Chapter 23

Design of UML Diagrams for AAROGYA SETU – Health Care APP

23.1 Problem Statement

Coronavirus pandemic is spreading in large numbers. Experts suggest that social distancing has been used for a long time as one of the methods to reduce the spike in diseases and infectious illnesses. In India alone, the cases have sharply spiked up in the past two weeks, which has led to imposing even tougher measures. By identifying 'hotspots', necessary mapping can help deal with the problem of community transmission, i.e., when cases start

Spreading within the population in such a way that people don't know how they were exposed to the contagion. This is known as 'Stage 3' of an outbreak. The Aarogya Setu app, which is a coronavirus tracker of sorts works on the basis of contact tracing and can help a user identify possible coronavirus 'hotspot' around his or her area. It can help people stay safe and adopt necessary precautions in some areas where there are cases and accordingly, help stop or prevent community transmission to an extent. On the basis of geotagging, it can also alert a specific user about their proximity to a nearby infection case or hotspot. The app also helps users self-identify their risk and monitor their health assessment, considering the times when it can get difficult (and most of all, is not particularly safe to step out and visit health clinics).

Aarogya Setu app also helps people identify the symptoms, alert them about the best safety precautions and other relevant information concerning the spread of COVID-19. While this is a noble initiative, the app also lists down basic quarantine measures for those who are considered to be in the 'high-risk' category. It can also help people, who have had a travel history self-quarantine and prevent any risk of transmission (Figures 23.1–23.8).

DOI: 10.1201/9781003287124-23

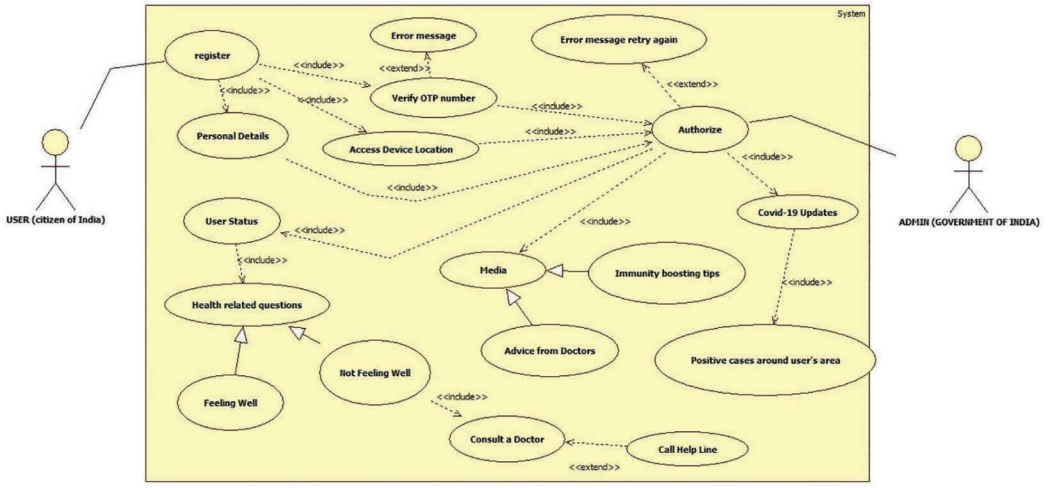

Figure 23.1 UML usecase diagram.

