

# **UNIVERSITY OF CALCUTTA**

**B.Sc COMPUTER SCIENCE (HONOURS)**

**(UNDER CBCS)**

**PROJECT WORK**

**ZWK : ZERO WASTE KITCHEN**

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**PREPARED**

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# CERTIFICATE

This is to certify that the project entitled "*ZWK:ZERO WASTE KITCHEN*" has been done and submitted successfully by Suman Ram Kanu (Roll No.: 203144-21-0032) and Sougata De (Roll No.: 203144-21-0035), as part of their University of Calcutta curriculum for the 3-year undergraduate degree course in B.Sc. Computer Science (Hons.), under the guidance of Smt. Susmita Koner, presented for the 6th semester examination of the courses CMSA-CC-6-13-P & CMSA-CC-6-14-P, held on 3rd August, 2023. Furthermore, this is an original piece of work, and meets all the necessary criteria, to be accepted as a project work submitted for a Bachelor's degree programme in Computer Science Honours.

## PROJECT GUIDE

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## **ACKNOWLEDGEMENT**

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## **ABSTRACT**

As per ancient Indian wisdom, food is hailed as nectar, and wastage of food is considered as sin. If we all stop wasting edible food, it would be the equivalent of taking one in four cars off the road. As per one data, the average person in India wastes 137 grams of food every single day. That's 0.96 kg per week or 50 kg per year. In India, 40% of the food is wasted which is equivalent to Rs 92,000 crores a year. So, stopping the wastage of food is one single step that can make our country and planet a better place to live. It is a very easy habit that need a small change in our existing habits of how we consume and store our food. In this project work, we aim at developing an android application, based on waste management, named "ZWK : ZERO WASTE KITCHEN" for all over the world to save food which is being wasted by not being used before expiring . This android application will notify and help people to track the expiry date of the food which is available in their home kitchen, so that they can use it before expiry date.

## INTRODUCTION

Zero Waste Kitchen offers a comprehensive solution to ensure you never let food products go to waste again. Our app provides you with a seamless experience, allowing you to effortlessly add items to your inventory in two convenient ways. You can either scan the barcode of the product with your phone's camera, leveraging our intelligent barcode recognition system to fetch all the essential details. Alternatively, for products without barcodes or if you prefer manual input, you can easily add items by entering the relevant information.

But that's not all! Zero Waste Kitchen goes beyond expiration date reminders. Imagine having a personal chef at your fingertips – our app can also provide you with exciting and mouth watering recipes based on the food products you have in your inventory. Whether it's creating a delightful dish from scratch or using up those near-expiry ingredients creatively, our vast recipe database will help you make the most of your kitchen resources.

Once your food products are added, Zero Waste Kitchen takes care of the rest. Our intelligent system sends you timely reminders before items are about to expire, ensuring you have enough time to consume or plan for replacements. No more forgotten perishables at the back of your fridge or pantry!

Our user-friendly interface makes navigating and managing your inventory a breeze. You can categorize items, search for specific products, and even set preferences for different notification intervals. Say goodbye to the anxiety of consuming expired food, and embrace a more organized and sustainable approach to your kitchen management.

Join us in the mission to reduce food waste while delighting in exquisite culinary experiences. Download Zero Waste Kitchen today and let us help you create a more sustainable and rewarding kitchen journey – one delicious recipe at a time!

# **REQUIREMENT SPECIFICATIONS**

## **SPECIFICATIONS FOR RUNTIME DEVICES**

OPERATING SYSTEM : ANDROID

MINIMUM VERSION OF OPERATING SYSTEM : 24 (ANDROID 7)

MINIMUM RAM : 2GB

## **DEVELOPER ENVIRONMENT**

IDE : ANDROID STUDIO

MARKUP LANGUAGE : XML

PROGRAMMING LANGUAGES : KOTLIN

DATABASE : SQLite

## **PROBLEM UNDERSTANDING**

Food waste is a pressing global issue that continues to exacerbate the challenges of hunger, sustainability, and resource management. One significant contributor to food waste is the expiration of edible items. Across the world, countless tons of food are discarded each day simply because they have reached their expiration dates. This wastage occurs at various stages of the food supply chain, from production and distribution to consumer behaviour.

