Final Documentation

Function Achieved:

1. Batch Process:
    - Allow user to input a max weight. For a single order, if the total weight is greater than the max weight, it will be splitted into several subOrders. If the max weight is not reached, then it will try to combine with other orders so that they can be processed together.
    - Batch processed orders will be saved in to a file so that it can be loaded into program later.

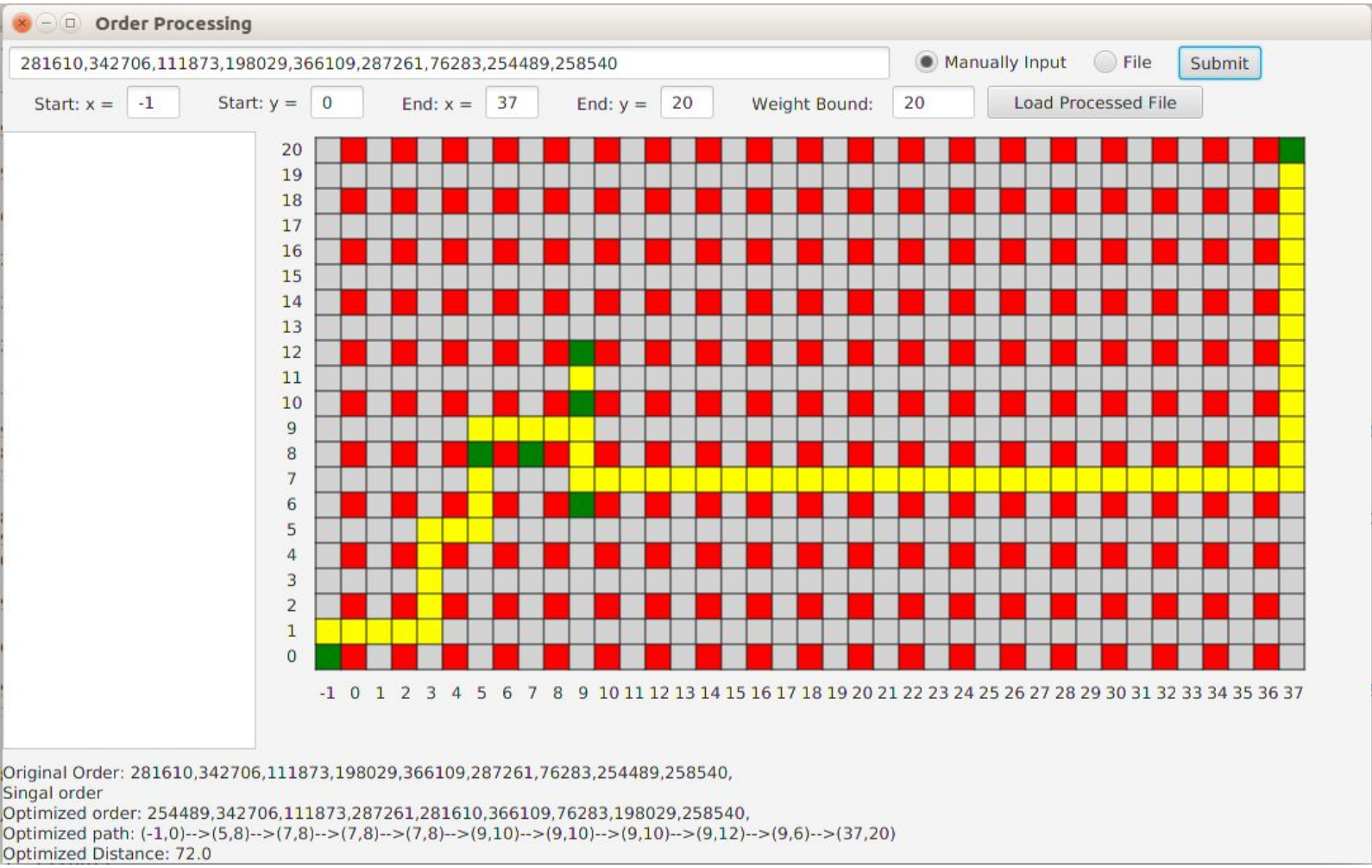
2. GUI
    - Users can choose to manually input a single order, process a file containing orders, or load processed batch file. If users manually input a single order, then “original order”, “optimized order”, “optimized path”, and “optimized distance” info will be shown on GUI. If load processed batch file, then users can choose orders from all the orders in the batch file, and the info mentioned above and **“combine / split status” will be shown on GUI.**
    - If an order is splitted into several subOrders, the subOrders will be shown as children of the original order in a tree view format.
    - The optimized path for the order will be shown in the grid representing warehouse.
    - Users can also input start location, end location, weight bound, single order, and file name in the GUI.