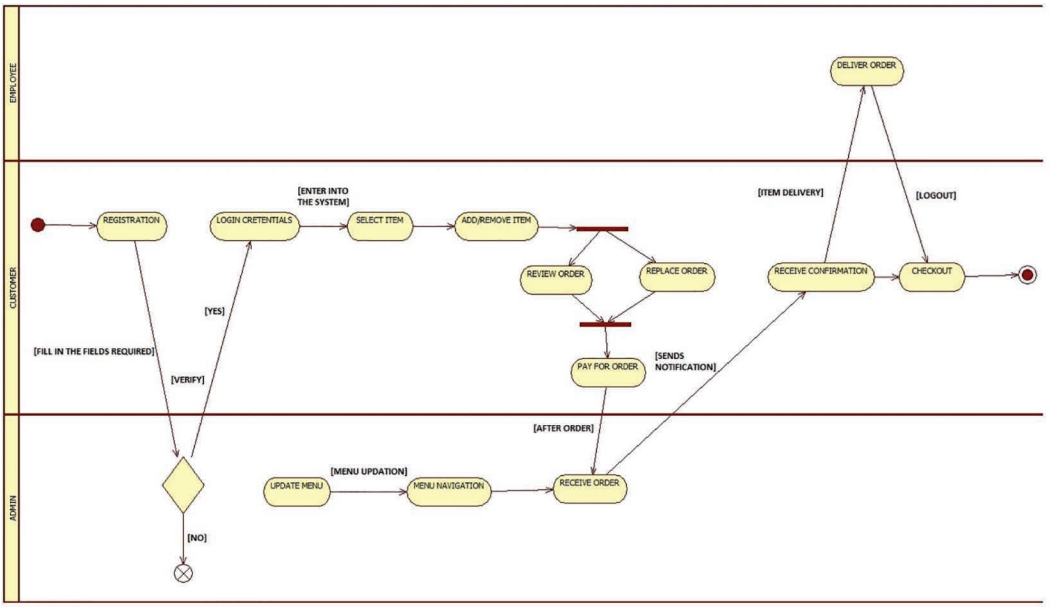

Figure 23.2 UML activity diagram.

23.2 UML Diagrams

Actor Specification

1. **User** – User has to register by giving personal details and the verification process.
2. **Admin** – Admin provides authorization to the user by the verification process.

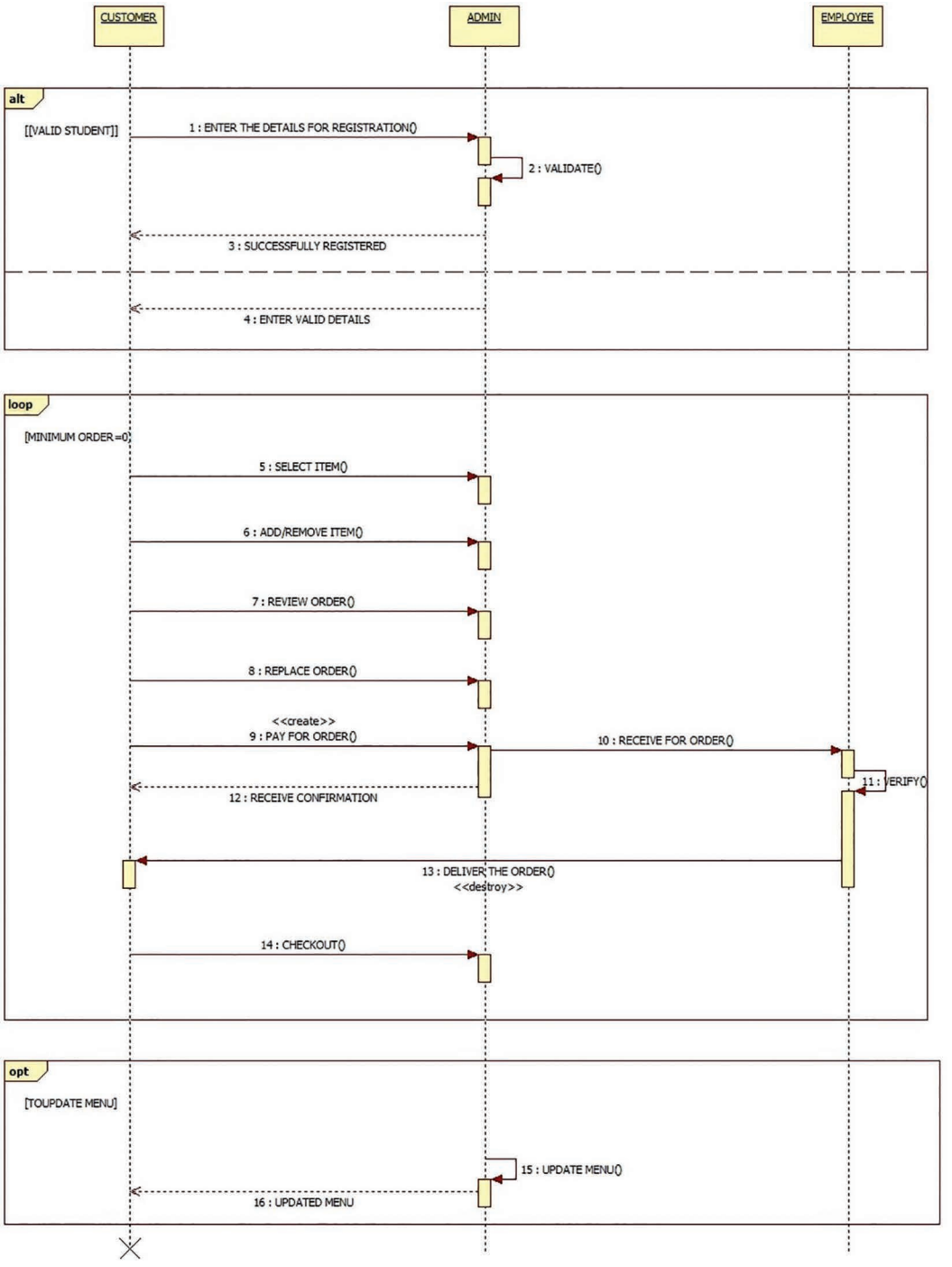

Figure 23.3 UML sequence diagram.