The wasting of food due to expiration is particularly problematic because it represents a loss of valuable resources, including water, energy, and labour, that were invested in producing that food. Moreover, it contributes to environmental degradation by squandering precious agricultural land and emitting greenhouse gases through the decomposition of organic waste in landfills.

Furthermore, the consequences of food waste extend beyond the realms of economics and the environment. Globally, millions of people suffer from hunger and malnutrition, and yet, a significant portion of the food that could potentially alleviate this problem is discarded due to expiration. This juxtaposition highlights the urgent need to address the issue of food waste and explore sustainable solutions to maximize the utilization of available resources.

In this context, it is crucial to raise awareness about the scale and implications of food waste resulting from expiration. By understanding the causes and consequences of this problem, individuals, communities, and organizations can work collaboratively to implement effective strategies to reduce waste, improve food management practices, and promote a more sustainable and equitable food system.

To combat the wasting of food through expiration, it is essential to adopt a holistic approach that involves stakeholders at every level, from farmers and food producers to retailers, consumers, and policymakers. By implementing measures such as improved food labelling, enhanced storage and distribution systems, educational campaigns, and food rescue initiatives, we can make significant progress in reducing food waste and ensuring that edible resources reach those in need.

In conclusion, the wasting of food due to expiration is a complex global issue with far-reaching implications for the environment, economy, and social welfare. By recognizing the magnitude of this problem and taking concerted action, we can work towards a more sustainable and equitable future, where the valuable resources we allocate to food production are utilized efficiently and no one suffers from hunger due to the unnecessary discarding of edible items.



## **STEPS FOR REDUCING FOOD WASTE**

1. Check out your refrigerator first. Freeze and preserve surplus fruits and vegetables - especially abundant seasonal produce.
2. Before buying food items, we should check the dates like 'use-by, 'best-by, and expiration dates.
3. Storing food properly helps increase the shelf life of the food and reduces food waste. We can store your dry-fruit items in the refrigerator.
4. Unused, nutritious, safe, and untouched food can be donated to food banks to help those in need.

## **KEY FEATURES OF ZWK : ZERO WASTE KITCHEN**

- 1.You don't need to check your refrigerator, you check the items in 'Zero Waste Kitchen' application on your phone.
- 2.You don't need to check dates like 'use-by, 'best-by, and expiration dates of every product you have bought, just enter all details when you buy them and you check them any time all at once.
- 3.If any food-product at our place or refrigerator will be expiring soon the application will notify you.
- 4.The Zero Waste Kitchen application is available at amazon app store.

## **SCOPE OF WORK**

ZWK : Zero Waste Kitchen is an android application designed for food waste management. The application utilizes Camera X for scanning barcode of the product then add the product to notify before it expires. The application also has a recipe unit which shows recipe of the product which is going to expire, so that it can be used before expiring, it shows the recipe by using Youtube API and then parse the response and shows the recipes to user.

# **METHODOLOGY**

## **SOFTWARE REQUIREMENT SPECIFICATIONS (SRS)**

The goal of the requirements analysis and specification phase is to clearly understand the user's requirements and to systematically organize the requirements into a specification document. The Software Requirement Specification (SRS) document is the final outcome of the requirement analysis and specification phase. Zero Waste Kitchen application is basically developed for people or small food stores who have to check their kitchen daily for the food going expired, it notifies before the food gets expired and also suggest recipe for that.

## **PURPOSE**

The primary purpose of the Zero Waste Kitchen android application is to notify people about the food that is going to expire in their kitchen or shop.

## **DATABASE STORAGE**

The android application uses SQLite database to store the food reminders added by the user. The database includes food name, food expiry date and also the barcode number of that food product.

## **EFFICIENT FRONTEND – BACKEND COMMUNICATION**

Zero Waste Kitchen application ensures seamless communication between the frontend and backend components of the application. This efficient communication enhances the overall performance of the android application, providing a smooth user experience.

