

## Pedagogical Note on Picking Strategy

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### 1. Introduction

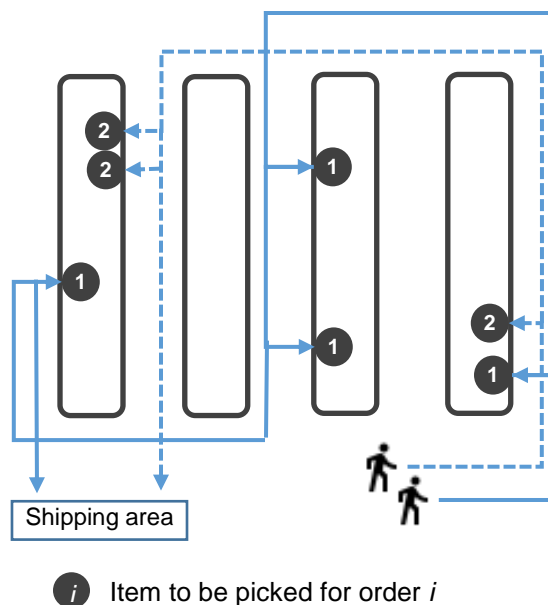
Imagine that your family is attending a dinner party with your three other friends and their family. Each family plans to cook a dinner and share it with everyone. Thus, you and your friends were asked to go for grocery shopping with long lists of items given by each family to be purchased. You can possibly complete the shopping list of your family without coordinating with your friends. Alternatively, you and your friends can try to combine the lists and split the tasks so that each of you would pick items that are in proximity and consolidate the items for each list given by each family later. What would be the possible options to assign the tasks so that they can be done in an efficient way?

This kind of task assignments is very common in warehousing activities where the order preparation (most notably, time to go search and find the right items for each order) accounts for approximately 55% of all the operations in a warehouse or distribution center. Each grocery list explained earlier corresponds to an order placed by your customer and the workers in your warehouse need to go find and pick the products in order to fulfill each order. There are two broad categories of picking strategies, namely picking **one order at a time**, and **multiple orders at a time**. We can consider three main strategies based on these two categories.

### 2. Picking strategy

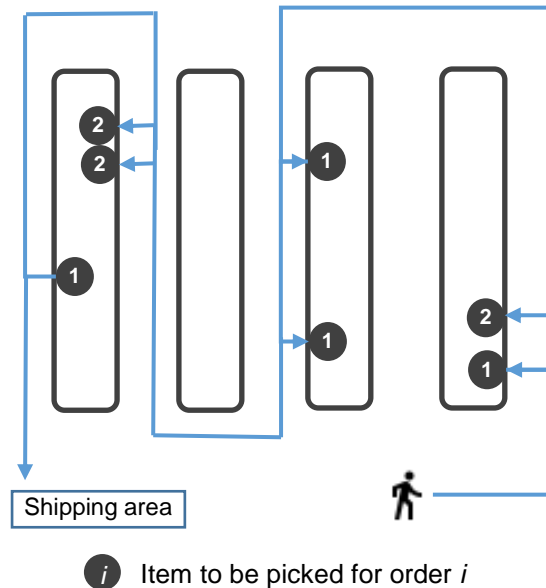
Based on these two categories of picking strategies, we can consider three possible picking strategies as follows.

- Strategy for one order at a time:
  - **Strategy 1 - Discrete picking:** we choose to complete one order at a time. Based on the example of the grocery shopping above, it means that each person will take care of the entire order he received. This is shown in Figure 1.



