total neighbors = 7**

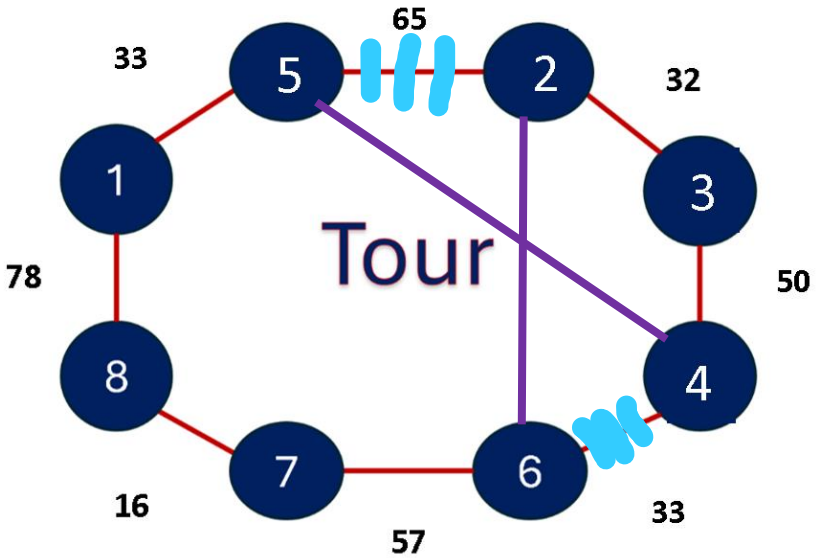
move3(**1**, **5**; **2**, **3**) = -33-32+89+75 = 109 **NO**
move3(**1**, **5**; **3**, **4**) = -33-50+87+40 = 33 **NO**
move3(**1**, **5**; **4**, **6**) = -33-33+38+62 = 44 **NO**
move3(**1**, **5**; **6**, **7**) = -33-57+71+26 = 7 **NO**
move3(**1**, **5**; **7**, **8**) = -33-16+59+21 = 31 **NO**

---

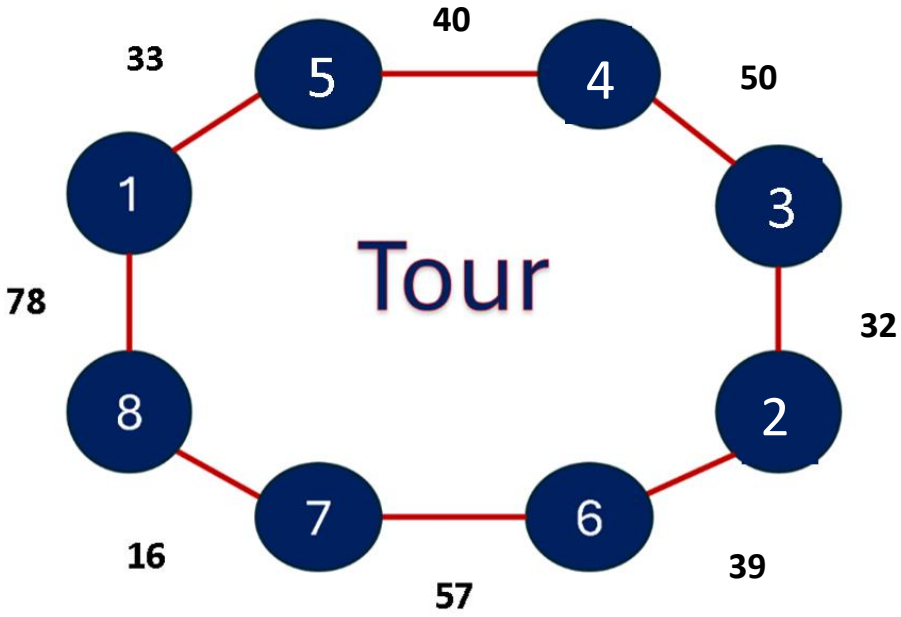
move3(**5**, **2**; **3**, **4**) = -65-50+75+65 = 25 **NO**
move3(**5**, **2**; **4**, **6**) = -65-33+40+39 = -19 **YES**

move3(**5**, **2**; **4**, **6**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move3(**5**, **2**; **4**, **6**) = remove edges (**5**,**2**) and (**4**,**6**) and reconnect to form a tour (**5**,**4**) + (**2**,**6**).