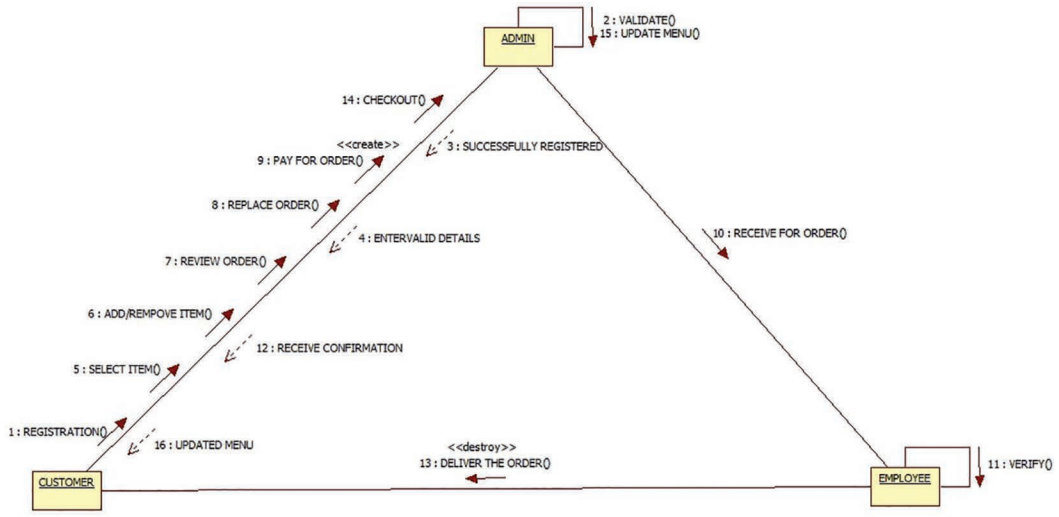

Figure 23.4 UML collaboration diagram.

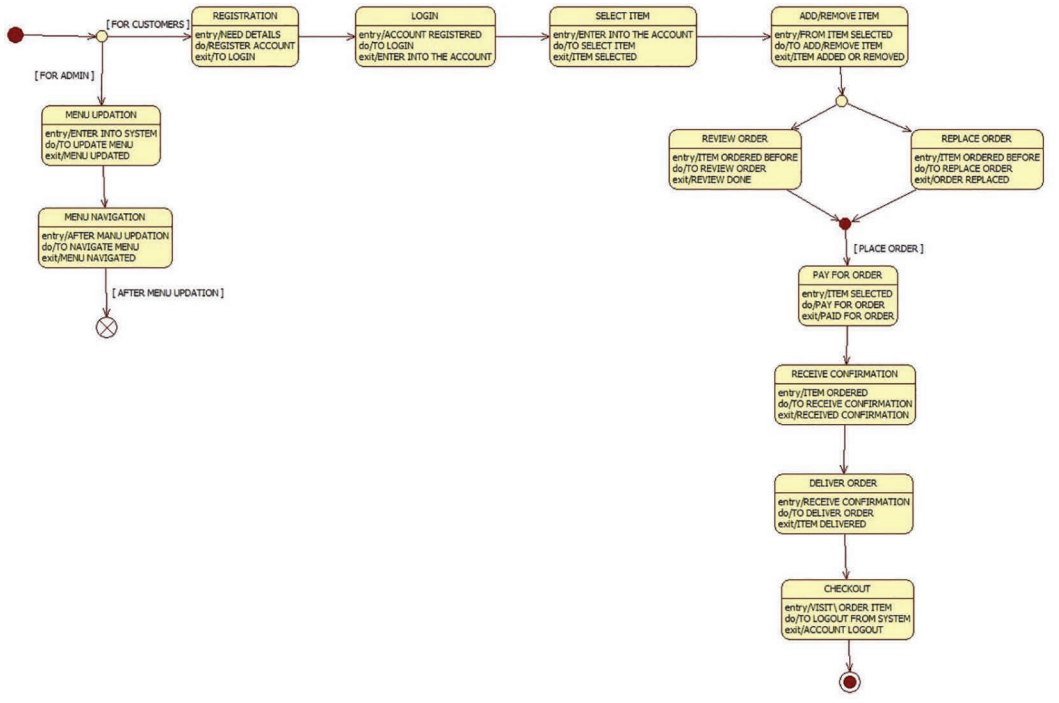

Figure 23.5 UML state machine diagram.

