Software Requirements Specification

for

Restaurant Automation System

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1. Introduction

1.1. Purpose

Restaurant Automation System(RAS)is an android application/webpage that aims to digitalize the process of various restaurant booking/order management operations including ordering, reservation of tables for dining, inventory management etc. On the managers end it aims to automate the process of ingredients ordering, generating invoices, printing cheques and generating statistics of item sales and expenses on ingredients. This document aims to capture the system requirements and features particularly of the above mentioned functionalities to be implemented in RAS version 1.0. This Document presents a detailed explanation of the objectives, features, user interface and application of RAS in real life. It will also describe how the system will perform and under which it must operate. Both the stakeholders and the developers of the system can benefit from this document. To conclude, a complete document overview is provided to facilitate increased reader comprehension and navigation.

1.2. Intended Audience and Reading Suggestions

The purpose of this document is to give a detailed description of the requirements of the RAS software. It will illustrate the purpose, scope, and complete description of the development of the system. It will also explain external interface requirements and system requirements as well as non- functional requirements. This document is primarily intended to be proposed to a customer for its approval and for further processing such as additions to be developed in later releases. This document will also be used as a reference for developing and testing Version 1.0 by the development team as well as the testers.

This document is intended for different types of readers such as restaurant owners, system designers, system developers, and testers.

1.3. Definitions, Acronyms, and Abbreviations

Term	**Definition**
System Admin	is a person who is responsible for managing the whole system and who has full access to the system.
System Manager	‘face’ of a Restaurant responsible for managing the restaurant part.
System User	A person who is using or operating the system but with a limited privilege.
Database	Collection of all information monitored by this system.

RAS	Restaurant Automation System
Software Requirements Specifications (SRS)	A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document
Stakeholder	Any person who is involved in the development process of the software
Point of Sale (POS)	A point-of-sale system is either a stand-alone machine or network of input and output devices used by restaurants to accomplish their daily activities including food and beverage orders, table booking, etc.

1.4. Product Scope

This System will help to manage and run the restaurant business systematically both from the customers as well as the managers point-of-view. In this management system, we will provide an app/website that can be used by the customers to order food and check the restaurant status. Customers can also give feedback through this app. So that the owner of the restaurant can evaluate and proceed accordingly. This will ultimately lead to hiring waiters and creating an opportunity to appoint more chefs and better kitchen places to serve food faster, reducing wastage of inventory as much as possible. Customers can see the current discount facility and the menu of the restaurant.

2. General Description

This section will give an overview of the RAS application. The basic functionality of the system as well as its context will be explored in detail. It also describes different kinds of stakeholders and user classes associated with the system and what functionality is available for each class. At last, the assumptions and dependencies for the system are presented.

2.1. Product Perspective

RAS app/website will attempt to replace the traditional manual ordering process and is a new self-contained software system that consists of two parts: one mobile application and the other is a database. The mobile application will be used for item orders, interacting with the inventory, while the database will be used for storing the inventory and ordering related information about the food items like pending and complete order queues, invoice data, statistics if item orders. The mobile application will have three interfaces. Each for Customer/User, Manager, Admin.

The customer's interface will consist of a scrollable menu listing available items and their price along with ratings of those items and/or restaurants. When the customer selects some dishes and places the order, it will be stored in the "Order Item" table in the database.

Manager's interface will be such that he is notified of the pending order and he can assign it to one of the available queues of chefs who are then able to see the new order on their screens or a central display in the kitchen (Based on the Restaurant). He can also enter a order directly from a customer. After each item/dish in an order is prepared, the order is marked and the manager gets notified.

The customer's interface has an option for requesting the bill. Bill is printed through the Manager's interface. Not only this but the Customer can access the availability of the tables for reservation purposes via the "Available Tables" from the database and request is sent.

Manager's Interface will be such that he is notified and approves the request along with these the customer's details are stored i.e., time, no. of persons etc. He can also approve of inventory management suggestions prompted by the system, only after which the ingredients orders will be placed.

Admin can change and modify the database like add new menus or restaurants, view status of item orders and inventory availability, check the feedback provided and act accordingly etc.

2.2. Product Functions

Given below are the major functions that can be performed using the RAS app.

