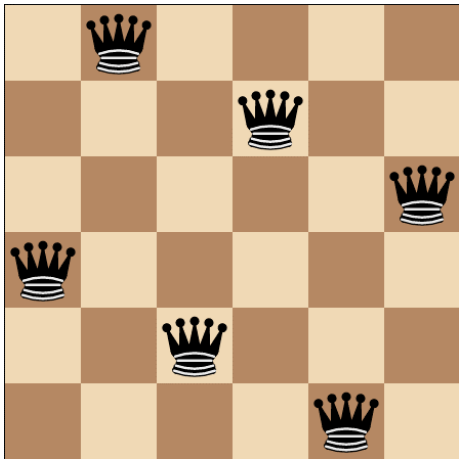
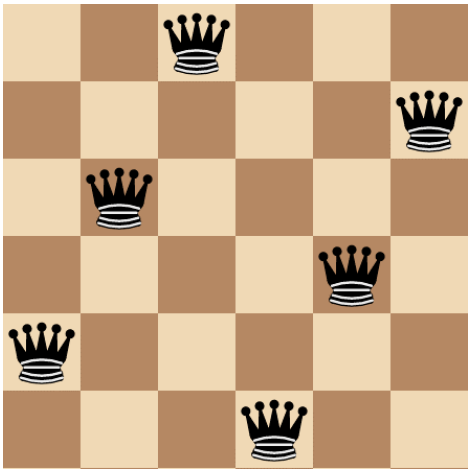
5-1 Show the first two solutions to the n-Queens problem for $n = 6$ and $n = 7$ (two solutions for each) using the Backtracking algorithm.

N=6:

<1, 2>, <2, 4>, <3, 6>, <4, 1>, <5, 3>, <6, 5>

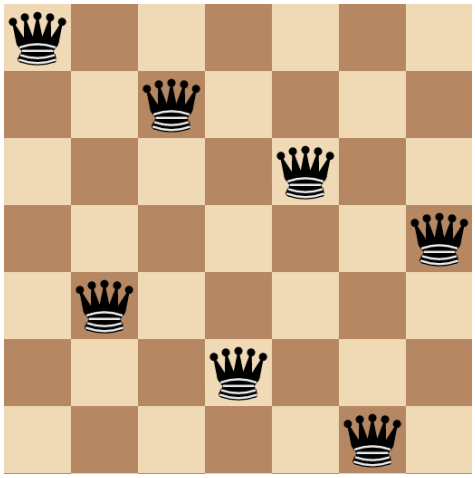


<1, 3>, <2, 6>, <3, 2>, <4, 5>, <5, 1>, <6, 4>

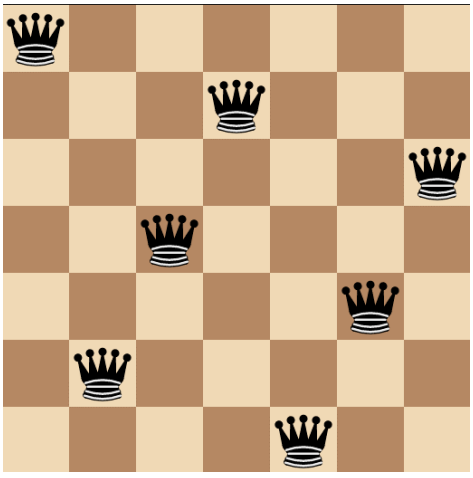


N=7

<1, 1>, <2, 3>, <3, 5>, <4, 7>, <5, 2>, <6, 4>, <7, 6>



<1, 1>, <2, 4>, <3, 7>, <4, 3>, <5, 6>, <6, 2>, <7, 5>



5-7 Improve the Backtracking algorithm for the *n*-Queens problem (Algorithm 5.1) by having the promising function keep track of the set of columns, of left diagonals, and of right diagonals controlled by the queens already placed.

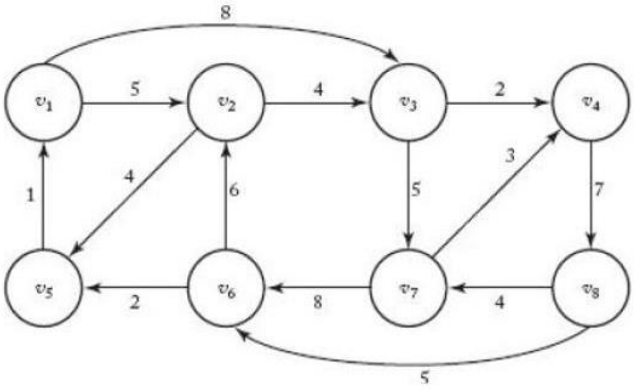
```
bool promising (index i)
{
        index j;
        bool switch;

        j=1;
        switch = true;

        while (j<i && switch == true){
          if(vindex[i]==vindex[j] || abs (vindex[i] - vindex[j])==i-j || vindex[i] == -69 ||
       vindex[j]== -69){
                vindex[i] = -1;
                vindex[j] = -1;

                switch = false;
                j++
          }
          return switch;
        }
}
```

