

# ICA 20: Activity Profiling

ISE 453: Design of PLS Systems

Spring 2020

Activity profiling involves the systematic analysis of item and order data. This data can be used to determine warehouse design parameters that can be used to select the most appropriate methods and equipment to use for piece picking in a warehouse. Three sets of representative customer order data and an item master file are in the spreadsheet *ItemOrderData* that is available on the course webpage (with length, width, and depth in inches; cube in cubic-inches; weight in pounds; and UOM and EA abbreviations for “unit of measure” and “eaches”). This data can be used to answer the following questions:

1. How is it possible to determine that piece picking should be used for each of the datasets, as opposed to either pallet or case picking?
2. Assuming a different piece picking method will be used for each order dataset, determine the most appropriate method using the parameters total lines and lines per order.

Dataset	Total Lines	Lines per Order	Method
OrderSet1			
OrderSet2			
OrderSet3			

3. Using dataset “OrderSet1” and the item master file, determine the most appropriate type of equipment to use to pick each SKU assuming that at least one of the eight different SKUs in the dataset is assigned to each of the following types of piece picking equipment:

*A-frame, bin shelving, carton flow rack, horizontal carousel, storage drawers, and vertical lift module.*

SKU	Lines per Item	Cube Movement	Equipment Type
1			
2			
3			
4			
5			
6			
7			
8			

4. Referring to the item master file, explain why the cube (in<sup>3</sup>) of each item needs to be listed in the file, instead of just calculating its value using the product of the item's dimensions?
  
5. Determine the demand correlation distribution for the eight SKUs in the dataset "OrderSet1" (in each cell, you should indicate the number of orders instead of calculating a percentage):

SKU	1	2	3	4	5	6	7	8
1	—							
2		—						
3			—					
4				—				
5					—			
6						—		
7							—	
8								—

## Solution

1. UOM is in EA

2.

Dataset	Total Lines	Lines per Order	Method
OrderSet1	41	2.05	zone-batch
OrderSet2	16	2.00	batch
OrderSet3	38	4.22	zone

3.

SKU	Lines per Item	Cube Movement	Equipment Type
1	5	1656	carton flow rack
2	3	1080	bin shelving
3	4	256	vertical lift module
4	5	1092	bin shelving
5	8	1140	horizontal carousel
6	7	1880	carton flow rack
7	3	270	storage drawers
8	6	364	A-frame

4. Cube might be less than the product of the item's dimensions, allowing nesting for packaging.

5.

SKU	1	2	3	4	5	6	7	8
1	—			2	3	1	1	
2		—	1	1		1	1	3
3			—				1	2
4				—	2	3		1
5					—	4		1
6						—		2
7							—	1
8								—