# GIT Department of Computer Engineering
## CSE 222/505
## Spring 2014
## Homework 08

## Graphs and Search
## Due date: June 7th 2015 23:59
### (No late submissions will be accepted for this HW)

In this homework, you will use the graph traversal algortihms to solve the 4 knights puzzle(4 at problemi) in the game of chess. The problem is to swap the positions of white and black knights using the least number of moves. The following figure shows the initial and the final board positions of a sample game.



The rules of the piece movement is the same as the chess knight movements. A knight can move only in L shape as shown below
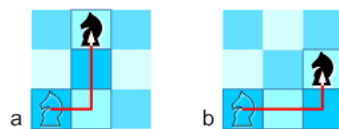


You can represent each board state as a graph node. Each piece can have one of 9 positions and no two knights can share the same position. There are total of 9*8*7*6 = 3024 nodes in the graph.

The following figure shows a sample partial graph and the solution path to the goal.
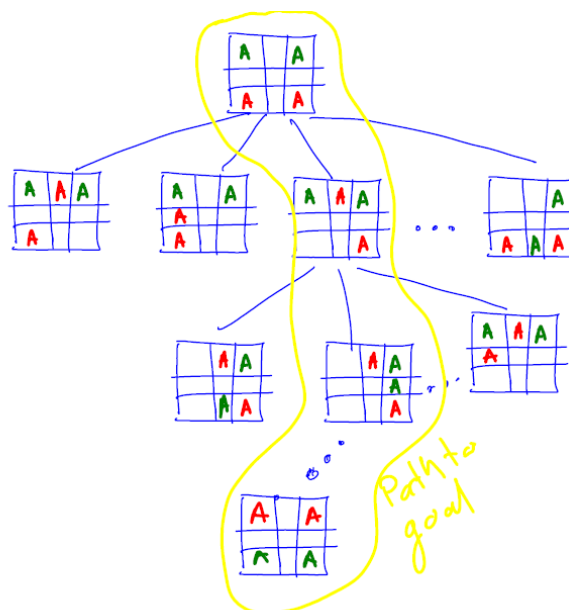
Your program does not have to use GUI. We can represent each board configuration with a string. Letter 'K' represents the white knights and letter 'k' represents the black knight.

Your program should work as follows.

```
Please enter the initial node in row-wise (use - for space)
K-K---k-k

Your solution takes … steps
K K

k k

Step 1
KkK

  k

Step 2
 kK
   K
   k

Step 3
 kK

K k


.
.
.

Step …
k k

K K
```

In your implementation, you should use only the BFS class of the textbook. Do not use any other code from any other source.

Bonus 30 pts: Use graphical user interface to animate the chess puzzle board for the moves.

Notes.
- Do not forget to include your project files in your submission.
- **Do not modify the classes from the textbook.**
- Provide at least 3 different runs for each graph traversal algorithm.