## **REAL LIFE APPLICATIONS**

The android application can be used by in any kitchen , small food business , any food store or any food organization.

## **FUNCTIONAL REQUIREMENTS**

Functional requirements are those that refer to the functionality of the system, i.e., what services it will provide to the user. The functional requirements section contains information about each of the software's functions, and its corresponding input and output. In our android application the functional requirements are as follows:

### **MAINSCREEN**

INPUT : BARCODE / MANUAL

OUTPUT : ALL ITEMS

### **ALL ITEMS MENU**

OUTPUT : LIST OF ALL ADDED ITEMS AND RECIPE BUTTON

### **RECIPE**

OUTPUT : SUGGESTS 10 RECIPE FOR THAT FOOD.

## **NON-FUNCTIONAL REQUIREMENTS**

In software engineering, a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours. In our software, the non-functional requirements are as follows:

### **USABILITY**

This software provides an easy to use and attractive user interface which helps the user to use and perform a lot of task by only one click. Also this application provides a very clear and understandable error message and notification. And also this application is very much user friendly.

### **PERFORMANCE**

The system shall take as less time as possible to provide service to the user.

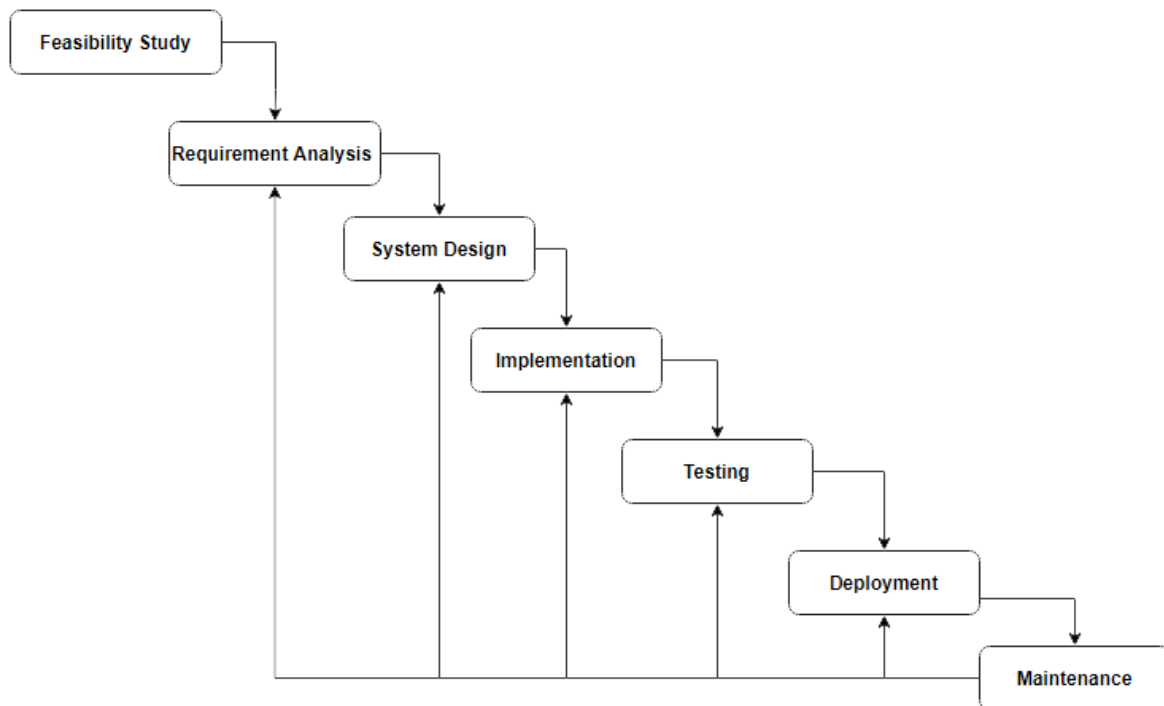
### **DESIGN CONSTRAINTS**

The application is developed using XML. XML provides a smooth and user-friendly platform, it also gives all modern features and extensions.