Now our solution will be **T= (1,5,4,3,2,6,7,8)**



Possible neighbors iteration 4 **Total neighbors = 10**

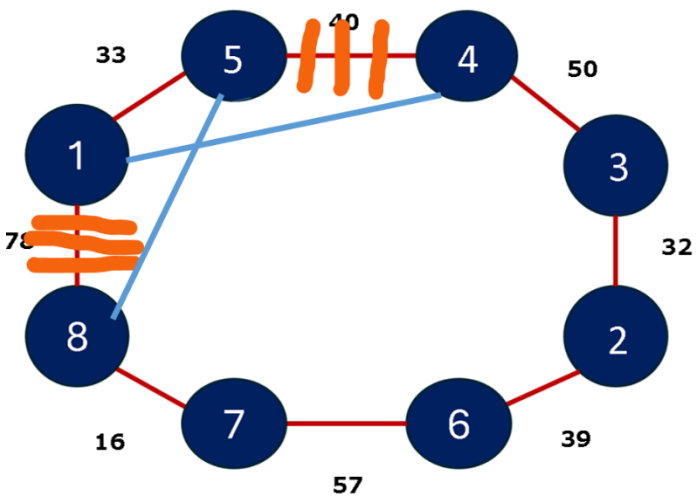
move4 (**1**,**5**; **4**, **3**) = -33-50+33+75 = 25 **NO**
move4 (**1**,**5**; **3**, **2**) = -33-32+87+65 = 87 **NO**
move4(**1**,**5**; **2**, **6**) = -33-39+87+62 = 77 **NO**
move4 (**1**,**5**; **6**, **7**) = -33-57+71+26 = 7 **NO**
move4 (**1**,**5**; **7**, **8**) = -33-16+59+21 = 31 **NO**

---

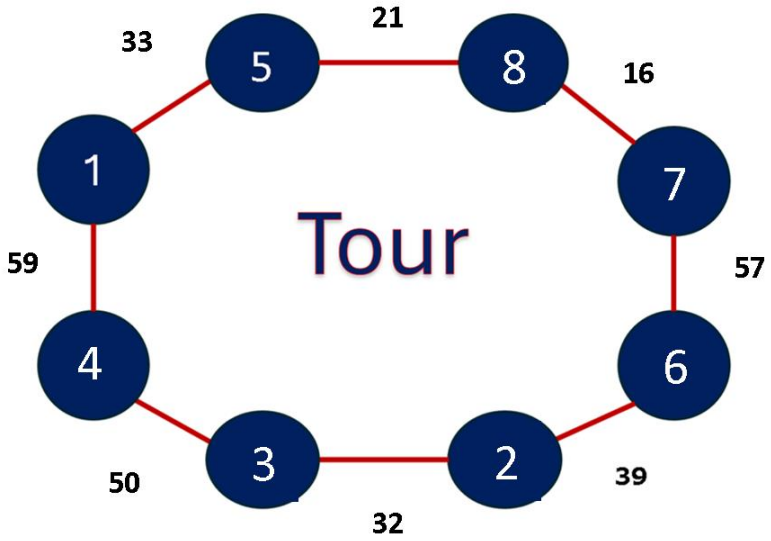
move4 (**5**,**4**; **3**, **2**) = -40-32+75+59 = 62 **NO**
move4 (**5**,**4**; **2**, **6**) = -40-39+65+33 = 19 **NO**
move4 (**5**,**4**; **6**, **7**) = -40-57+62+50 = 15 **NO**
move4 (**5**,**4**; **7**, **8**) = -40-16+26+56 = 26 **NO**
move4 (**5**,**4**; **8**, **1**) = -40-78+21+38 = -59 **YES**

move4(**5**, **4**; **8**, **1**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move4(**5**, **4**; **8**, **1**) = remove edges (**5**,**4**) and (**8**,**1**) and reconnect to form a tour (**5**,**8**) + (**4**,**1**).



