SUPERMARKET ROUTE GENERATION

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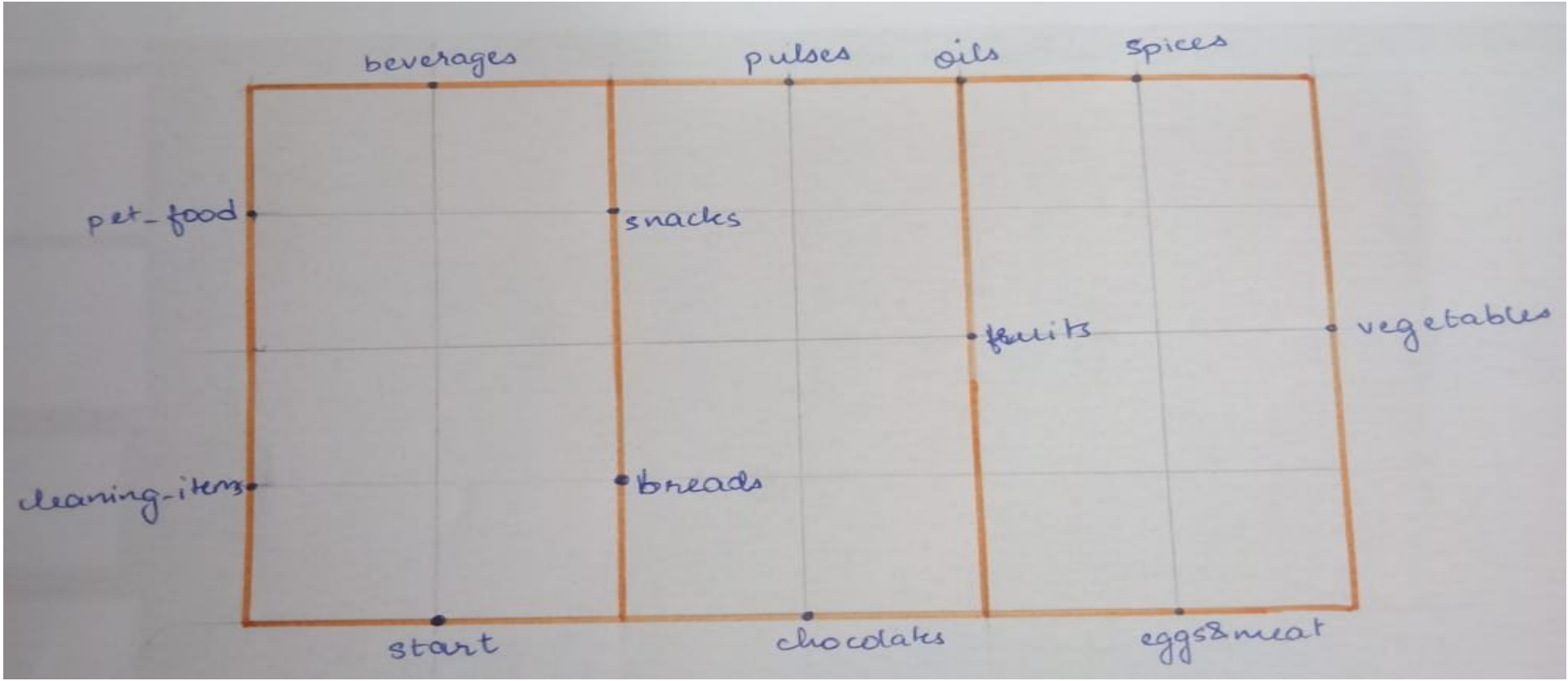
INTRODUCTION

