

COP 3503 Fall 2026 Section 201 Program 2 Directions

This program is testing the use of the breadth first search algorithm but is much harder than regular breadth first searches since each board position doesn't easily map to an integer in a fixed range. (In the standard breadth first search, each location is stored as an integer in between 0 and $n-1$, where n is the number of vertices in the graph.)

This program will require many methods and excellent program design before you start typing.

The most important issues are:

1. How will you store each board state efficiently.
2. How will you map each board state to the number of moves it took to get there, efficiently.

It may make sense to have two methods to store the board, one being a regular array of characters and another being some sort of bitmask. (This assignment is a great one to see the value of the bitwise operators you learned about in COP 3502.)

You may compute possible moves on the array while use the bitmask for the map which stores the distances to each board state.

You will still be graded on standard style issues as well as commenting. Your program should have a header comment as well as a reasonable amount of internal comments. In addition, do strive to use reasonable variable names, but it's likely we'll be somewhat lenient on this particular issue.

Please read your input from standard input. Do NOT prompt the user to enter anything.

Please provide your output to standard output.

Your program will process one file with many test cases. You will get credit only for the test cases that complete within the given time limit which also produce a correct answer.

Deliverables

1. Please submit your source file and call it **blockgame.java**. (Note: Webcourses automatically adds version numbers to the end of your files if you resubmit. Don't worry about this. The grader will fix it.)
2. Please submit a short write-up discussing your development of the program, any interesting observations you made while working on the program, any hurdles you faced and how you overcame those hurdles. This should be submitted in a file called **P4-commentary.pdf**.