```c
#include <stdio.h>
#include <math.h>
/* ========================================================================
 *              File: nqueens.c
 *              Purpose: Demonstrate the backtracking algorithm for n queens
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 * ======================================================================== */
int n = 0; /* number of queens */
int x[100];
/* ======================================================================== */
void display()
{
        int i = 1;
        for (i; i <= n; i++) printf("queen %d is at %d ", i, x[i]);
        printf("\n");
}
/* ======================================================================== */
int place(int k, int i)
{
        int j = 1;
        for (j; j < k; j++)
                if ((x[j] == i) || (abs(k - j) == abs(x[j] - i)))
                        return 0;
        return 1;
}
/* ======================================================================== */
void nqueens(int k)
{
        int i = 1;
        for (i; i <= n; i++)
        {
                if (place(k, i))
                {
                        x[k] = i;
                        if (k == n) display();
                        else nqueens(k + 1);
                }
        }
}
/* ======================================================================== */
int main(int argc, char** argv)
{
        n = atoi(argv[1]);
        printf("solving nqueens problem with %d queens\n", n);
        nqueens(1);
        return 0;
}
```