

Abstract	
User	
Administrator, Shopper	
<ul style="list-style-type: none"> • UserID • Password • Inventory • LogOut • LogIn • Search products • Get a list of products sorted by availability up • Get a list of products sorted by availability down • Get a list of products sorted by category • Get a list of products in price range • Get a list of products in certain product category in given price range 	

Shopper	
User	
Customer	
<ul style="list-style-type: none"> • Shopping Cart • sessionID • shopperID • Inventory • Save shopping cart • Cancel shopping cart • Add product to cart 	<ul style="list-style-type: none"> • Shopping Cart

Customer Shopper	
<ul style="list-style-type: none"> • First name • Last name • Customer ID • Session ID • Address • Email • City • Street • Inventory • Credit card number • Credit card expiry date • List of shipping invoices • Add shipping invoice to list 	<ul style="list-style-type: none"> • Inventory • ShoppingCart • Invoice

Administrator User	
<ul style="list-style-type: none"> • Manage three different managers • Maintain product categories <ul style="list-style-type: none"> ○ Add a new category ○ Generate a screen report of existing categories • Maintain products <ul style="list-style-type: none"> ○ Add a new product ○ Change the photograph, description, price or availability quantity of products • List of shoppers • Get all invoices of all shoppers • Add new distribution centres • Maintain shipping routes 	<ul style="list-style-type: none"> • Product Manager • Shopper • DistributionManager

Inventory		Observer
<ul style="list-style-type: none"> • Product Manager • Products • List of product categories • Sort a list of products by availability • Sort a list of products by product category • Get a list of items by product category • Get a list of items by availability • Get a list of items by price range • Add shopper • Add administrator • Get shopper's file • Search user from list of users • Get the available quantity of a certain product in a certain distribution center • Save shopper's shopping cart • Empty shopper's shopping cart • Add invoice to shopper's list of invoices • Modify the quantity of product in file • Change the quantity of product in certain distributionCenter • Search product 		<ul style="list-style-type: none"> • Product Manager • Observer

Product	
<ul style="list-style-type: none"> • Image • Product ID • Product description • Product category • Price • Availability • Compare a product with another 	<ul style="list-style-type: none"> • ProductCategory

ProductCategory	
<ul style="list-style-type: none"> • Category description • Category code • List of products 	<ul style="list-style-type: none"> • City • Update quantity • Inventory • quantity • ProductManager • List of products • Get neighbours
<ul style="list-style-type: none"> • Inventory • ProductManager 	

ShoppingCart	
<ul style="list-style-type: none"> • Shopper • deliveryCost • Add products in various quantities if there is enough quantity • The contents of shopping cart generate a shipping invoice • Update inventory • Remove an item • Empty a shopping cart • Save shopping cart • Cancel shopping cart 	<ul style="list-style-type: none"> • Product • Shipping Invoice • Shopper

ShippingInvoice	
<ul style="list-style-type: none"> • Tracking number • ShoppingCart • Total price of products • List of items that were in a shopping cart • Get total price • Calculate total price • Update the list of shoppers' shipping invoices 	<ul style="list-style-type: none"> • Inventory • Product

ProductManager	
<ul style="list-style-type: none"> • List of products • List of product categories • Load product file • Save product file • Add new product to file • Edit product • Get list of products 	<ul style="list-style-type: none"> • Product • Product Category

ShopperManager	
<ul style="list-style-type: none"> • List of shoppers • Save shopper file • Load shopper file • Add new Shopper to list • Get Shopper • Edit Shopper 	<ul style="list-style-type: none"> • Shopper

DistributionManager	
<ul style="list-style-type: none"> • List of distributionCentres • List of shipping routes • Load distributionCentre file • Save distributionCentre file • Add new DistributionCentre to file • Get DistributionCentre • Edit DistributionCentre 	<ul style="list-style-type: none"> • DistributionCentre

DeliveryRoute	
<ul style="list-style-type: none"> • Calculate route • List of centres • Find the closest distribution centre • Find the closest centre to deliver product between distribution centres • Calculate delivery cost 	

City	HeapItem
<ul style="list-style-type: none"> • City • Cost • heapIndex • parent • inPath to check if an item is already in path • set heap index • get heap index • compare two objects 	<ul style="list-style-type: none"> • HeapItem

Observer	
	Inventory
<ul style="list-style-type: none"> Update available and backordered quantities 	

Observable	
	Inventory
<ul style="list-style-type: none"> Register an observer Remove an observer Notify an observer 	

Exception	
OutOfStockException	
<ul style="list-style-type: none"> Throw an exception if a product is out of stock 	

Exception	
CartFullException	
<ul style="list-style-type: none"> Throw an exception if a number of products is over a certain limit 	

Heap	
<ul style="list-style-type: none"> • Add an item • Update an item • Remove the first element • Sort the elements in ascending order • Sort the elements in descending order • Swap two items 	<ul style="list-style-type: none"> • HeapItem • HeapFullException

Comparable<HeapItem> HeapItem	
<ul style="list-style-type: none"> • Set a heap index • Get a heap index 	

HeapFullException Exception	
<ul style="list-style-type: none"> • Throws an exception if a heap is full 	

HeapEmptyException Exception	
<ul style="list-style-type: none"> • Throws an exception if a heap is empty 	

<div>Exception</div> <div>CityExistsException</div>	
<ul style="list-style-type: none">• Throws an exception if a vertex (city) already exists	

<div>Exception</div> <div>RouteFullException</div>	
<ul style="list-style-type: none">• Throws an exception if the graph is full	