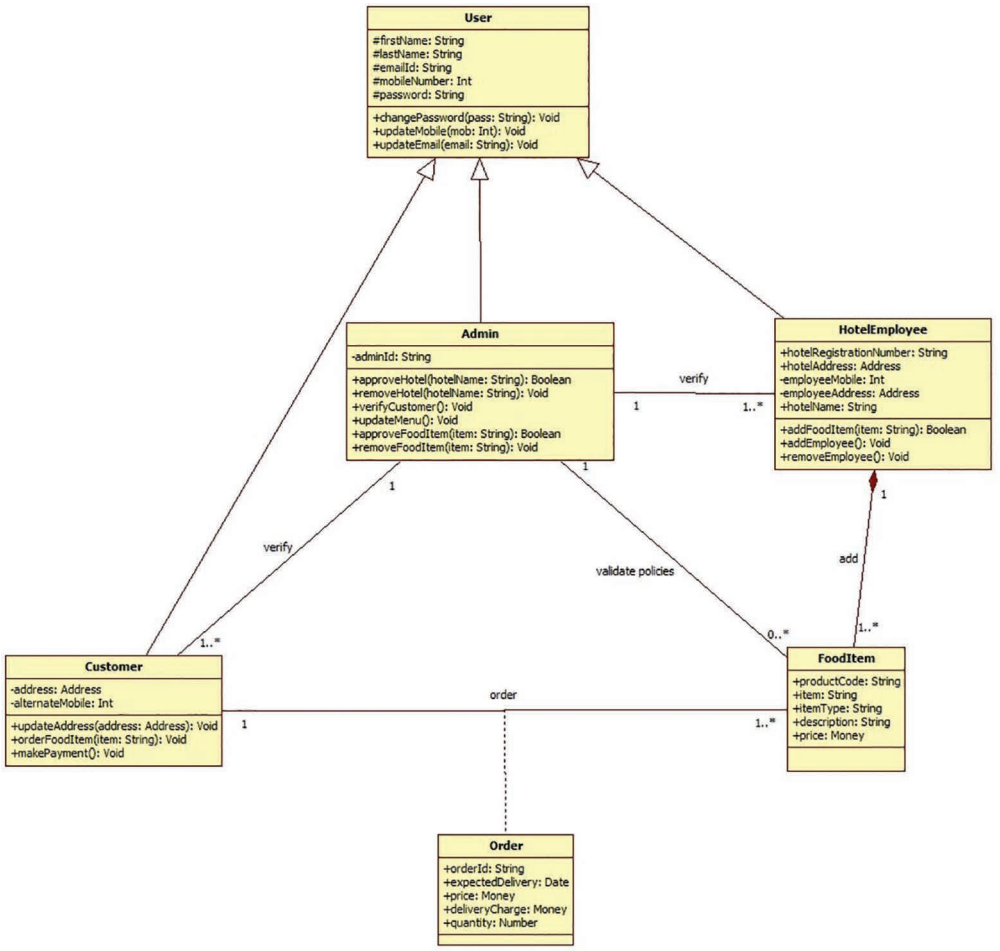

Figure 23.6 UML class diagram.