Now our solution will be **T= (1,5,8,7,6,2,3,4)**



Possible neighbors iteration 5 **Total neighbors = 15**

move5(**1**,**5**; **8**, **7**) = -33-16+54+26 = 31 **NO**
move5(**1**,**5**; **7**, **6**) = -33-57+59+62 = 31 **NO**
move5(**1**,**5**; **6**, **2**) = -33-39+71+65 = 64 **NO**
move5(**1**,**5**; **2**, **3**) = -33-32+89+75 = 99 **NO**
move5(**1**,**5**; **3**, **4**) = -33-50+87+40 = 44 **NO**

---

move5(**5**,**8**; **7**, **6**) = -21-57+26+70 = 18 **NO**
move5(**5**,**8**; **6**, **2**) = -21-39+62+61 = 63 **NO**
move5(**5**,**8**; **2**, **3**) = -21-32+65+79 = 91 **NO**
move5(**5**,**8**; **3**, **4**) = -21-50+75+56 = 60 **NO**
move5(**5**,**8**; **4**, **1**) = -21-38+40+54 = 35 **NO**

---

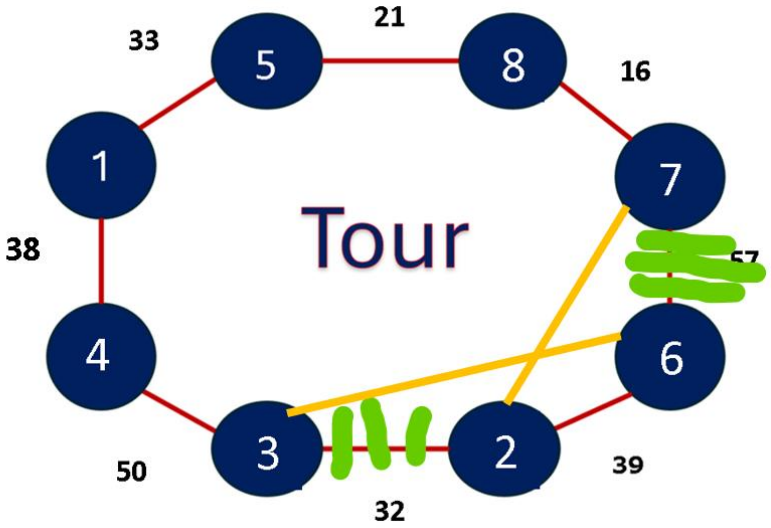
move5(**8**,**7**; **6**, **2**) = -16-39+70+45 = 60 **NO**
move5(**8**,**7**; **2**, **3**) = -16-32+61+64 = 77 **NO**
move5(**8**,**7**; **3**, **4**) = -16-50+79+50 = 63 **NO**
move5(**8**,**7**; **4**, **1**) = -16-38+56+59 = 61 **NO**

---

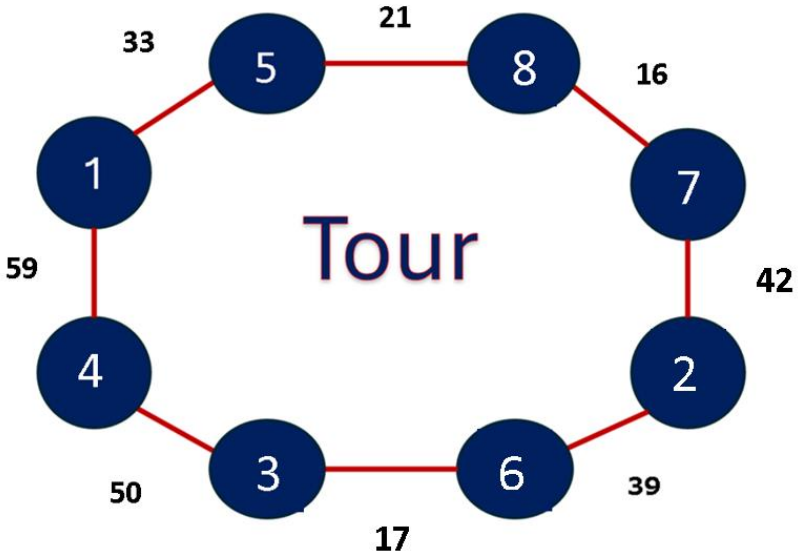
move5(**7**,**6**; **2**, **3**) = -57-32+45+17 = -27 **YES**