The system will:

1. Login Page: User Login, Manager Login window. choose accordingly
    1. Username and Password
    2. New Registration
    3. Forgot Password
2. In the home page the Users have an option to select the restaurants of their choice by typing the city and on the top right corner Profile Section.
3. Users screen displays the list of restaurants along with the rating, they can scroll through the restaurants page and select one.
4. Upon Selection of restaurant, Users are provided with two options:
    1. Order Food : scroll through the menu and select the dishes he/she wants.
    2. Table Reservation: Displays the blueprint and available tables for booking, date of reservation, number of members.
5. At the bottom of the page, Users can now see the reviews, feedback of the restaurant provided by other users, Add review option.

6. On selecting the option >> Order Food:
   1. The Screen displays a list of food items along with the price, rating, discount, Veg/Non-Veg, delivery time, ADD TO CART option and on the top right corner a basket-like symbol denoting the cart.
      1. ADD TO CART : when the user clicks on this option it shows

         `< - | quantity | + >` in place of the add to cart option.
         1. + : increases the quantity
         2. - : decreases the quantity (When quantity is 0 shows ADD TO CART instead of the quantity option)

      2. CART : when the user clicks on this option it redirects the pagewhere he/she can find the items added: Displays the Item Name (Image of the food) + `< - | quantity | + >` + Restaurant Name selected from + `< Price >`.
         1. + : increases the quantity
         2. - : decreases the quantity (When quantity is reduced to 0

            >> Displays an option/warning! to remove from the cart

            `< Yes | NO >`)

      At the bottom of the page displays the total amount, Enter Discount Coupon ID and quantity, Proceed to Purchase Option.

         1. PROCEED TO PAY: users get redirected to a page consisting of payment mode, options etc.
         2. APPLY DISCOUNT: Pop a small page to enter the discount coupon ID. Shows Check, Close Options. Then verifies VALID! -> Then reduce the total amount by the specified

            discount. INVALID! -> Display the wrong number and exit the popup.
         3. CANCEL/EDIT Orders: This option is available once the order is placed. Users have an option to cancel/edit (add + remove some items) for a specific amount of time after the purchase.

Internally it triggers a query that will send a notification to the manager about the ordered food and delivery address.

3. CLICKING ON THE FOOD ITEM : when the user clicks on the item name, it redirects to page where User can see the Ingredients, Veg/Non-Veg, curries or cooldrinks that is received along with the order, feedback, rating of the particular food item, below of the page it also shows recommended similar food items. Also it contains the ADD TO CART and CART Option which performs
the same operation as above.

1. On selecting the option >> Reserve tables:
   1. Pop up showing Enter Date, Capacity, Time. Based on the entered data Displays a blueprint of the restaurant showing the available tables (marked blue) and reserved table (marked red). Users can select/ markthe tables (marked yellow) and press OK after finalising.
   2. Displays the amount for booking, purchase options, upon successful payment.
   3. Manager of the particular restaurant receives notification.

2. ADD REVIEW: Users can provide feedback, rating regarding the food and service of the restaurant on the purchased food item and the restaurant.
3. PROFILE SECTION:
   1. View Profile : Displays the Username, profile image, phonenumber, email-address, delivery address, etc.
   2. Manage order : Displays the recent order, view or printbills/invoice of orders, order again option etc.
   3. Remove Profile : Deletes the account of the user, but the details are not removed from the database.

UNDER THE MANAGER SECTION

4. MENU: Manager of the respective restaurant can create, retrieve, update and delete menu Items. Accordingly, the database is changed/updated.
5. NOTIFICATION :
   1. Table notification: Manager can see/edit the status of tables reserved and available and their capacities. Modify the database entries

        2. Order notification: Manager checks the ordered items and prepares it for delivery by assigning a delivery person.

        1. Feedback notification: based on the feedback and review provided by the users, Manager can act accordingly

2. Inventory Management:
    1. See Status of Inventory: check and verify the items available in inventory and place orders of ingredients if needed.
    2. Approve ingredients order: If the RAS prompts the manager to order a particular ingredient it reviews the order and accordingly approves it.

ADMIN SECTION

3. MANAGE RESTAURANT: Administrator to add/remove restaurants to the application (Assuming there are multiple branches of the restaurant). Complete Access over the database application such as viewing the feedback, rating on restaurant, sales statistics, inventory statistics, manager access etc.

