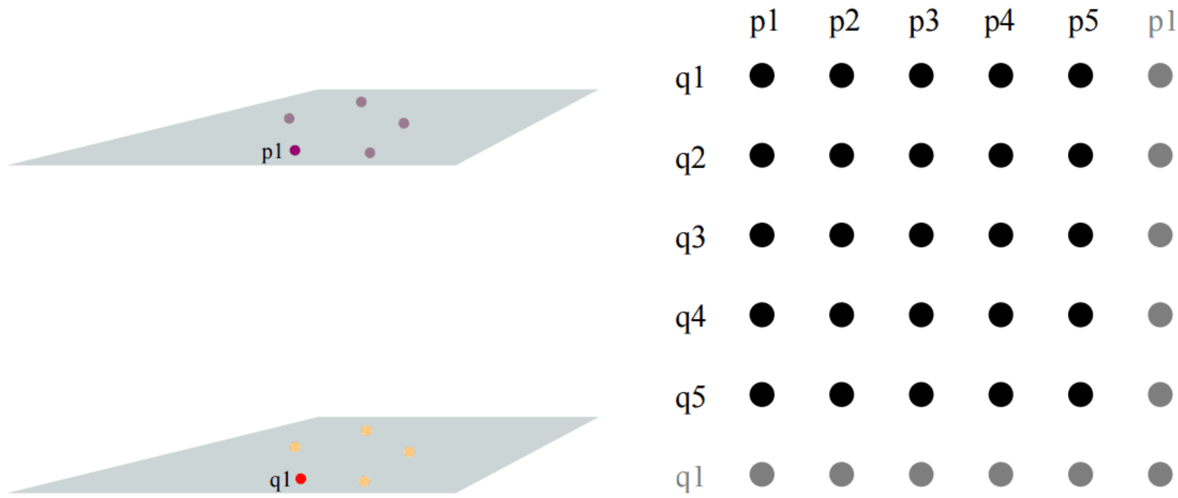

1. The principal of optimality is applied in such a way: First, we can transform this triangulation problem to a toroidal graph(figure above). In every stage (every tringle formed), we only have two options. We can either go down or go right. So, we can determine the minimum cost of current stage in terms of its previous two stages. This means that we can solve the current problem using the solutions of its sub problems. For example, as the figure above shows, if I want to determine the minimum cost of stage (p2, q2), I can use its subproblems, which is to find the minimum of

   ((p2, q1) + cost((p2, q1)->(p2, q2)), (p1, q2) + cost((p1, q2)->(p2, q2))

   The minimum would be the solution to this stage and we can keep applying this method till the end. This is principal of optimality, which is to solve larger problem using the solution of its smaller sub problems.

2. The recurrence relation is:

   (i, j) = min((i-1, j) + cost(i-1, i, j), (i, j-1) + cost(i, j-1, j))

   Note: (i-1, i, j) represents the cost from (i-1, j) to (i, j)

   (i, j-1, j) represents the cost from (i, j-1) to (i, j)

3.

0	4	5	7	9
1	x			
3				
4				

Above table is an example of partial solution. (number in the box represent the minimum cost to go here) If we want to determine x, we can find the minimum of either 1+cost(from here to x) or 4+cost(from here to x).

The way to construct the table is as following: first, we can fill out the first row and column since we only have one way to go such places. For row, we can only go from left. For column, we can only go from top. After filling out the first row and column, we can keep applying the recurrence relation to fill out the rest of the table.