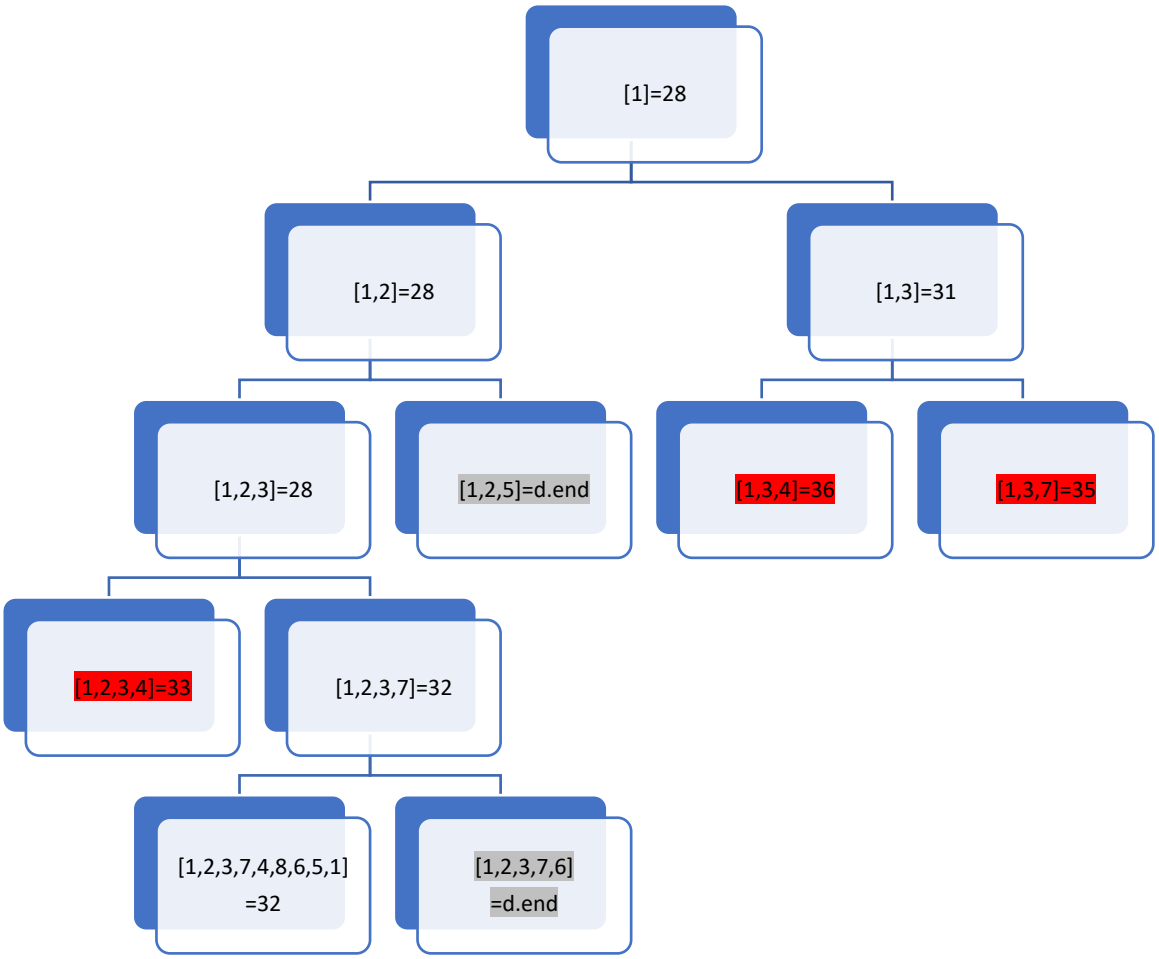
6-7 Use Algorithm 6.3 (The Best-First Search with Branch-and-Bound Pruning Algorithm for the Traveling Salesperson problem) to find an optimal tour and the length of the optimal tour for the graph below.



	v1	v2	v3	v4	v5	v6	v7	v8
v1		5	8					
v2			4		4			
v3				2			5	
v4								7
v5	1							
v6		6			2			
v7				3		8		
v8						5	4	

Min Length : 32

Path: [v1,v2,v3,v7,v4,v8,v6,v5,v1]



First min length found=32

[1,3] still feasible

Childs of [1,3] lower than min length

Algorithm ends