CS5011 A2 Report

Introduction

i.This assignment is CS5011:A2-Logic - 'Easy As ABC' Hint System.
My student ID is 190004531, and the date of submission is March 13th.

ii.For the implemented three parts:
Part1 : passed all tests.
Part2 : passed all tests.
Part3 : Didn't implemented.
Part4 : implemented a hints system with 4 levels.

iii.Run:
```
# Test part1
java A2main TEST Staff1
# Test part2
java A2main TEST Staff2
# Test Hints
java A2main HINT ABC1
```

Design, Implementation and Evaluation

i. Design

Three are three parts in this system. The first part detects some illegal states. The second part provides the next step based on the rules of the puzzle. Part 4 is a hints system, which combines the status of the current grid to give different levels of hints.

ii. Implementation

In part1, two method has been implemented, which are 'isFullGrid'and 'isConsistent'. Function 'isFullGrid' check the current grid whether filled or not. The second function check whether there is a filling that does not meet the rules of puzzle. In those part, I did not use special algorithms and techniques.

In part2, I implemented six methods to apply basic techniques to fill the puzzle. Similarly, I did not use special algorithms and techniques.

In part4, I created a hints system to give user hints. Considering that users will encounter difficulties when doing puzzles. If we directly give answers of key steps, they will lose the fun of solving puzzles. So, I will give user 4 levels hints to make them continue without losing the fun of solving puzzles.
Level 0 to Level 3 are the initial tips, which are based on the inference of part2, which are 'onlyPlaceForLetter', 'fillInBlank', 'differentCorners' and 'commonClues'.

I have tried many rounds of this puzzle myself, and I found that after I use the part2 technique, I may get into a difficult dilemma of selection. That is I will often entangle two squares locally. If one square is certain, the other one will be confirmed. Then, I tried to write down the possibilities of all the squares in the current state, and I found that some squares actually only have one possibility, but I did not see this square.
So, in level 4, I will not give user the possibility of each empty square. In that part, I used hashMap to select possibility for each elemt.

Test Summary

Part 1 : all passed.
Part 2 : all passed.
Part 4 :

```
Current Grid:

   ddccba
   ------
d| d__cba |a
b| bdca__ |a
b| _ba_dc |c
c| c_b_a_ |a
a| _ad_cb |b
a| ac_b_d |d
   ------
   acdbcd
Tips: this is the hints from 'fill In Blanks Row and Col'
You can check those position to filled letters
position : [5 4]
From the hints level2.
```

Bibliography

docs.oracle.com. (n.d.). *Java API Reference*. [online] Available at: https://docs.oracle.com/en/java/javase/11/docs/api/java.base/java/util/PriorityQueue.html.

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