2.3. User Classes and Characteristics

Three types of users interact with our system. Customer, Manager, and Administrator. Everyone has a different interface.

Customer

Customers interact with our system directly to select a restaurant, book tables or place orders, modify orders, get bills and give feedback. Username/Password, Name, Address, Recent Orders, etc. details are stored in the database.

Manager

Managers can process orders, assign delivery assistants, update the sitting chart to show the availability of tables, and edit the menu.

Administrator

Administrators can monitor the application overall and update the software improving the user-friendly environment.

2.4.Operating Environment

This application runs on mobile phones as well as desktops. For the customer, the application runs on desktop/mobile phone. He can place orders, browse through restaurants, see reviews, etc. The manager would be present at the entrance, and the system on his desktop would show the tables that are empty/ reserved. When an order is placed, or table is reserved the server would notify the manager. Then assign the delivery guy through his system._The system is running on various devices but the operating environment and purpose of each are different for each user.

2.5.Design and Implementation Constraints

The application should be compatible and must run smoothly on various platforms, operating system configurations like windows 10, android, macOS, Linux etc.
There are some constraints which cost more for the system. If those constraints can be overcome, then this whole system will perform best:

1. IOS App and Windows App
2. Information Control or Data flow can be controlled and more effective.

1. Faster server system such as LINUX Server.
2. Other Languages for other Countries
3. C# can be used for more security

2.6.User Documentation

1. The software is accompanied by User manual 1.0. Furthermore a Video(*SlideShow*) will be provided which will represent the whole system function and how it works.
2. Online Support at *www.RAS.com*

3. External Interface Requirements

3.1. User Interfaces

UI

3.1.1. Customer Interface

The customer interface will contain three screens. All three screens will have a consistent layout.

Place Order

In this screen, the system shows a list of cards (UI Elements) of dishes. Each dish will have an Image and its price per serving.

Timer and Edit/Cancel Order

After confirming the order, the user will be shown a timer screen. On this screen, the customer will be shown the "Edit Order" and "Cancel Order" buttons and a timer that shows the completion time of the order. There will also be a button to request the bill (version 2.0).

Feedback

In the feedback screen, at the top right corner a button for "Request Bill"will be shown. Beneath this button, we will display a form that will have different multiple-choice questions and a submit feedback button.

- **Home page**
    - --Home page of the application.
    - **Login page**
        - --Login with credentials or signup.
    - **Browsing the restaurants page**
        - --Displays all the available restaurants and their ratings, and reviews.
    - **Menu page**
        - --Shows the available dishes in the particular restaurant.
    - **Basket chart(cart items)**
        - --Shows the items added to the order.
    - **Restaurant seating chart(tables)**
        - --Displays the sitting chart and shows if a table is filled or vacant.
- **Delivery information page(includes payment details)**
- --Displays the final order details with payment options.
    - **Payment page (if online payment is chosen)**
        - --Payment option if chosen online, this page opens up to proceed withpayment.
    - **Order tracking page**
        - --Order can be tracked using GPS on this page.
    - **Contact us /feedback page**
        - --This page is useful to raise any queries or provide feedback to a restaurant.

3.1.2. Manager Interface

Manager will have a screen where he will get a notification whenever an order is completed System will notify the Manager about the order number and table number. The manager also has a screen where all orders are listed, and a status button to mark the order as paid. Moreover, he also has an interface screen to seethe status of tables in the restaurant as free/available.

- **Home page**
    - --Home page of the application.
- **Manager login page**
    - --Login with credentials for managers.
- **Seating chart(editable)**
    - --manager can edit the sitting chart for live availability of tables for customers.
- **Menu items edit page**
    - --manager can edit menu items here.
- **Order processing page**
    - --manager will process the order.
- **Inventory Management page**
    - --manager will process and manage the ingredients and inventory.
- **Delivery assistant page**
    - --manager can see the available delivery assistant and assign them the order to deliver it.
- **Order records date-wise page**
    - --manager can see the data of orders date-wise in the database.
- **Complaints page**
    - --managers can see the feedback given by customers and try to improve their restaurant.

3.1.3. Admin Interface

The Administrator interface gives the tools to add/delete restaurants and monitor the overall database and maintenance of resources, fixing bugs etc.