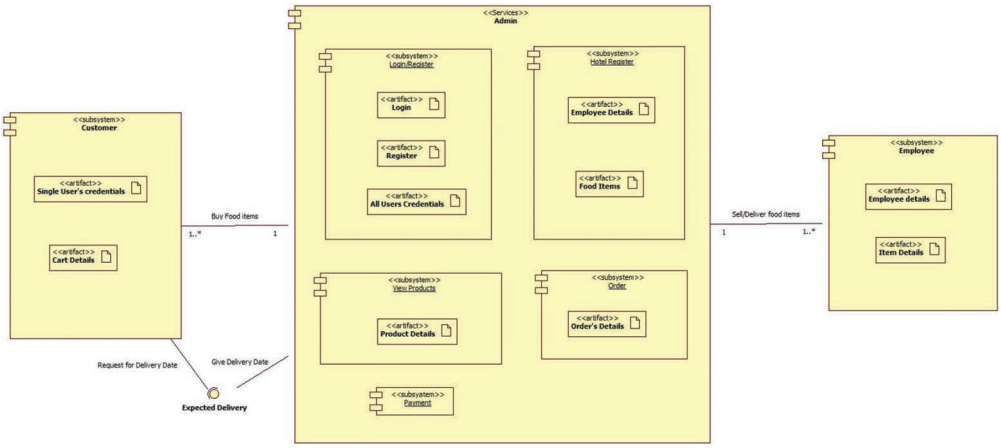

Figure 23.7 UML component diagram.

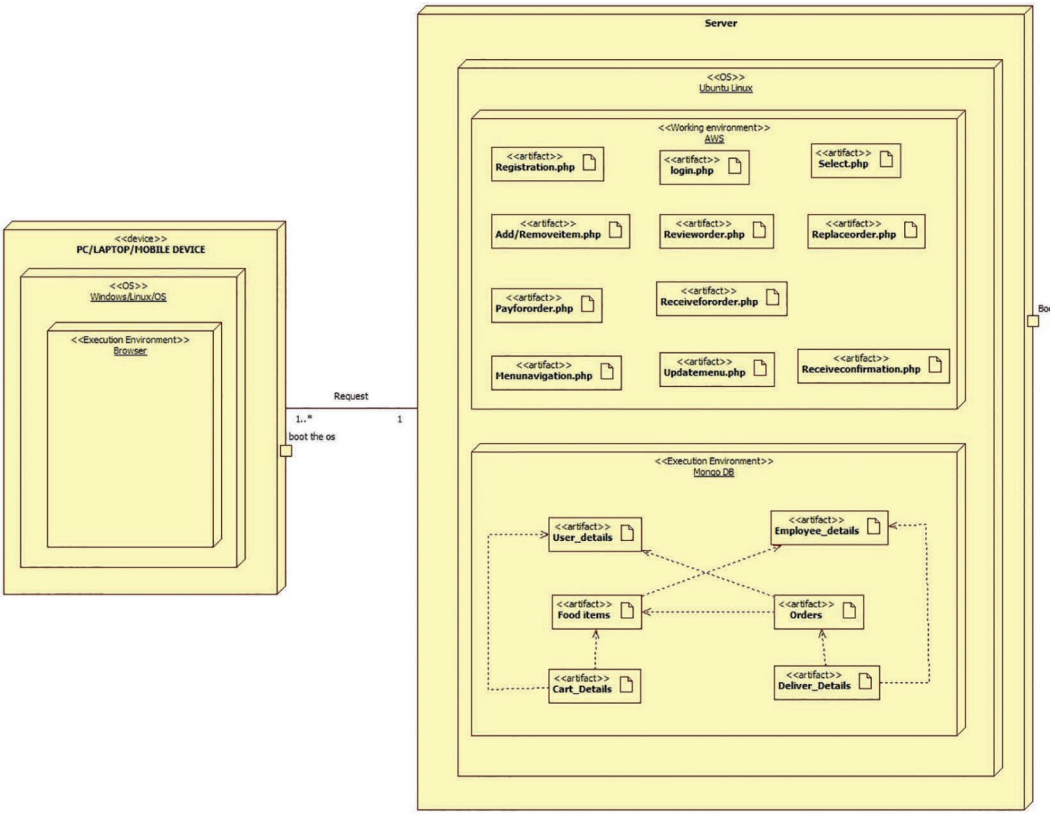

Figure 23.8 UML deployment diagram.

Usecase Specification

1. **Register**
   Description: User should register to get access to the application.
   Flow of Events
   Basic Flow: Allows user to undergo the verification process.
   Pre-Conditions: User should be the citizen of India.
   Post-Conditions: Providing proper details and verification process.
2. **Verify OTP Number**
   Description: User should enter the OTP number provided by the system for the verification process.
   Flow of Events
   Basic Flow: Allows user into the system after getting authorized by the admin.
   Alternate Flow: Displays error message if the user has entered an incorrect OTP number.
   Pre-Conditions: Nil.
   Post-Conditions: Nil.
3. **Access Device Location**
   Description: The user must turn on his/her device location and accept the terms and conditions of the application.
   Flow of Events

Basic Flow: Allows user into the system after getting authorized by the admin.
Alternate Flow: Displays error message if the location is not turned on.
Pre-Conditions: Users location should be in India.
Post-Conditions: Nil.

