Exercise D

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Problem explanation

- Given two numbers n and k, determine the number of wats one can put k bishops on an n x n chessboard so that no two of them are in attacking positions

Solution explanation

- Implement a backtracking search
- The implementation is similar to the eight queens problem except:
  - Board is now n X n
  - Bishops are used

Solution explanation

- Difference between the queens problem and the current bishop problem:
  - A bishop does not move vertically and horizontally

Solution explanation

- When basing off the construct_candidates in the eight queens problem:
  - Disregard column threats to adjust to bishops

```
construct_candidates(int a[], int k, int n, int c[], int *ncandidates)
{
        int i,j;                          /* counters */
        bool legal_move;                  /* might the move be legal? */

        *ncandidates = 0;
        for (i=1; i<=n; i++) {
            legal_move = TRUE;
            for (j=1; j<k; j++) {
                    if (abs((k)-j) == abs(i-a[j]))  /* diagonal threat */
                            legal_move = FALSE;
                    if (i == a[j])                  /* column threat */
                            legal_move = FALSE;
            }
            if (legal_move == TRUE) {
                    c[*ncandidates] = i;
                    *ncandidates = *ncandidates + 1;
            }
        }
}
```

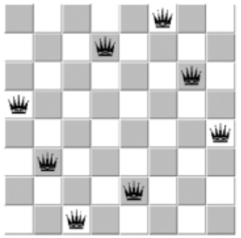

Figure 8.1. A solution to the eight-queens probl

Solution explanation

- Otherwise, the rest follow the backtracking process:

- Continually find all candidates for solutions and keep track of all the legal moves

Solution analysis

- Pros: Safely checks all possible combinations
- Cons: Since it is similar to brute force, the time complexity is worse
  - There may be a better and more methodological approach to this problem

Thank you!