move5(**7**, **6**; **2**, **3**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move5(**7**, **6**; **2**, **3**) = remove edges (**7**,**6**) and (**2**,**3**) and reconnect to form a tour (**7**,**2**) + (**6**,**3**).



Now our solution will be **T= (1,5,8,7,2,6,3,4)**



Possible neighbors iteration 6 **Total neighbors = 18**

move6(**1**,**5; 8, 7**) = -33-16+54+26 = 31 **NO**
move6 (**1**,**5; 7, 2**) = -33-45+59+65 = 46 **NO**
move6 (**1**,**5; 2, 6**) = -33-39+87+62 = 77 **NO**
move6 (**1**,**5; 6, 3**) = -33-17+71+75 = 96 **NO**
move6 (**1**,**5; 3, 4**) = -33-50+87+40 = 44 **NO**

---

move6 (**5**,**8; 7, 2**) = -21-45+26+61 = 19 **NO**
move6 (**5**,**8; 2, 6**) = -21-39+65+70 = 75 **NO**
move6 (**5**,**8; 6, 3**) = -21-17+62+79 = 103 **NO**
move6 (**5**,**8; 3, 4**) = -21-50+75+56 = 60 **NO**
move6 (**5**,**8; 4, 1**) = -21-38+40+54 = 35 **NO**

---

move6 (**8**,**7; 2, 6**) = -16-39+61+57 = 63 **NO**
move6 (**8**,**7; 6, 3**) = -16-17+70+64 = 101 **NO**

move6 (**8**,**7; 3, 4**) = -16-50+79+50 = 63 **NO**
move6 (**8**,**7; 4, 1**) = -16-38+56+54 = 55 **NO**

---

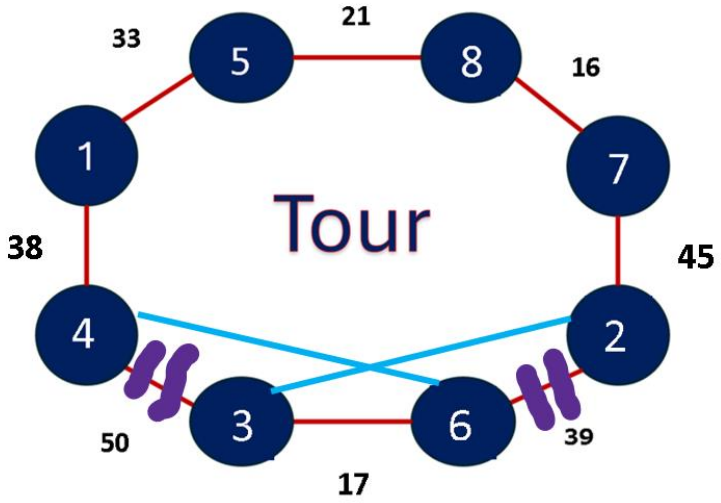
move6 (**7**,**2; 6, 3**) = -45-17+57+32 = 27 **NO**
move6 (**7**,**2; 3, 4**) = -45-50+64+59 = 28 **NO**
move6 (**7**,**2; 4, 1**) = -45-38+50+89 = 56 **NO**