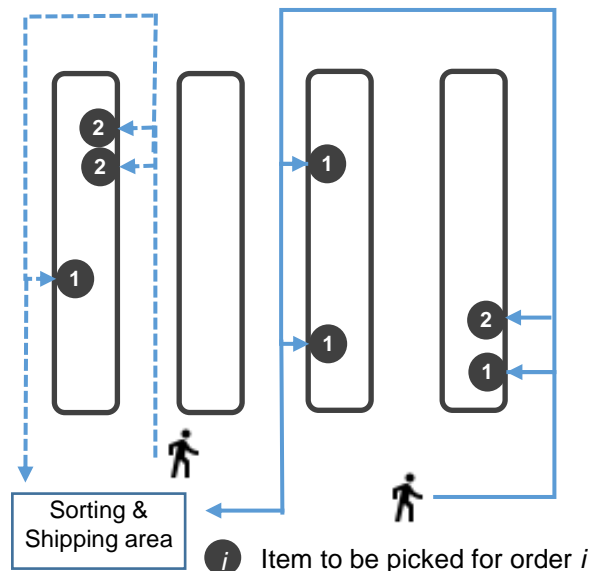
- **Figure 1:** *Discrete picking* where each worker picks one order at a time

- Strategies for multiple orders at a time: If many orders are consolidated, we can split the picking lists for the pickers in such a way that each worker picks items for many orders at the same time.
  - **Strategy 2 - Group picking**: each worker can organize and sort the orders at the same time (*sort-while-pick*). This is shown in Figure 2. This type of picking typically requires an equipment or a container with partitions to separate the products for each order.



**Figure 2:** *Group picking* where a worker picks and puts the products separately by order at the same time

- **Strategy 3 - Batch picking**: each worker picks all the items that are assigned to him/her and then sort them later after the picking is complete (*pick-then-sort*). This is shown in Figure 3.



**Figure 3:** *Batch picking* where two workers pick the products and sort them by order later

### 3. Advantages and disadvantages

These 3 strategies offer different advantages and disadvantages. By using the *discrete picking* strategy, there is no dependencies among the pickers. If an order consists of a number of items, it would be more efficient to use this strategy because the time spent to consolidate and sort a number of items for different orders would be very long. However, it would not be efficient to use this strategy when the orders typically contain only a few items in each order and the locations of these items are spread out in the entire warehouse. In this case, all the workers would travel a long distance to pick up a few items for an order. Therefore, it is more efficient to consolidate and divide the tasks among different workers. If it is possible to sort while picking (i.e., using *group picking* strategy), we can pick and complete the orders at the same time. However, it is not often the case that pickers can keep the order integrity when picking up the items because there must be enough partitions with sufficient capacity to keep each order separate. In this case, we can adopt the *batch picking* strategy to sort the items for orders after picking.

### 4. Picking strategy selection

The method to choose the right picking strategy is to consider how many products and how many units for each product in an order. Table 1 provides a guideline how to properly choose the picking strategy.

**Table 1: Guideline for picking strategy selection**

		Number of lines (products) per order		
		1-5	6-39	40+
Number of units per line (product)	1-5	Group (sort-while-pick)	Batch (pick-then-sort)	Discrete (one order at a time)
	6-19	Batch (pick-then-sort)	Batch (pick-then-sort)	Discrete (one order at a time)
	20+	Discrete (one order at a time)	Discrete (one order at a time)	Discrete (one order at a time)

**Example 1:** Two orders are placed by two stores to a distribution center. The lists of the products in the orders are given as follows. What picking strategy should be used for the orders in the case picking zone?

**Order:** A12009

**Ship to:** STORE Dorval 1229

SKU	Description	UNIT	QTY
55900	DEHYDRATEUR 240 ML	CS	4
74237	KN PEAR BIO	CS	2
19801	NATURAL MINERAL WATER	CS	12

**Order:** A12010

**Ship to:** STORE Montreal 1106

SKU	Description	UNIT	QTY
55900	DEHYDRATEUR 240 ML	CS	2
74237	KN PEAR BIO	CS	2
66730	VANILLA SOYA BIO	CS	9
12880	ORANGE JUICE BIO 250 ML	CS	4
12883	APPLE JUICE BIO 250 ML	CS	2
19801	NATURAL MINERAL WATER	CS	15

We can see that the average number of lines is  $(3+6)/2 = 4.5$  and the number of units (cases) per line is  $(4+2+12+2+2+9+4+2+15)/9 = 5.78 \approx 6$  cases per line. Therefore, the **batch picking** strategy (pick-then-sort) should be used. The list of products in these two orders must be consolidated and then the picker will pick all the items and sort after the picking is done.