Implementation:

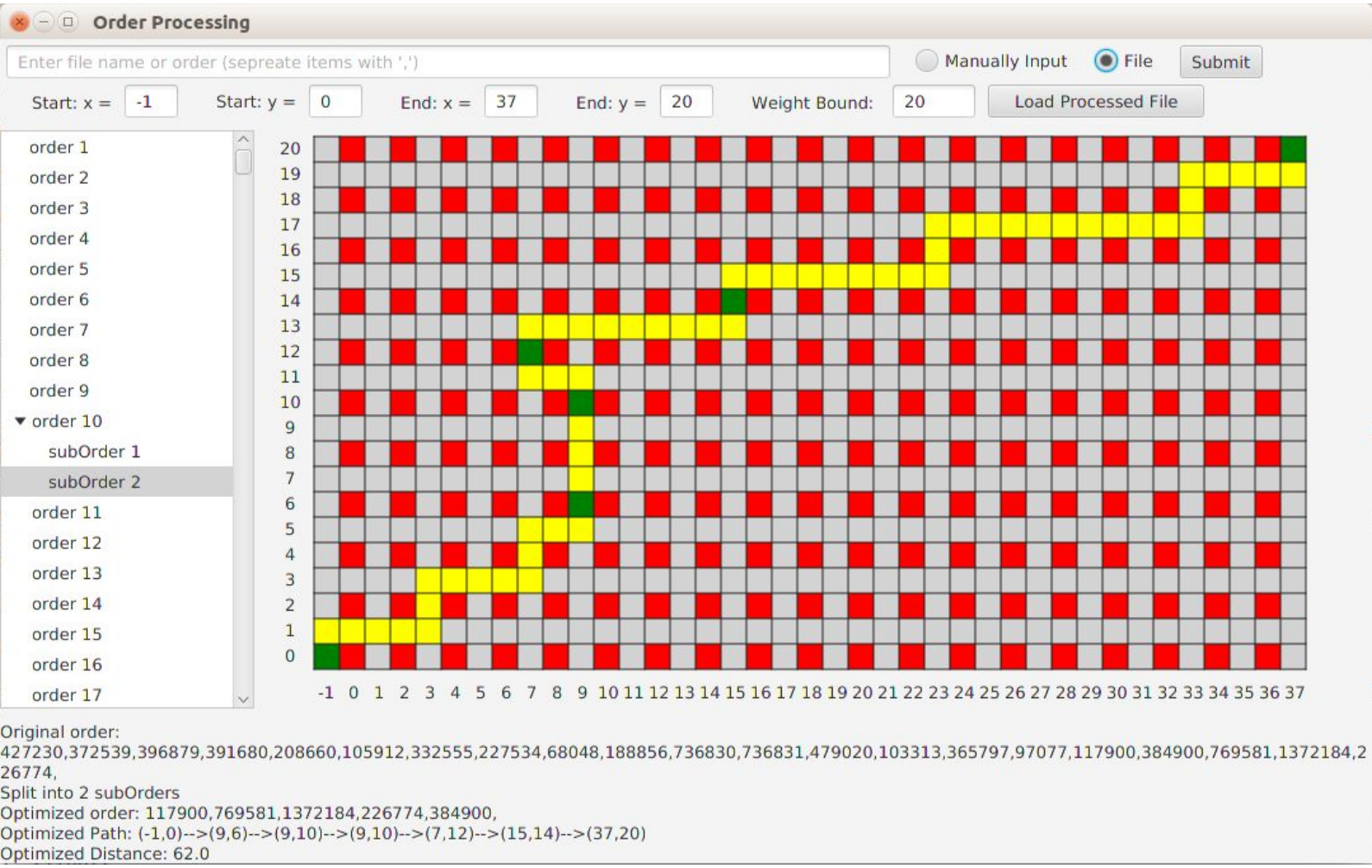
1. Algorithms:
    - I implemented 3 algorithms in total: Dynamic Programming, Branch & Bound, and 2-Approximation. However, I dropped Dynamic Programming method after we start to consider both sides of a shelf, because of its unrealistic time / space complexity. So, in the final project, it adopts Branch & Bound and 2-Approximation algorithm.
    - When the order size is lower than 10, Branch & Bound will be used, because it usually finds a better result. When the order size is greater than 10, 2-Approximation algorithm will be used, because Branch & Bound will takes longer than 30 seconds. (my Branch & Bound works for orders of size 10, 20, even 30, it just takes a relatively long time)
2. Combine:
    - If an order doesn’t reach the max weight, it will try to combine with other orders to get more weight in weight bound, until the num of items is greater than 50.

