A) Restaurant User Interface

Restaurant Profile Interfaces
- Create Account Page
- Restaurant Profile Editor
- Restaurant Owner Login Page
- Restaurant Owner Summary

Goal and Reward Customization Page

Bingo Board Editor

B) Customer Interface

Customer Profile Interfaces
- Account Creation Interface
- Customer Login Page
- List of Rewards Earned Page
- Compete with Friends Page
- List of Favourite Restaurant Boards Page

Restaurant Information Interfaces
- Restaurant Board Page
- List of Restaurant Boards Page

C) Backend

- Restaurant Profile Frontend Communication
- Goals and Rewards Customization Frontend Communication
- Bingo Board Frontend Communication
- Customer Profile Frontend Communication
- Restaurant Information Frontend Communication

Profile Management
- User Authentication
- User Profile Management
- Restaurant Profile Management
- Customer Profile Management

- Goal Modifier
- Rewards Modifier
- Restaurant Bingo Board Modifier
- Goal and Reward Completion Verification

- Customer Favourites Modifier
- Customer Bingo Board Viewer

Data Access
- Database Communication

D) Database
- Customer Profile Collection
- Game Goals Collection
- Restaurant Profile Collection
- Game Rewards Collection

A) The <u>Restaurant User Interface</u> subsystem contains one subcomponent with multiple components and two independent components. All of these are dependent on the Backend. The subsystem components and dependencies are further explained as follows:

    a) The <u>Restaurant Profile Interfaces</u> subcomponent contains all the interfaces pertaining to the restaurant user's profile. The entire subcomponent is dependent on the Profile Frontend Communication based in the Backend. The subcomponent's components are further explained as follows:

i) The <u>Restaurant Owner Login Page</u> prompts the user to enter their username and password. An error message will appear if the username or password are incorrect.

ii) The <u>Restaurant Owner Summary</u> displays the information as well as provides links to their bingo board and a link to edit their public profile page.

iii) The <u>Create Account Page</u> provides a form in which the new user can add their full name, desired username and password in order to create a new restaurant profile.

iv) The <u>Restaurant Profile Editor</u> provides a form in which the restaurant owner can update their restaurant information.

b) The <u>Goals and Rewards Customization Page</u> allows for a restaurant user to create customized goals and/or rewards that are unique to them. This component is dependent on the Goals and Rewards Customization Frontend Communication component in the Backend.

c) The <u>Bingo Board Editor</u> allows for a restaurant user to edit the setup of their bingo board, including the rewards earned when a customer gets a bingo. This component is dependent on the Bingo Board Frontend Communication component in the Backend.

B) The <u>Customer Interface</u> subsystem contains two subcomponents, each with multiple components. These subsystems are dependent on the Backend. The subsystem components and dependencies are further explained as follows:

a) The <u>Customer Profile Interfaces</u> subcomponent contains all the interfaces pertaining to the customer's profile. The entire subcomponent is dependent on the Customer Profile Frontend Communication based in the Backend. The subcomponent's components are further explained as follows:

i) The <u>Account Creation Page</u> provides a form in which the new user can add their First Name, desired username and password in order to create a new restaurant profile.

ii) The <u>Customer Login Page</u> prompts the customers to enter their username and password. An error message will appear if the username or password are incorrect.

iii) The <u>List of Rewards Earned Page</u> shows the user a list of all the rewards that they redeemed.

iv) The <u>Compete with Friends Page</u> shows the user their ranking in comparison with their friends who use the application.

v) The <u>List of Favourite Restaurant Boards Page</u> displays the boards that the customer has saved in order for them to access easily.

b) The <u>Restaurant Information Interfaces</u> subcomponent contains all the interfaces pertaining to the information of the restaurants using the application. The entire subcomponent is dependent on the Restaurant Information Frontend

Communication based in the Backend. The subcomponent's components are further explained as follows:

    i)   The <u>List of Restaurant Boards Page</u> shows the user a list of all the restaurant boards that are in progress. A restaurant board that is "in progress" has one or more goals completed.

    ii)   The <u>Restaurant Board Page</u> shows the user an individual restaurant game board.

C) The <u>Backend</u> subsystem contains multiple components and two subcomponents. The subsystem components and dependencies are further explained as follows:

    a) The <u>Profile Frontend Communication</u> allows the Restaurant Profile Interfaces in the Restaurant User Interface subsystem to interact with the Backend.

    b) The <u>Goals and Rewards Frontend Communication</u> allows the Goals and Reward Customization Page in the Restaurant User Interface subsystem to interact with the Backend.

    c) The <u>Bingo Board Frontend Communication</u> allows the Bingo Board Editor in the Restaurant User Interface subsystem to interact with the Backend.

    d) The <u>Customer Profile Frontend Communication</u> allows the Customer Profile Interfaces in the Customer Interface subsystem to interact with the Backend.

    e) The <u>Restaurant Information Frontend Communication</u> allows the Restaurant Information Interfaces in the Customer Interface subsystem to interact with the Backend.