3.2 Hardware Interfaces

There are three external hardware devices used by the RAS. These devices are surface computers, wireless tablets, and touch displays. All three devices must be physically robust and immune to liquid damage and stains. The devices (with the possible exception of displays) must also have good industrial design aesthetics, as they are to be used by the Managers of each restaurant. They should be fully capable computers that can use textual data from the server along with local UI/interpretation code to display UI elements and take input. All order and transaction records should be stored on the server, not on these computers.

The hardware device takes information from the RAS and processes the information to display. It also provides user input information to the RAS.

3.3. Software Interfaces

For Database Services System shall use any suitable DBMS of latest version that is compatible with our hardware interfaces.

The DBMS must be able to provide, on request and with low latency, data concerning the restaurant's menu, and available dietary requirements. Additionally, it should take, and archive data provided to it by the RAS. This data will include records of all orders and transactions (system states and state changes) executed by the RAS. The DBMS must store all data such that it can be used for accounting, as well as accountability. For the website version we use HTML, CSS, JavaScript for front-end and python, node.js, express for back-end. For the app version we use DART programming language to develop the application using Flutter software.

3.4. Communications Interfaces

The RAS will interface with a Local Area Network (LAN) to maintain communication with all its devices. It should use a reliable-type IP protocol such as TCP/IP or reliable-UDP/IP for maximum compatibility and stability. All devices it will interface with should contain standard Ethernet compatible, software accessible LAN cards to maintain communication between the server and the surface computers, tablets, displays and the external payment system. Devices that are wireless should also use Ethernet compatible cards, using the IEEE 802.11b/g standard and having support for WPA2-PSK encryption. The use of IEEE 802.11n transmission standard hardware is also acceptable if all other local hardware is conformant to the same standard.

4. System Features

4.1.System_Feature_Users

Description and Priority

This section is for ordering food, viewing table vacancies, browsing restaurants etc.

Stimulus/Response Sequences

This section is dependent on other parts of software to get data and perform further processing. This feature has special access to different features i.e. users classes, product classes. It takes responses from different classes and sends it to generate analytics.
Further it also relies on GUI, Databases, Cloud Computing APIs to complete the process.

Functional Requirements

For User to gain access to work with an application he must login. This function needs to perform data verification. It must handle requests if wrong information is entered and show proper messages. User can create an account if he/she doesn't have one.

LOGOUT

Before execution of this function all dependencies/ Current going tasks need to be saved or any warning should be generated for any ongoing process. Then perform a final call for the logout process.

SEARCH

Using this function, customers can browse through different restaurants, their ratings and dishes they offer etc. They can select any restaurant and look into table vacancies too. They can also search by entering location names.

ORDER

Using this feature, customers can select dishes to add in his order. This is available after selecting a restaurant. The Corresponding restaurant's menu is displayed, an item can be added by clicking on it. After the order is finalized it can be sent to the manager to process the order.

BOOKING

Using this feature, customers can book any vacant table upon selecting a restaurant. A sitting chart opens upon selecting a restaurant and booking table option, It displays a seating chart with vacant tables indicated with green and
red else.

MY CART

Using this feature, the customer can view and edit the items in his order currently before finalizing the order. Users can also cancel the order before it's completely processed.

MENU

Using This feature allows customers to see all the dishes offered by a restaurant upon selection where he/she can place an order.

DELIVER

Using This feature allows customers to enter the address to deliver the food items they have ordered from the restaurant.

PAYMENT

This feature allows customers to pay online using credit cards or debit cards or UPI’s. Upon processing of the payment, the customer's order will be processed and will be ready for delivery.

HELP REQUEST

Using This feature allows customers to request help when they are stuck while ordering or in general while using the app.

ORDER TRACKING

Using this feature, customers can see where the food is at the moment using GPS tracking with the delivery assistant.

FEEDBACK

Using this feature, customers can give feedback to any restaurant.

4.1.System_Manager_Feature

Description and Priority

This is the section for controlling, reviewing, and customizing the software. It is to be accessed by the restaurant owner, with special permissions.

Stimulus/Response Sequences

This section depends on other parts of the software to get data and perform further processing. This feature has unique access to different features i.e. user classes, and product classes. It takes responses from different classes and sends them to generate analytics. Further, it also relies on GUI, Databases, and Cloud Computing APIs to complete the process.

