

Problem statement 2

Spark innovation with a robust Wal-Ket basket.

Online orders are very often fulfilled through brick-and-mortar Walmart outlets. Every aisle at a Walmart store or distribution center is mapped to ensure that the most optimal route is taken while searching for items. Sometimes, associates get delayed alerts and might have to take three trips in place of one, even when multiple orders come at the same time. The associate can carry up to three items to fulfil the order. Your task is to design a system to help our associates navigate seamlessly and fulfil more orders in less time.

Problem statement: Saving energy for Walmart and for a better world

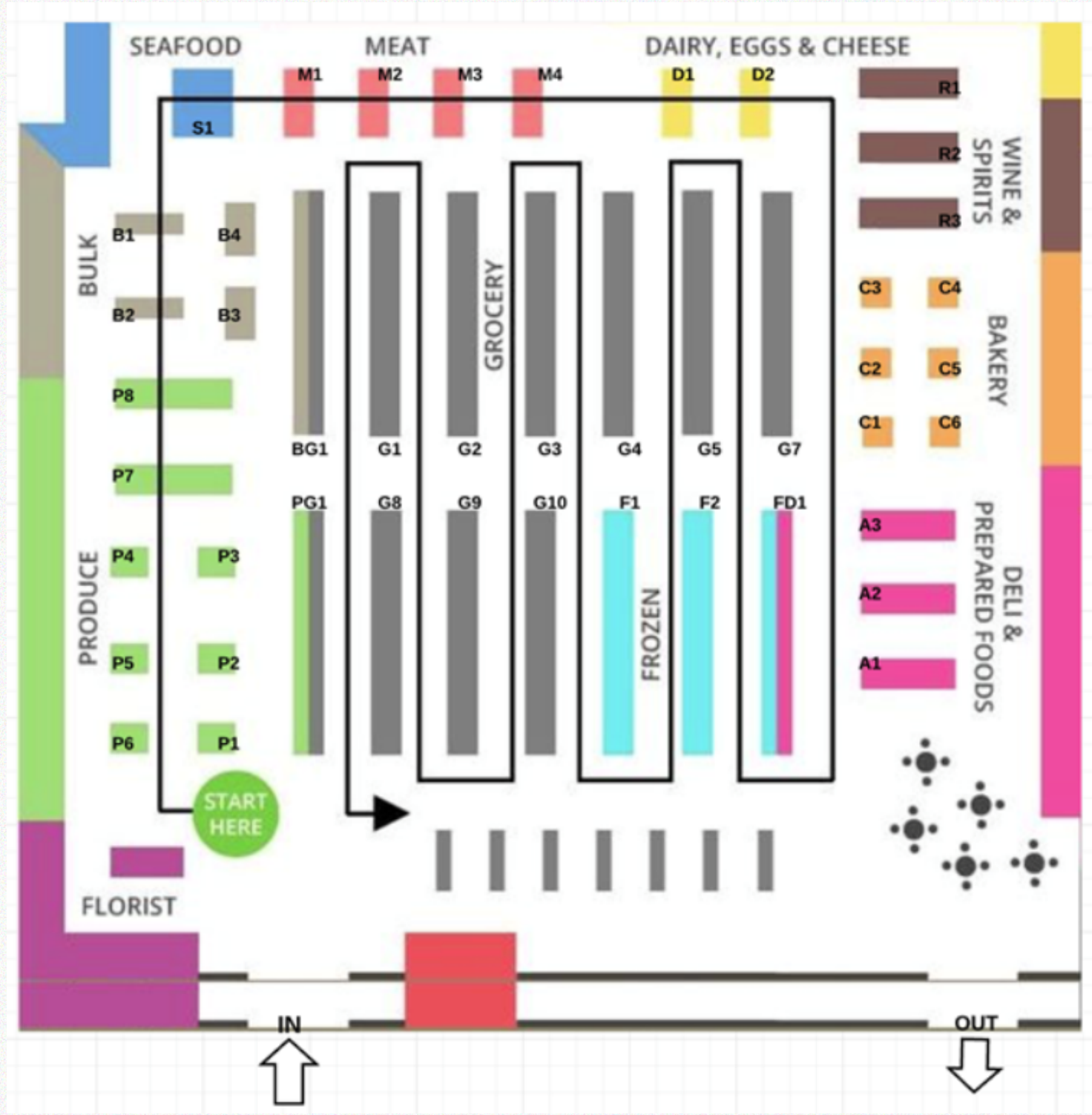
The associate navigates through the store and picks up items from the shelves/aisles belonging to the order.

Each associate steers the trolley on the shop floor to select multiple items of an order, and may therefore have to walk a considerable distance. Considering the physical size of Walmart stores and the assortment of items, this process of picking and fulfilling every order individually is slow and takes up a considerable amount of time.

Walmart stores/distribution centers consist of:

- Departments like grocery, meat, milk, etc
- Aisles that are numbered slots inside a particular department like A1, A2, S1, M1, etc

A typical Walmart store will have a floor map like in the diagram below:



The process of individually fulfilling each order increases the cost and time involved in delivering the order. This problem can be addressed using an innovative concept known as Wal-Ket. Wal-Ket refers to fulfilling/batching multiple orders by simultaneously picking items belonging to different customer orders under a particular category.

How it works:

- The Wal-Ket system already has the map of the store which contains information about which product belongs to which aisle
- An associate batches three (for the sake of simplicity, consider batching of three orders) customer orders and feeds them into the Wal-Ket system
- The Wal-Ket system then provides the optimal route the associate should take to fetch products from different aisles
- The associate then goes on to fetch products based on the path provided by Wal-Ket, thereby saving both cost and time

Sample order model:

```
{
  "shipToAddress": {
    "address": {
      "addressLineTwo": "",
      "isPoBox": false,
      "city": "OSHAWA",
      "countryCode": "CA",
      "addressType": "RESIDENTIAL",
      "postalCode": "L1K 2N8",
      "addressLineOne": "1525 Grandview St N",
      "stateOrProvinceCode": "ON",
      "addressLineThree": ""
    },
    "phone": {
      "completeNumber": "9054472333"
    },
    "name": {
      "firstName": "Billie Jo",
      "lastName": "Wood",
      "completeName": "Billie Jo Wood"
    },
    "email": {
      "emailAddress": "bjwood@rogers.com"
    }
  },
  "orderTotals": {
    "grandTotal": {
      "currencyAmount": 38.48,
      "currencyUnit": "CAD"
    }
  },
  "orderNo": "3268129163",
  "products": [
    {
      "productId": "PR12ERT45",
      "description": "Avian Mineral Water",
      "unitPrice": {
        "currencyAmount": 4.99,
        "currencyUnit": "USD"
      },
      "orderedQuantity": 5,
    },
    {
      "productId": "PR45GHT98",
      "description": "Tide Detergent",
      "unitPrice": {
        "currencyAmount": 7.99,
        "currencyUnit": "USD"
      },
      "orderedQuantity": 2,
    }
  ],
  "event_time": "2019-10-12T23:03:23.011-0500"
}
```

Input: Provide multiple orders as input to the Wal-Ket system. You can pre-feed the store map in the Wal-Ket system.

Assumptions:

- The speed of the associate is constant
- No time is taken to put items in the basket

Expectations:

- Design an optimal solution to batch the orders to reduce the fulfillment time
- Design an efficient store navigation system to fulfill multiple orders simultaneously