# SDLC MODEL USED FOR THIS PROJECT

## ITERATIVE WATERFALL MODEL

The Iterative Waterfall Model is a software development approach that combines the sequential steps of the traditional Waterfall Model with the flexibility of iterative design. It allows for improvements and changes to be made at each stage of the development process, instead of waiting until the end of the project.

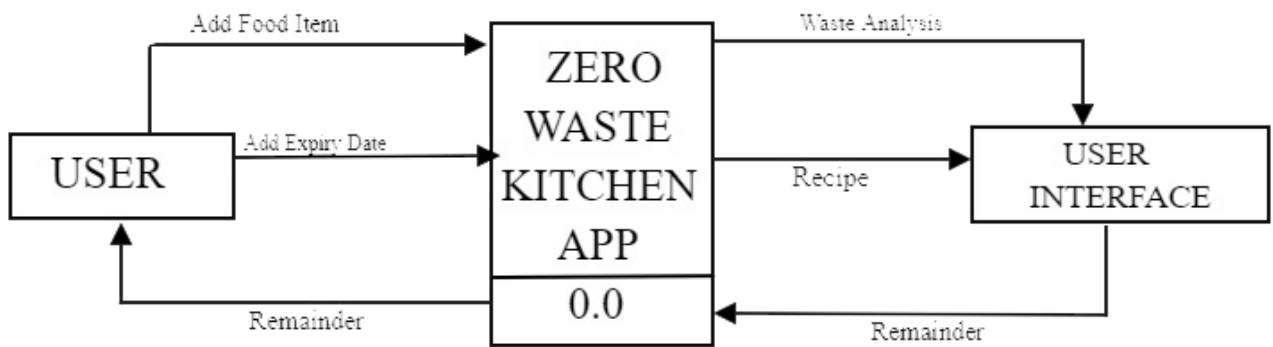


### Advantages of Iterative Waterfall Model :

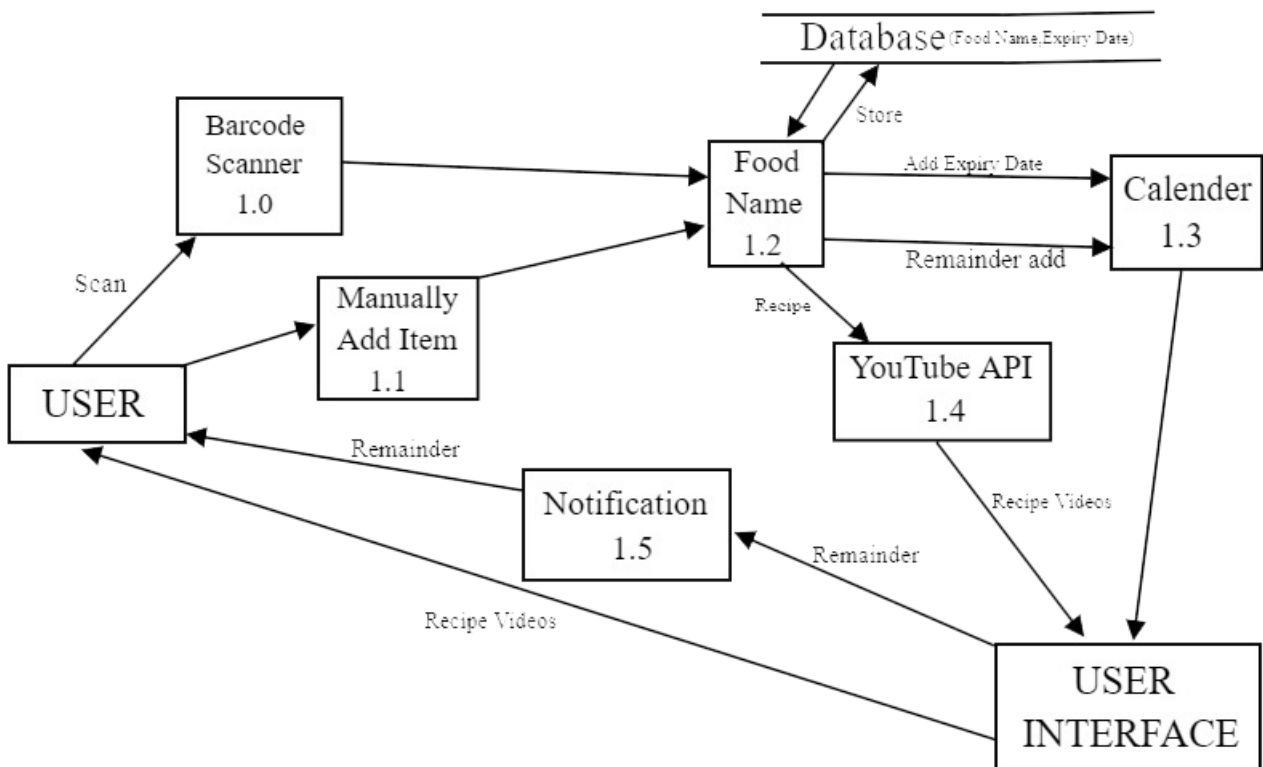
- **Feedback Path –**  
In the classical waterfall model, there are no feedback paths, so there is no mechanism for error correction. But in the iterative waterfall model feedback path from one phase to its preceding phase allows correcting the errors that are committed and these changes are reflected in the later phases.
- **Simple –**  
Iterative waterfall model is very simple to understand and use. That's why it is one of the most widely used software development models.
- **Cost-Effective –**  
It is highly cost-effective to change the plan or requirements in the model. Moreover, it is best suited for agile organizations.
- **Quality Assurance -**  
The iterative approach promotes quality assurance by providing opportunities for testing and feedback throughout the development process. This results in a higher-quality end product.