Screen Shots:

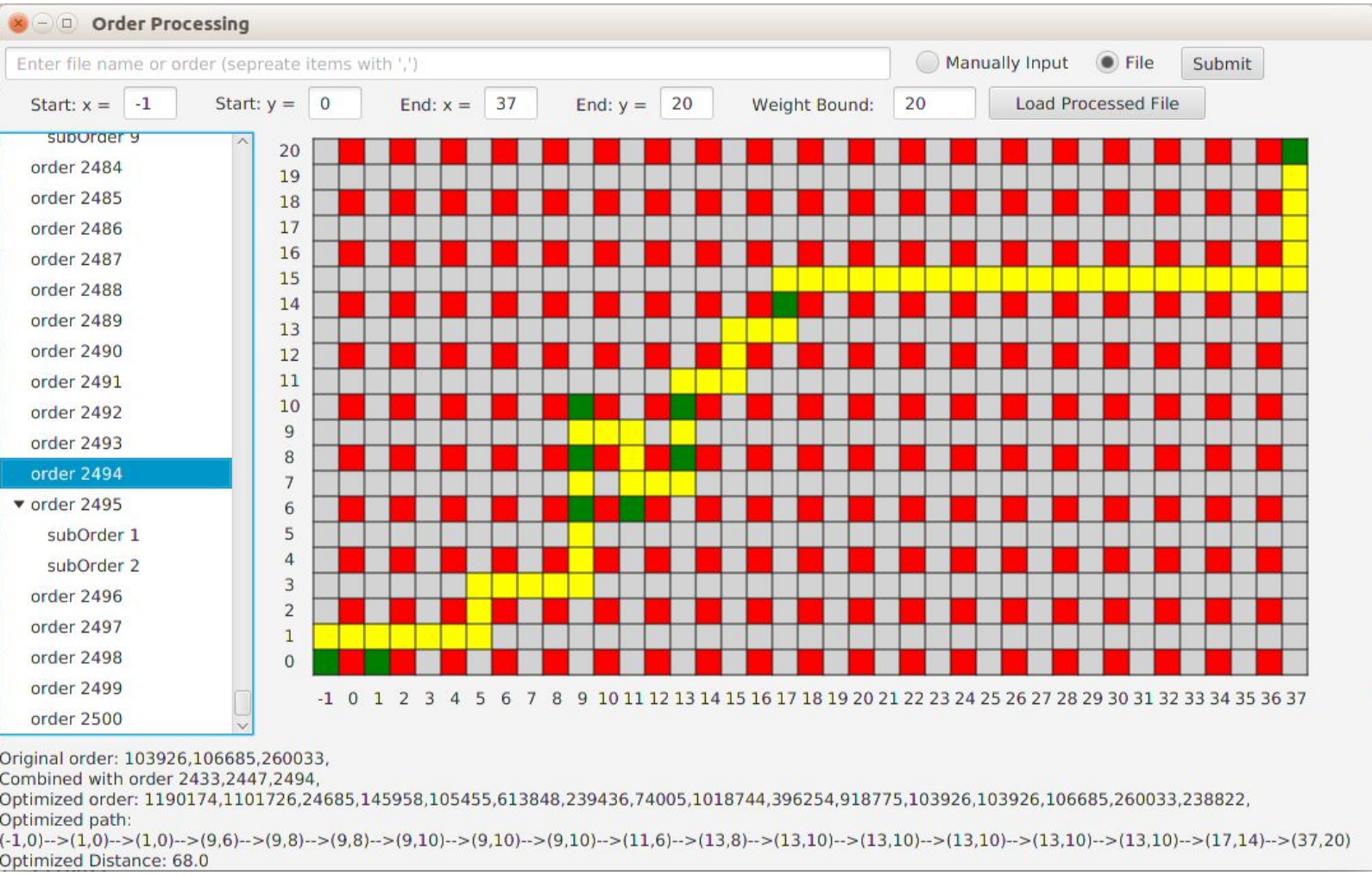
Home Page



User Manually Input (Single Order)



Splitted Order (loaded from batch file)



Combined Order (loaded from batch file)