

15 puzzle is a sliding puzzle game with numbered squares arranged in 4X4 grid with one tile missing.

Initial State

1		2	4
5	7	3	8
9	6	11	12
13	10	14	15

The puzzle is solved when the numbers are arranged in order.

Goal State

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

The actions are defined in terms of direction where empty square can be moved to UP (U), Down(D), Left(L), Right(R)

Write a program which performs a breadth-first search to find the solution to any given board position for 15 puzzle

Input

The input should be given in the form of a sequence of numbered tiles for initial board configuration, '0' indicating the empty space (see example below)

Output

1. Moves
2. Number of Nodes expanded
3. Time Taken
4. Memory Used

Example

> 1 0 2 4 5 7 3 8 9 6 11 12 13 10 14 15

Moves: RDLDDRR

Number of Nodes expanded: 361

Time Taken: 0.238

Memory Used: 704kb

