

ADD Iteration 2

The goal of the first iteration was to establish an overall system structure. After successfully accomplishing all the objectives we move on to the second iteration. Second iteration mainly focuses on *identifying structures to support primary functionality*.

Step 2 : Establish Iteration Goal by Selecting Drivers

This iteration addresses the general architectural concerns of identifying structures to support primary functionality. Identification of elements is useful as it helps in understanding how the functionality is supported. Moreover, it also helps in allocation of work to members of the development team.

The architect considers the system's primary use cases :

1. **UC-1 Scanning Items**
2. **UC-2 Payment**

Step 3 : Choose One or More Elements of the System to Refine

The modules placed in the different layers indicated by the reference architecture are the elements to be refined in this iteration. In general, the interaction of components linked with modules placed in different layers is required to support functioning in this system.

Step 4 : Choose one or more design concepts that satisfy the selected driver

The primary goal of this iteration is to structure the backend database, design concepts are selected after thoroughly analyzing the data storage structures. The table below summarizes the selection of design decisions.

Design Decision	Rationale
The system will use a Distributed Search Engine for the reference architecture	This is a scalable indexing solution that allows for executing quick and complex queries on semi-structured data.

Create semi-structured data for products	Structure the data for products such that it includes all relevant data of it, such as purchase price, selling price, inventory level, and sources of products
The Apache Cassandra framework will be used to build the server side architecture.	Open source DBMS with good availability and no single point of failure. Has high throughput and low latency for reliable use.

Step 5: Instantiate Architectural Elements, Allocate Responsibilities, and Define Interfaces

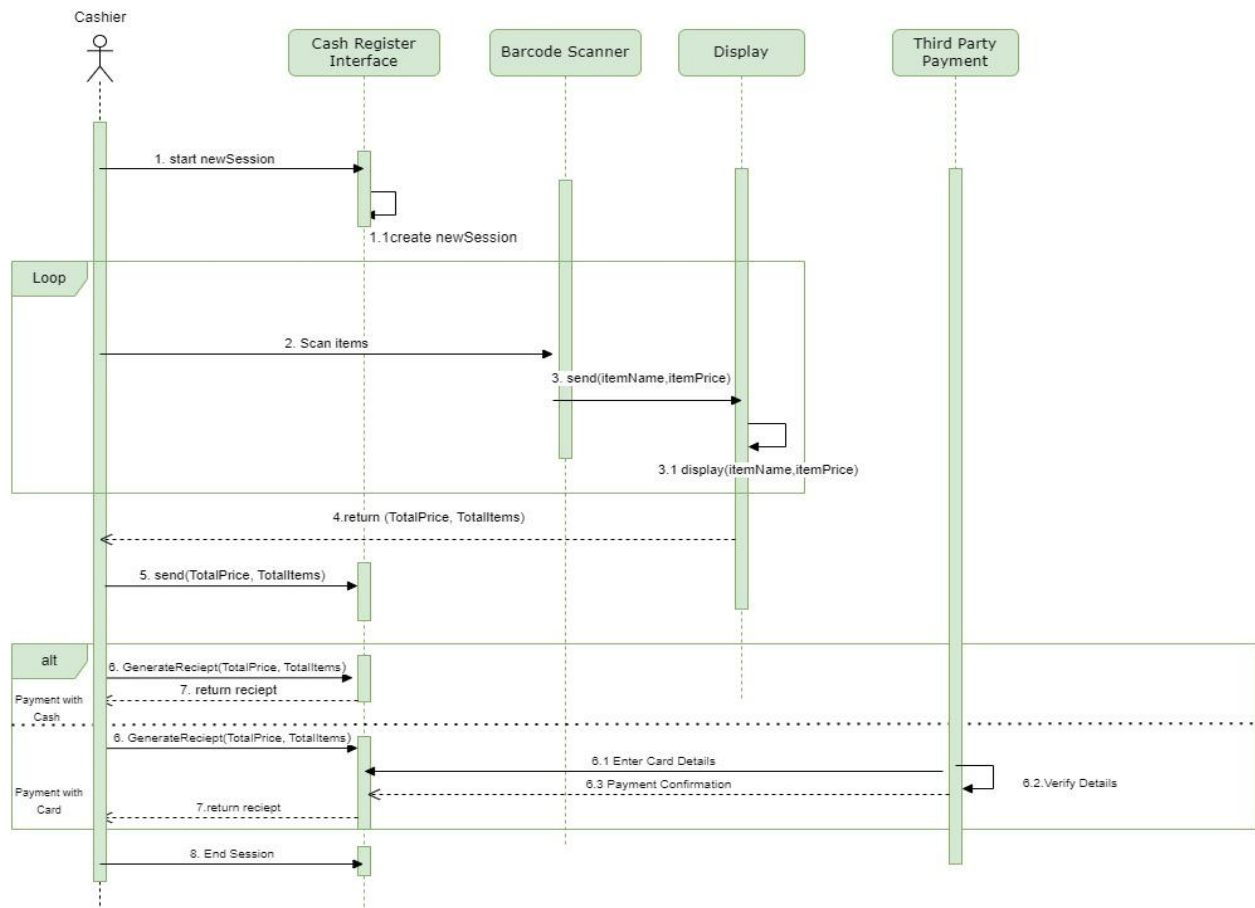
The instantiation design decisions considered and made are summarized in the following table:

Design Decision and Location	Rationale
Create a model for a distributed search engine	The database model will be a distributed search engine, allowing for quick and complex queries of the product.
List the products as semi-structured data	The products will be added to the database attached to all the relevant data that is needed by the cash register, including the price of the product. This allows for the quick calculations for the purchase.

The next phase involves documenting the outcomes of these instantiation choices. This next cycle will focus on defining interfaces in greater depth alongside other functionality.

Step 6 : Sketch Views and Record Design Decisions

In order to capture the primary functionality i.e based on the primary use cases a sequence diagram is used to properly capture the functionality of both the use cases



The table below explains all the methods along with a description of each method.

Method Name	Description
send(ItemName,ItemPrice) display(ItemName,ItemPrice)	<p>The send() method passes data from the barcode component to the display by passing the item name and price as arguments.</p> <p>The display() method calculates the total price and the total number of items and displays the item name and price on the cashier's screen.</p>

send(TotalPrice,TotalItems)	This method forwards the total price and total items to the cash register interface.
GenerateReceipts(TotalPrice,TotalItems)	Creates a receipt that includes price and items
startsession()	Cashier starts a new session
endsession()	Cashier ends session

Step 7 : Perform analysis of current design and review iteration goal and design objectives

Drivers	Design Decisions and Location	Rational and Assumptions
UC1	The cashier will open up a session creating a list of items that the scanner will scan items into	This separates each purchase from into its own list allowing for better tracking of items being sold and purchases
UC2	The total cost will be queried from the database when all the items are scanned. The cashier will have the option to send payment request to a debit/credit account	The total cost of the purchase will only be queried at the end of the purchase to limit queries from database. Also the payment of the purchase can be sent to a debit or credit company so the customer can Pay with their card.
QA1	The database will be created in a way that will make it easy to transfer hardware	The database has to be portable so that it will be easy to upgrade hardware without having to recreate the entire database
CON1	The database will be saved locally	This saves operation cost of having an online database that requires upkeep
CON2	The cash register has to be a standalone application	This makes portability of the design easier as all the code will be created to be standalone