# DATA FLOW DIAGRAM FOR THIS PROJECT

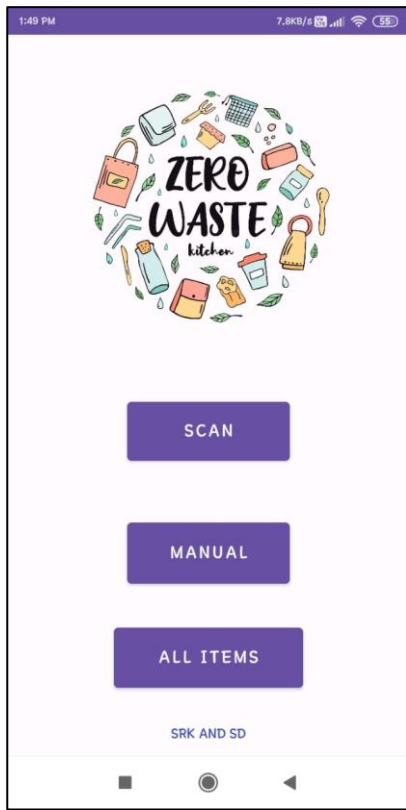
## LEVEL – 0



## LEVEL – 1

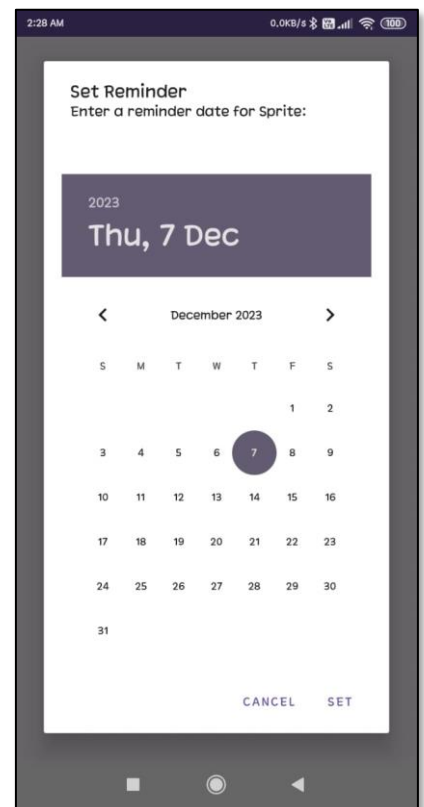
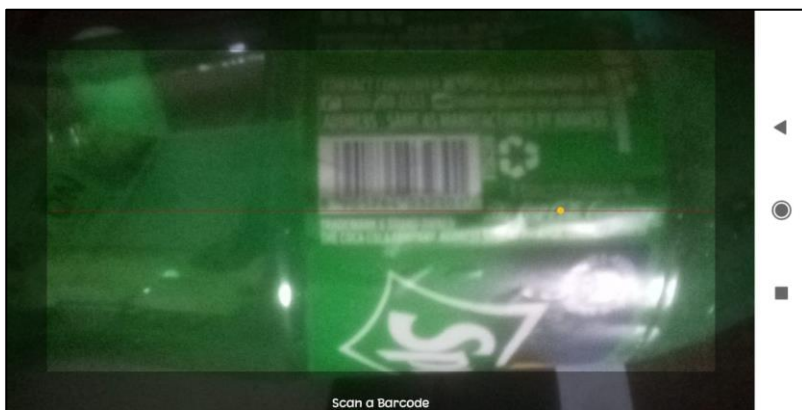


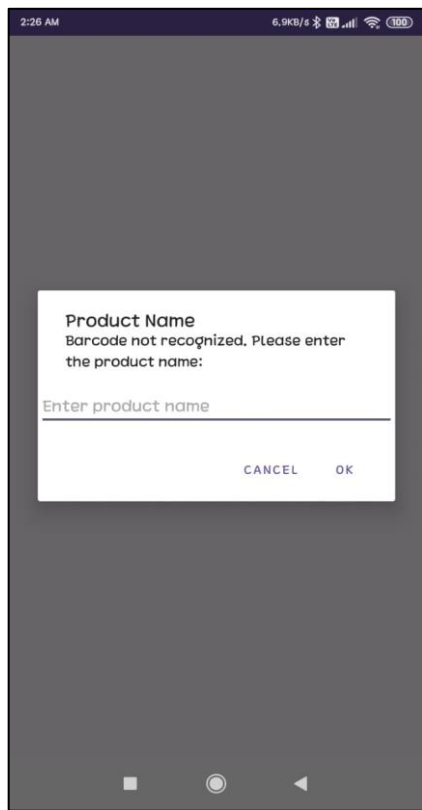
# RESULT AND DISCUSSION



This is the main screen of the application here the user can scan the barcode of the product, enter manually if the product has no barcode or the user can see the all added items.

When user clicks on scan button, it will scan the barcode and give a popup for setting expiry date for that product





When the scanned barcode number is not present in the database , it will ask the user for entering the name of the product and after that it will give a date picker to set reminder.

After the user enters the product name, a date picker will appear to set the expiry date of the product.