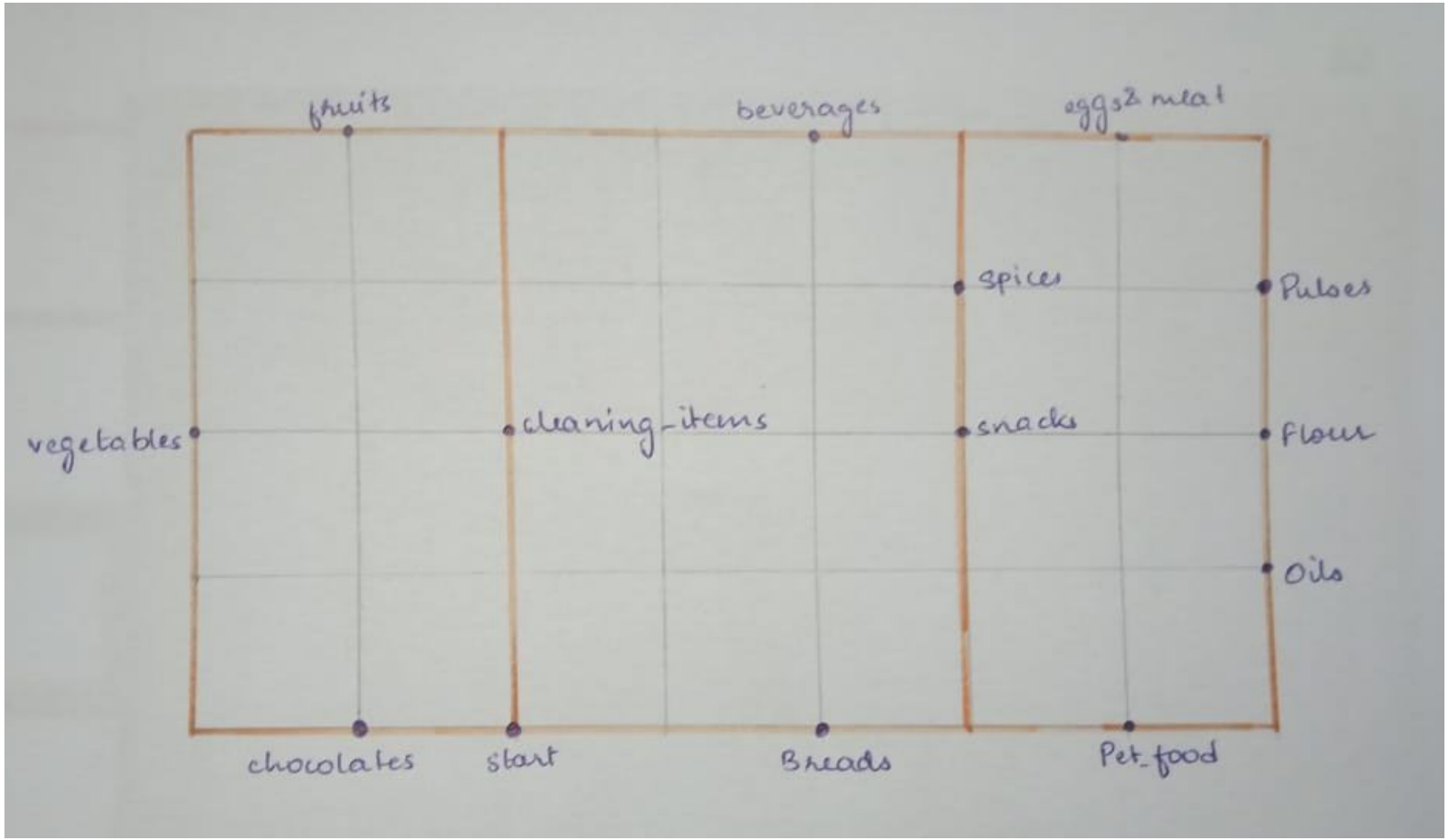
- Searching for required items in departmental stores and supermarkets is at times very confusing and time consuming.
- Even if the location of items are known prior, there can be a dilemma in choosing paths while purchasing the products.
- This can lead to long multiple trips all around the store which is often very tiresome to the customers purchasing the goods.

PROBLEM STATEMENT

- The motive behind taking up this project is to come up with a solution to the difficulty faced by customers while purchasing, using the knowledge of data structures.
- We there by intend to generate routes in the store which reduces the efforts of customers involved in the purchase, in two ways:
  - Give customers a route which ensures visiting the entire store in an efficient manner having shortest path.
  - If a customer wish to purchase only few items, a provision is provided for them to enter the required products and the path is generated visiting all the required items.

GRAPH


beverages
pulses
oils
spices
pet_food
snacks
fruits
vegetables
cleaning-items
breads
start
chocolates
eggs&meat


fruits
beverages
eggs& meat
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vegetables
cleaning_items
snacks
Flour
Oils
chocolates
start
Breads
Pet_food

IMPLEMENTATION

The implementation of this project is entirely based on the graph theory concepts. The visualization of this scenario is as follows:

- All the items of a particular category are provided a group number in our case. For example, all milk products as a group, chocolates as another group, etc.
- These groups are thus visualized as nodes of a graph.
- All the direct paths between these groups are considered as edges between the nodes.
- Distances between the adjacent groups in meters are considered as weights of the edges between the nodes.

METHODOLOGY

- The input graph is obtained in the form of a text file, which contains the distances between all the nodes as the weights of the respective edges.
- It is then fed into the program to generate the paths.
- Then using Dijkstra algorithm and Brute-force to calculate min distance containing the selected items
- Brute Force is applied when there is a possibility of selecting multiple items for min distance

TIME COMPLEXITY

- If you have n nodes and k 'mustpass' nodes, its running time is $O(n^3)$ and O(k!n) for the all permutations part.
- Total runtime is o(n3)
- Space complexity is o(n) because the total memory required to store the graph is equal total memory to store n nodes.

CONCLUSION

Using the graph theory concepts, an effective solution to a real time problem of customers is developed. This model is user friendly and can be deployed in all types of stores and markets. It can save time and effort when applied while shopping at a large store.

THANK YOU!