Mid Assignment Report

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***Abstract*——This paper introduced for Breadth-First Search(BFS) problem and 8 puzzle problem by heuristic function using C++ language. Index Terms——Languages : C++**

***Index Terms*—**

I. Introduction for 8puzzle

The 8-puzzle is a prominent workbench model for measuring the performance of heuristic search algorithms [Gaschnig, 1979; Nilsson, 1980; Pearl, 1985; Russell, 1992], learning methods [Laird et a/., 1987] and the use of macro operators [Korf, 1985a]. It is simple, but has a combinatorially large problem space of 9!/2 states. The 8-puzzle is the largest possible N-puzzle that can be completely solved. There exist larger variants, e.g. the 15- puzzle [Johnson and Storey, 1879], which can also be solved [Korf, 1985b], but not to completion. The general N x N extension of the 8-puzzle is NP-hard [Ratner and Warmuth, 1986]

II. Introduction for Bfs

Breadth first and Depth-first search are indispensable investigated strategies for incisive. specified the very diverse way in which they categorize node expansions, it is not apparent that they can be pooled in the same search algorithm. To demonstrate the reimbursement of this loom, we exploit the grid (also known as the induced tree width) is a appraise of how analogous the grid is to a hierarchy, which has a tree width of 1. A entirely attached graph is slightest akin to a hierarchy, in addition has a tree breadth of (n–1), where n is the number of vertices in the grid. Nearly every graphs enclose a tree width that proposal, with the intention of guarantees O (logn) worst-case administration era of vital dynamic-set operations. Recently,[1,2] vacant a stunning serviceable accomplishment of red-black trees[5]. In this dissertation we stab deeper into the formation of red-black trees by solving an according to the grapevine effortless quandary: prearranged a mounting progression of rudiments, assemble a red-black tree[6] that contains the ground rules in symmetric array. A red-black hierarchy is a binary search tree (BST) with five linked redblack properties[7]: 1. All node is either red or black. 2. The derivation nodule is black. 3. peripheral nodes are black. 4. A red node's children are mutually black.

III. Literature Review

advocated for complex development projects. For example, Hummelbrunner and Jones (2013) refer to the following as examples of effective tools for complex projects: (i) problem-driven iterative adaptation (PDIA10), (ii) strategic assumption surfacing and testing (SAST11), (iii) solution focus12, (iv) deliberative processes13, (v) viable system model" (VSM14), (vi) GIZ15's capacity WORKS16, and (vii) network management and co-management17

IV. Advantages foe puzzle

Concentration
Spatial Awareness
Shape Recognition
Topic-Specific Knowledge
Fine Motor Ability
Hand-Eye Coordination
Problem Solving Skills
Language
Memory
Self Esteem
Social Skill

V. Advantages for Bfs

In this procedure at any way it will find the goal. It does not follow a single unfruitful path for a long time. It finds the minimal solution in case of multiple paths.

VI. Disadvantages for Bfs

BFS consumes large memory space. Its time complexity is more. It has long pathways, when all paths to a destination are on approximately the same search depth

VII. Conclusion for puzzle

Table 1 gives a summar y of our empirical results. The 8-puzzle data has been derived by exhaustively solving all possible board configurations. For the 15-puzzle, no exact data can be given, because the search space is too large to be completely enumerated. We used Korf's [1985b] selection of 100 randoml y generated problem instances as a test set1 . In our second set of experiments, we used the 8-puzzle as a workbench to evaluate the benefit of node ordering techniques in iterative-deepening search. Surprisingly, we found that common IDA * implementations wit h a fixed operator sequence (e.g. up, left, right, down) perform worse than average. A simple rando m operator selection scheme is better! The longest-path heuristic was found most effective. Consisting of a linear moves array, it is easy to implement and its space overhead of O(depth) is negligible. More sophisticated ordering techniques did not yield better performance, because the 8-puzzle has a low branching factor and it lacks a clear criterion for measuring the goodness of a move.

VIII. Conclusion for BFS

We had offered a novel arrangement of breadth-first and depth-first search that allows a single search algorithm to acquire the matching strengths of both. While our paper focuses on the tree width problem, many of the ideas have the prospective to be applied to other search troubles, especially graph-search harms with large encoding sizes, for which memory-reference neighborhood is the key to achieving good piece. Possibilities include model checking, where a large data structure that represents the current state is typically stored with each search node, and constraint-based forecast and scheduling, where a simple secular group is stored with each search node. As long as the similarities among unusual search nodes can be captured in a form that allows depth-first search to waste the staterepresentation locality in node expansions, the approach we have described could be ineffectual. RedBlack trees let us apply all dictionary operations in O(log n). Further, in no case are more than 3 rotations done to rebalance. Certain very complex data structures have data stored at nodes which requires a lot of work to adjust after a revolving redblack trees ensure it won't go off habitually

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References

[1] P. Cheeseman, B. Kanefsky, W.M. Taylor. Where the really hard problems are 12th IJCAI Conf., Sydney (1991), 331 337.

[2] J. Gaschnig. Performance measurement and the analysis of certain search algorithms. Ph.D. diss., Carnegie Mellon Univ., Pittsburgh (1979).