Functional Requirements

LOGIN

This function allows managers with appropriate permissions to View/ Edit/Modify records in different categories. This function needs to perform data verification. It must handle requests if wrong information is entered and show proper messages.

LOGOUT

Before execution of this function all dependencies/ Current going tasks need to be saved or any warning should be generated for anyongoing process. Then perform a final call for the logout process.

SEARCH FACILITY

Using this method, managers can search using tags implemented in different classes, for products, any user grievances, ratings of specific products, read reviews, and some other kinds of searching.

PRODUCT ACCESS

This function provides a facility to access the attributes of the product class. Managers can modify, add, and remove product details at different levels of access.

INVENTORY MANAGEMENT

This include a few functionalities that include viewing status of inventory, items that are ordered for inventory, addition/ deletion of items for new dishes, approving item order requests, changing the quality of items etc. All these functions might not be accessible to all managers but only to those who are given privilege.

CUSTOMER REVIEW

Managers can view profiles of customers, and their order details. a manager can differentiate between different types of users based on their requirements, utility, cooks/chefs, normal customers, bulk clients, online customers.

RESTAURANT INFORMATION MANAGEMENT

The manager manages all the information about the restaurant. Only the Manager can edit basic details, display any information, and modify the permissions of different users. This is an automatic function and highly secured, only accessible to a very few.

BILLING

As any order gets completed a copy of the digital invoice is available to the manager in the database for log management. This billing should also have a dependency on the product, user, and payment services to synchronize. Different categories of data need to be fetched from this bill to generate analytics.

DISCOUNT

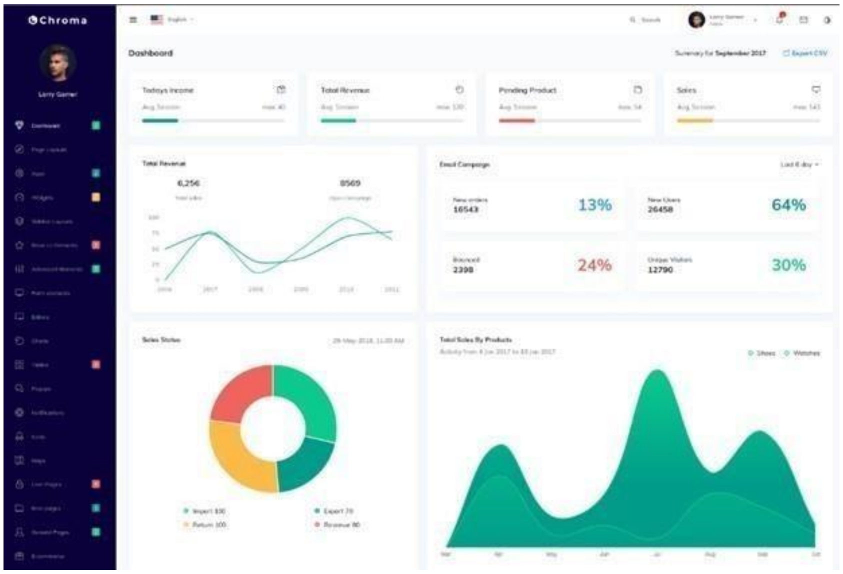
This function can access different products, and user categories to modify final rates while billing. This is required to provide special discounts.

PAYMENT SERVICES

This function manager can get reports of current payments, also able to approve any payment request, and add, remove, and edit services.

ANALYTICS AND DASHBOARD

This function fetches data from MYSQL database servers to generate analytics. Also modifies the UI of the manager as per data.
This function can also generate customized reports at the request of the manager.



A prototype of manager screen

3. System_Admin_Feature

1. Description and Priority

This is the section for controlling, customising, and getting the overall performance state of the software. It is to be accessed by the administrator,with special permissions.

2. Stimulus/Response Sequences

This section enables all the other sections to run smoothly and also providesthe required access to them.

3. Functional Requirements ADD/REMOVE RESTAURANTS

This feature allows the admin to add any new restaurants uponrequest and also can delete any existing restaurant from the application if reviews are bad upon customer feedback given to therestaurant.

MONITOR ACTIVITY OF RESTAURANTS

This feature allows the admin to view the activity of the restaurant if required.