    f) The <u>Profile Management</u> subcomponent contains all the interfaces pertaining to the profiles stored in the database. The entire subcomponent is dependent on the Profile Frontend Communication, Goals and Rewards Frontend Communication, Bingo Board Frontend Communication, Customer Profile Frontend Communication, Restaurant Information Frontend Communication, and Database Communication components in order to update and maintain the profiles of the application users. The subcomponent's components are further explained as follows:

        i)   The <u>User Authentication</u> component allows for the verification of inputted usernames and passwords.

        ii)   The <u>User Profile Management</u> component allows for users in general to modify their account information.

        iii)   The <u>Restaurant Profile Management</u> component allows for restaurant owner users to modify their restaurant profiles; these modifications include changes to the goals and rewards they want to offer. This component inherits from the User Profile Management. This component is dependent on the Goal Modifier, Rewards Modifier, Restaurant Bingo Board Modifier and Goal and Reward Completion Verification components as they are features that the restaurant owner users have access to.

iv) The <u>Customer Profile Management</u> component allows for customers to modify their friend lists as well as access goals and rewards. This component inherits from the User Profile Management. This component is dependent on Customer Favourites Modifier and Customer Bingo Board Viewer as they are features that the customer users have access to.

g) The <u>Goal and Reward Completion Verification</u> component allows for restaurant owners to verify if a goal is completed by a customer, or if a reward is valid and redeemed by a customer.

h) The <u>Goal Modifier</u> component allows for restaurant owner users to add, edit, or delete custom goals.

i) The <u>Reward Modifier</u> component allows for restaurant owner users to add, edit, or delete custom rewards.

j) The <u>Restaurant Bingo Board Modifier</u> allows for restaurant owner users to edit their public bingo boards, such as changing the contents, the size or the expiration date.

k) The <u>Customer Favourites Modifier</u> component allows for a customer user to save any of the restaurant bingo boards as a favourite so that they can access easily.

l) The <u>Customer Bingo Board Viewer</u> component allows for a customer user to view a restaurant bingo board as well as their progress for goals, goals they need to complete to receive rewards, rewards they have achieved, QR codes for goals to verify, and QR codes for rewards to redeem.

m) The <u>Data Access</u> subcomponent contains the component related to accessing data from the database. This subcomponent is dependent on the Database subsystem so that it can communicate with the database components as well as the Profile Management so that it can update the information in the database.

    i) <u>Database Communication</u> allows for the Backend to communicate with the Databases.

D) The <u>Database</u> subsystem contains multiple components. The Database is dependent on the Database Communication in the Backend subsystem. The components are as follows:

a) The <u>User Account Database</u> stores user account information such as password and username.

b) The <u>Restaurant Profile Database</u> stores restaurant information such as name of the restaurant, the username associated with the restaurant, the restaurant goals, and the restaurant rewards.

c) The <u>Game Goals Database</u> stores the premade goals used for the bingo loyalty game.

d) The <u>Games Rewards Database</u> is used for storing rewards for the bingo loyalty game.

e) The <u>Customer Profile Database</u> is used for storing customer user information such as username, active game boards, goals completed, rewards earned, and friends' usernames.

Changes to System Components
For this deliverable, we introduced a new subcomponent called Data Access to contain the Database Communication component. This new subcomponent decouples the Database Communication from Profile Management and allows for it to be related indirectly. In addition, it allows for future components related to data access to be introduced without affecting the other components directly. However, this subcomponent is still a part of C)Backend as it resides in the backend of our system. Also, we changed the names of the Login Interface in A)Restaurant User Interface and Login Page in B) Customer User Interface to Restaurant Owner Login Page and Customer Login Page to help distinguish the two interfaces. We changed the names and kept them separate because even though they are very similar they function differently and belong to different subsystems. In addition, we added new components such as the Goal Modifier, Rewards Modifier, Restaurant Bingo Modifier for which Restaurant Profile Manager is now dependent on, and Customer Favourites Modifier and Customer Bingo Board Viewer for which Customer Profile Manager is dependent on. We also combined the Goal and Reward Completion Verification as they function the same.

Minimizing Coupling & Maximizing Cohesion
In Deliverable 3, the frontend components all shared the same backend communication, both on the A) Restaurant User Interface and the B) Customer Interface. In Deliverable 4, we decoupled these features by creating more specific backend communication components. That is, each feature has its own backend communication. Thus, we minimized coupling in our current system diagram.

We introduced the subcomponents to group together similar components. For example, we introduced the Profile Management subcomponent in the C) Backend which contains the components User Authentication, User Profile Management, Restaurant Profile Management, and Customer Profile Management. These components are all grouped together since they relate to the management of profiles in the system. In addition, User Profile Management serves as a parent component, while Restaurant Profile Management and Customer Profile Management inherit from it. Thus, with the introduction of subcomponents with some inheritance, we maximized cohesion in our current system diagram.