[3] P.E. Hart, N.J. Nilsson, B Raphael. A formal basis for the heuristic determination of minimum cost paths. IEEE SSC-4,2(1968), 100 10

[4] R.E. Korf. Macro-operators: A weak method for learning. Art. Intell. 26(1985), 35-77. [Korf, 1985b] R.E. Korf. Depth-first iterative-deepening: An optimal admissible tree search. Artificial Intelligence 27(1985), 97-109.
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[5] Chris Okasaki. Purely Functional Data Structures. Cambridge University Press, 1998.

[6] Chris Okasaki. Functional Pearl: Red-Black trees in a functional setting. Journal OF FunctionalProgramming,9(4), July 1999.

[7] Richard S. Bird. Functional Pearl: On building trees with minimum height. Journal of Functional Programming, 7(4):441–445, July 1997

[8] Ralf Hinze.Institut f¨ur Informatik III, Universit¨at Bonn Romerstraße 164.

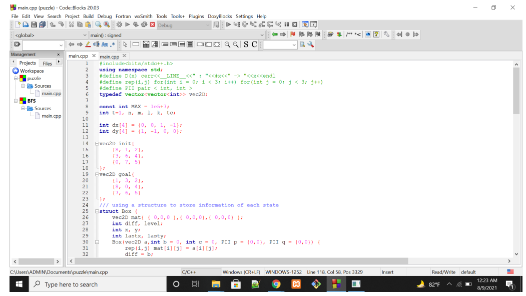
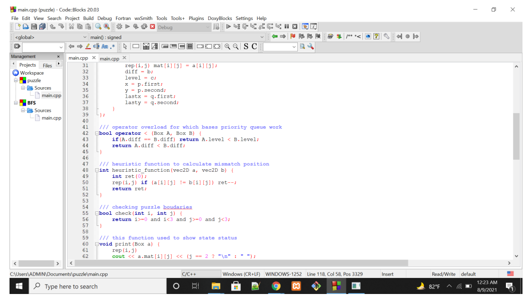


Fig. 1.



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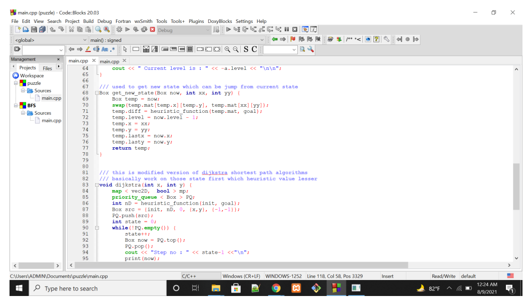

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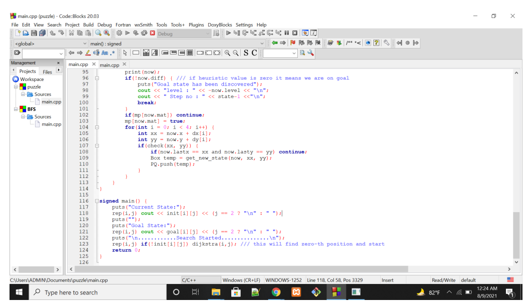
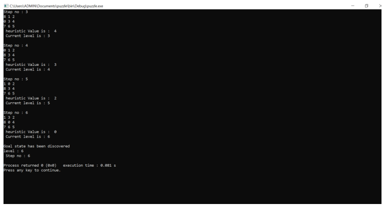


Fig. 4.

Fig. 5.



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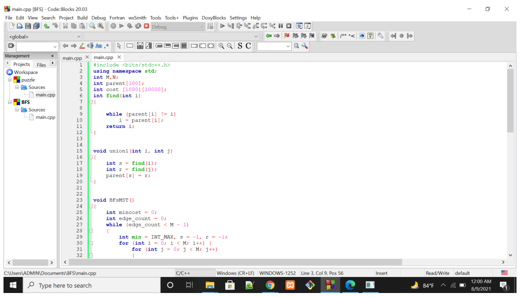

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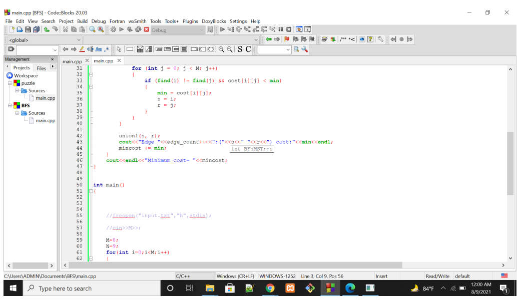

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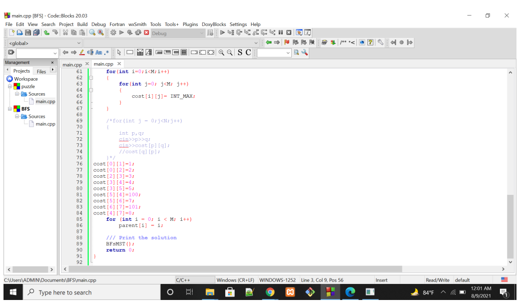

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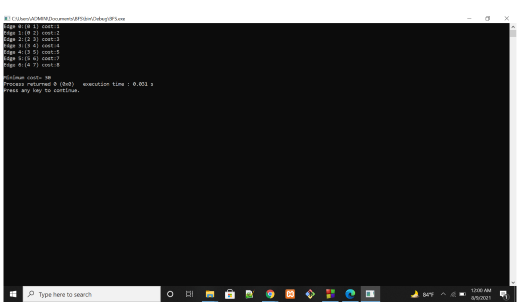

Fig. 10.