VIEW USER FEEDBACK

This feature allows the admin to view user feedback to decide upon the deletion of a restaurant from the application if required.

DATABASE

This feature allows the admin to add, modify, and extend the database according to the requirements of the restaurants. Also, provide required access to the restaurant managers.

MANAGER ALLOTMENT AND PRIVILEGE

This feature allows the admin to add and modify the managers that are on duty and also change the rights or privilege that they have. Some managers might have the analytics part some may concern with payment services and discounts while others deal the inventory management. One manager can have different roles.

APPLICATION MANAGEMENT

This feature allows the admin to modify, develop and maintain the application so that the application would not crash.

5. Other Nonfunctional Requirements

The Software is designed for many arbitrary customers using many different devices, who cannot be trained on the application functionalities.
Hence nonfunctional requirements such as usability and adaptability are as crucial for the application as the functional requirements. In this safety, Security, Software Quality Attributes, and Business Rules are the most critical non-functional requirements arediscussed in detail below.

5.1. Performance Requirements

The Software must be interactive, and the delay involved must be minimal. So, in every action response of the software, there is an immediate no delay. In scrolling through the menu, there should be no more than 2 seconds delay before the next page of menu items is displayed otherwise our people's dining experience will be affected. The order should be placed in Pending Orders and should be visible to theRestaurant's manager in less than 1 second to start preparation. Orders should be canceled/updated with little delay to avoid delivery delays. Also, successfulconnection delay should be low for effective real- time communication when connecting to a database (MySQL) server.

5.2.Safety Requirements

The software is completely environment-friendly and does not cause any security breaches. The menu will have a flexible font that can be zoomed in so as not to strain the eyes too much. The system shall be capable of restoring itself to its previous state in the event of failure (e.g. a system crash or power loss)

5.3. Security Requirements

Security is an important aspect of software; Proper and encrypted login authentication is required for restaurant manager and admin, as information regarding orders,analytics and menu prices should be protected from hacking. Data should be securely transmitted to the database without any changes to the data to avoid hassles in ordering and billing. All online payments need to be secured.

Wireless communication throughout the system will be encrypted using SSLv3 at the application layer and WPA2-PSK at the data link layer. The WPA2-PSK password used for wireless communication must have a bit-strength of at least 80 bits.The WPA2-PSK password used for wireless communication must be changed every three months.

5.4. Software Quality Attributes

Availability:

It’s needed to ensure that the system is up and running for most of the time and the database server is not down for more than a few minutes to avoid inconvenience of the customers. Fault tolerance must be considered in the system design so that the system is up and running without too much downtime. Service maintenance should be provided regarding system uptime in case of failure to ensure availability.

Adaptability:

As consumers are not tied to a specific device or operating system to use mobile applications, adaptability becomes an important requirement. The design should work on multiple smartphone devices such as iOS, Android, Windows, or Symbian with different screen sizes and resolutions. Therefore, the adaptability of the application to multiple devices is a key criterion for design and testing during the implementation phase.

Usability:

The customer’s view must be designed in a way that it is intuitive to use and self-explanatory across multiple devices. At the same time, the design should be simple and fast as the key measure of success is to reduce the order processing time. A complicated system with many screens or many scrolls up and down would defeat the purpose of the software.

Correctness:

The bill generated by the application must be accurate and the orders placed should exactly be the same which the user has selected.

Flexibility:

If need arises in the future, software can be modified to change the requirements.

Interoperability:

The data is transferred from the customer’s end to the Manager and then he assigns orders to the chef. This way data is transferred from one part of the system to another.

Maintainability:

Software can be easily repaired if a fault occurs.

Portability:

Software can be easily installed on devices and would run smoothly according to the requirement.

Reliability:

No matter how many orders are placed, the system must give the

correct results.

Reusability:

Current version can be used in the future versions
with more functionality added.

Robustness:

Software must have checks to ensure that the items that are not available in the menu cannot be selected and the emails, phone numbers added are all valid.

Testability:

All the requirements are fulfilled, response time is low, and all functions are working perfectly.

5.5. Business Rule:

Manager has access to perform add, delete, update operations on the database for Menu change or adding items in inventory. Customers can place orders from the list of available items and can update orders and pay bills.