

Coco's birthday Analysis - Manuel Morales

Greedy Choice:

- The greedy choice in this problem is to prioritize letting guests with higher happiness levels in first, as this maximizes the overall enjoyment of the party. In addition, if a guest at the end of the line has been waiting a long time (i.e., has a happiness level low or equal to 0 about to leave), it may be beneficial to let them in earlier to prevent their happiness from decreasing further or to prevent them from leaving the party.

Optimal Substructure:

- The optimal substructure property is satisfied because if I can find out how to optimally enter an L1 based on happiness, the global optimal solution will contain the optimal solution for a $(G - L1)$ and the optimal solution of an L1.

Time Complexity:

- Sorting the happiness levels takes $O(n \log n)$ time, where n is the number of guests. After sorting, iterating through the guests and allowing them to enter the party takes linear time $O(n)$. Therefore, the overall time complexity of the solution is dominated by the sorting step and is $O(n \log n)$.