---

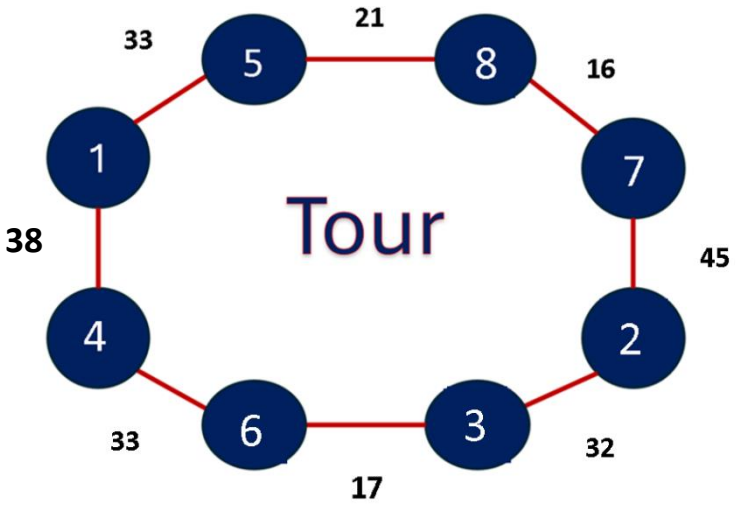
move6 (**2**,**6; 3, 4**) = -39-50+32+33 = -24 **YES**

move6(**2**, **6; 3, 4**) is the first neighbor that improves the solution, so we apply it to the actual solution.

move6(**2**, **6; 3, 4**) = remove edges (**2**,**6**) and (**3**,**4**) and reconnect to form a tour (**2**,**3**) + (**6**,**4**).



Now our solution will be **T= (1,5,8,7,2,3,6,4)**



Possible neighbors iteration 7 **Total neighbors = 20**

move7(**1**,**5**; **8**,**7**) = -33-16+54+26 = 31 **NO**
move7(**1**,**5**; **7**,**2**) = -33-45+59+65 = 46 **NO**
move7(**1**,**5**; **2**,**3**) = -33-32+89+75 = 99 **NO**
move7(**1**,**5**; **3**,**6**) = -33-17+87+62 = 99 **NO**
move7(**1**,**5**; **6**,**4**) = -33-33+71+40 = 45 **NO**

---

move7(**5**,**8**; **7**,**2**) = -21-45+54+26 = 31 **NO**
move7(**5**,**8**; **2**,**3**) = -21-32+65+79 = 91 **NO**
move7(**5**,**8**; **3**,**6**) = -21-17+75+70 = 107 **NO**
move7(**5**,**8**; **6**,**4**) = -21-33+62+56 = 64 **NO**
move7(**5**,**8**; **4**,**1**) = -21-38+40+54 = 35 **NO**

---

move7(**8**,**7**; **2**,**3**) = -16-32+26+64 = 42 **NO**
move7(**8**,**7**; **3**,**6**) = -16-17+79+57 = 103 **NO**
move7(**8**,**7**; **6**,**4**) = -16-33+70+50 = 71 **NO**
move7(**8**,**7**; **4**,**1**) = -16-38+56+54 = 56 **NO**

---

move7(**7**,**2**; **3**,**6**) = -45-32+64+39 = 26 **NO**
move7(**7**,**2**; **6**,**4**) = -45-17+57+65 = 60 **NO**
move7(**7**,**2**; **4**,**1**) = -45-38+50+89 = 56 **NO**

---

move7(**3**,**6**; **4**,**1**) = -17-38+50+71 = 100 **NO**
move7(**3**,**6**; **1**,**5**) = -17-33+38+62 = 50 **NO**

---

move7(**6**,**4**; **1**,**5**) = -33-33+71+40 = 45 **NO**

Theres not any neighbor that improves the solution, so we stop the algorithm in iteration 7 and we declare **T= (1,5,8,7,2,3,6,4)** our local optimal.

Strategy	iterations	Total # of neighbors
First-Found	7	75
Best-Found	5	100

In base of the statistics of each strategy and the fact that the local optimal it's the same for both we can affirm that in this particular example the **first-found strategy** is better that the **best-found** because it took less neighbors to achieve the local optimal which is the same as the one in the **best-found strategy,** obviously this happened in this example but maybe in a larger problem with more data, edges and vortex, **the best-found strategy** would give us a better solution than the **first-found strategy** but obviously using more processing time.