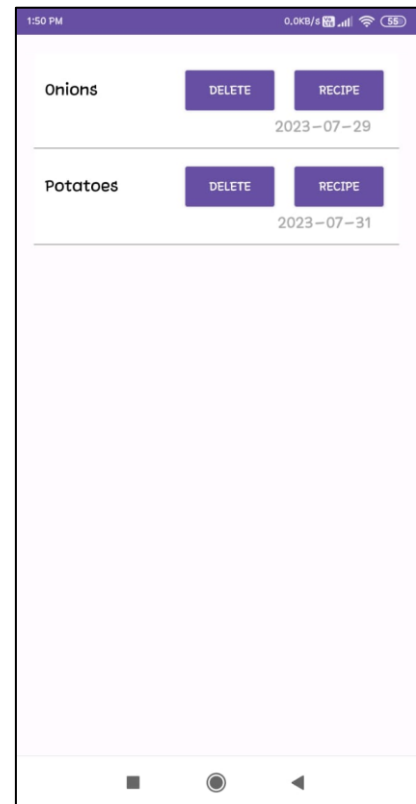


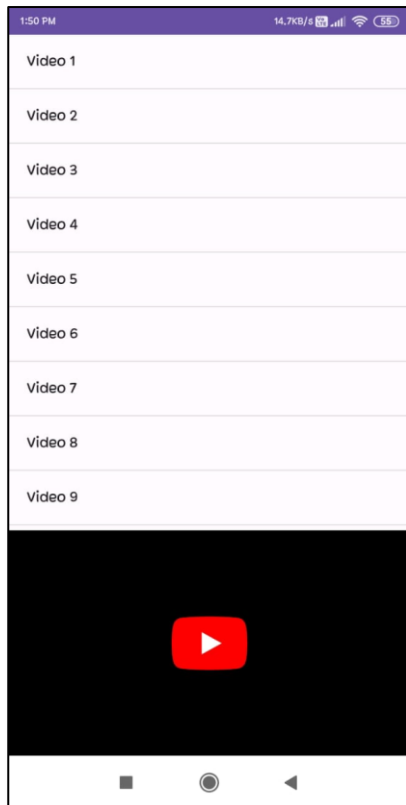




When user clicks on manual button, then the user will be directed to another activity or screen to enter date of expiry of the product and set reminder

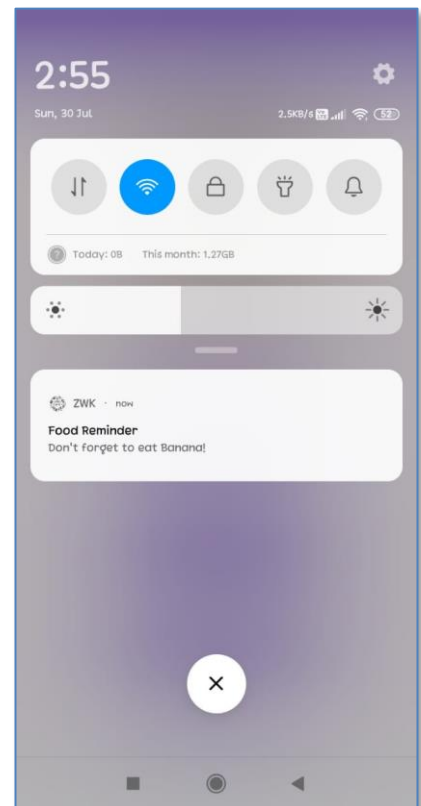
When user clicks on all items button on the main screen, the application will show all the added food items along with a recipe button.





When user clicks on recipe button from the all items menu, the application will show ten recipe videos, which user can play in the application by clicking on video number.