4. **Personal Details**
   Description: Users should provide all the necessary personal details asked by the system.
   Flow of Events
   Basic Flow: Allows user into the system after getting authorized by the admin.
   Alternate Flow: Displays an error message if the provided details are wrong.
   Pre-Conditions: Nil.
   Post-Conditions: Nil.
5. **Error Message**
   Description: If the entered user's OTP number is wrong.
   Flow of Events
   Basic Flow: Gets out of the system.
   Alternate Flow: Nil.
   Pre-Conditions: User should enter the correct OTP number.
   Post-Conditions: Nil.
6. **Authorize**
   Description: Admin authorizes the user into the system after the verification process.
   Flow of Events
   Basic Flow: Allows into the system.
   Alternate Flow: Displays an error message if the verification process gets failed.
   Pre-Conditions: Verification process should be done correctly by the user.
   Post-Conditions: Nil.
7. **Error Message Retry Again**
   Description: If the admin did not authorize the user, users should retry again.
   Flow of Events
   Basic Flow: Gets out of the system.
   Alternative Flow: Nil.
   Pre-Conditions: Authorization should be done properly.
   Post-Conditions: Nil.
8. **User Status**
   Description: To check the users' health conditions.
   Flow of Events
   Basic Flow: Allows user to take a self-analysis test.
   Alternate Flow: Nil.
   Pre-Conditions: The admin should authorize the user.
   Post-Conditions: User should answer the health care questions correctly.
9. **Media**
   Description: The System provides the users with advices, healthcare tips and trending videos.
   Flow of Events
   Basic Flow: Allows user too many categories of videos provided by the system.
   Alternate flow: Nil.
   Pre-Conditions: The admin should authorize the user.
   Post-Conditions: Nil.

10. **Covid-19 Updates**
    Description: The system provides the users with a daily number of positive cases.
    Flow of Events
    Basic Flow: Allows users to know the number of cases around their area.
    Alternate Flow: Nil.
    Pre-Conditions: The admin should authorize the user.
    Post-Conditions: Nil.
11. **Health-Related Questions**
    Description: The user should answer the health care questions in order to check their health condition.
    Flow of Events
    Basic Flow: Splits the users into feeling well and not feeling well categories accordingly.
    Alternative Flow: Nil.
    Pre-Conditions: The admin should authorize the user.
    Post-Conditions: If the user is not feeling well, he/she should consult a doctor.
12. **Feeling Well**
    Description: The system provides the users with the output of the self-analysis test as feeling well.
    Flow of Events
    Basic Flow: Nil.
    Alternative Flow: Nil.
    Pre-Conditions: The users must take the self-analysis test.
    Post-Conditions: Nil.
13. **Not Feeling Well**
    Description: The system provides the users with the output of the self-analysis test as not feeling well.
    Flow of Events
    Basic Flow: Suggests users to consult a doctor.
    Alternative Flow: Nil.
    Pre-Conditions: The users must take the self-analysis test.
    Post-Conditions: Nil.
14. **Consult Doctor**
    Description: If the users are not feeling well, the system suggests the users to consult a doctor.
    Flow of Events
    Basic Flow: Suggests users to call healthcare members.
    Alternative Flow: Nil.
    Pre-Conditions: The users must take the self-analysis test.
    Post-Conditions: Nil.
15. **Call Helpline**
    Description: In case if the users are not feeling well, the system suggests the users to call helpline.
    Flow of Events
    Basic Flow: Nil.
    Alternative Flow: Nil.
    Pre-Conditions: The users must take the self-analysis test.
    Post-Conditions: Nil.

16. **Advice from Doctors**
    Description: The system provides the users with many advising videos of doctors.
    Flow of Events
    Basic Flow: The system provides many health-related videos to the users.
    Alternative Flow: Nil.
    Pre-Conditions: The admin must authorize the user.
    Post-Conditions: Nil.
17. **Immunity-Boosting Tips**
    Description: The system provides many immunity-boosting tips to the users.
    Flow of Events
    Basic Flow: Nil.
    Alternative Flow: Nil.
    Pre-Conditions: The Admin must authorize the user.
    Post-Conditions: Nil.
18. **Positive Cases around User's Surroundings**
    Description: The system provides the number of positive corona cases around users' area.
    Flow of Events
    Basic Flow: Nil.
    Alternative Flow: Nil.
    Pre-Conditions: The admin should authorize the users.
    Post-Conditions: Nil.