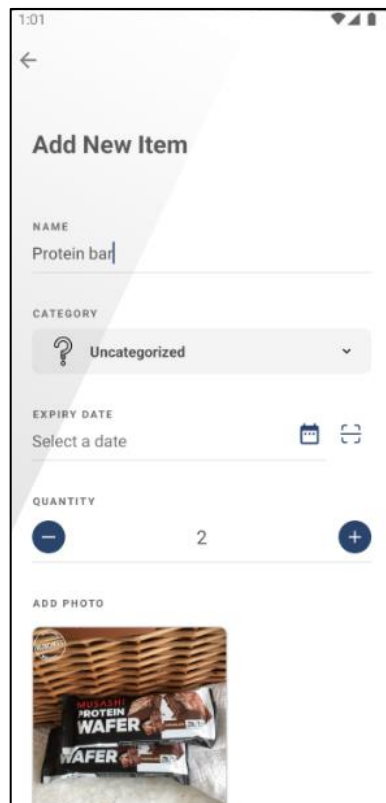
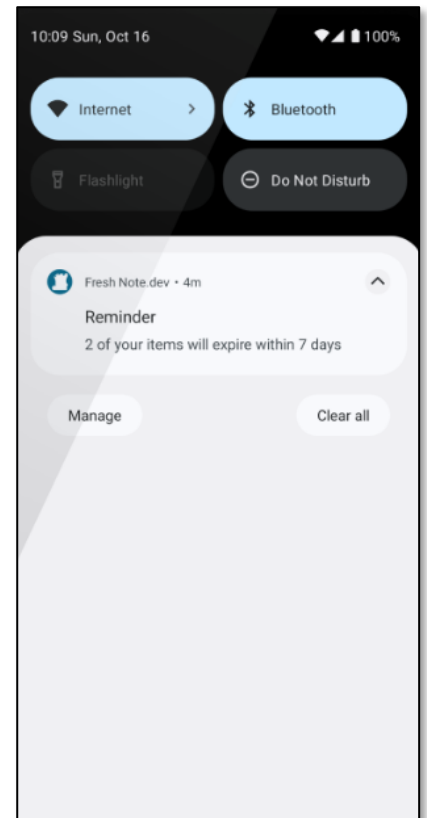
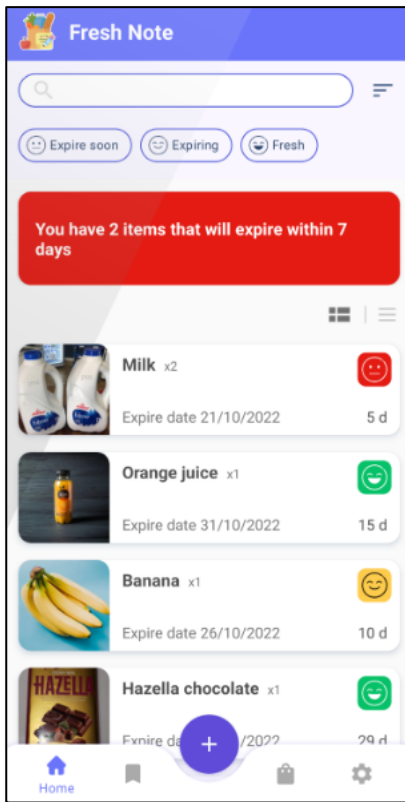
The application notifies the user for using the food which will be expiring soon.



# REVIEW OF RELATED WORK

## FRESH NOTE – EXPIRY TRACKER

Takes notes of grocery goods and track their expiry dates.



**COMPARISON OF ZERO WASTE KITCHEN WITH FRESH  
NOTE EXPIRY TRACKER**

<b>TOPIC</b>	<b>ZERO WASTE KITCHEN</b>	<b>FRESH NOTE – EXPIRY TRACKER</b>
USER INTERFACE	SIMPLE	COMPLICATED
RECIPE	SUGGESTS RECIPE FOR FOOD PRODUCT	DOES NOT SUGGEST RECIPE FOR FOOD PRODUCT
NOTIFICATION	SHOWS PRODUCT NAME	DOES NOT SHOWS PRODUCT NAME

## **CONCLUSION**

Zero Waste Kitchen is an android application that uses XML, Kotlin and SQLite to scan and store the expiry date of food products using their barcodes. The frontend is developed using XML for making a simple and userfriendly user interface. The backend relies on Kotlin which is officially preferred programming language by Google for developing android applications and SQLite as a database. Youtube API is integrated for suggesting recipe videos to the user for a specific food product which the user wants. Zero Waste Kitchen application can be used in any home, kitchen or small business or food shop.

# **FUTURE SCOPE FOR ZERO WASTE KITCHEN APPLICATION**

## **IOS Application Development**

Expanding Zero Waste Kitchen application accessibility by developing a mobile application for iOS platform.

## **NGO collaboration**

A new feature for sharing the food which will be expiring with the NGO. If the user unable to use that food item , then he/she can share that with his/her nearest NGO by using the application.

## **Expansion of supported languages**

Enabling to support various languages help user interaction easier. An user who is not familiar with English he/she can choose his/her preferred language.

## **REFERENCES**

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<https://kotlinlang.org/docs/home.html>

### **Food Waste Management**

<https://corpbiz.io/learning/scope-of-food-waste-management-business-in-india/>