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SUBMISSION 1

TEAM 1

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1. Introduction

a. Problem Statement

KFUPM residents have had complaints about the maintenance service that's offered in the university. Complaints included:

Long waiting times for service. Whenever a resident reports a problem to the maintenance department it takes a long duration of time for the service to arrive and it leaves the resident unhappy with the experience. That can be especially frustrating if it's an urgent request such as water leakage or malfunctioning AC.

Unsatisfactory fixing of problems and overall poor service. More often than not the handling by the maintenance department of resident requests is not optimal. Either the problem is left unfixed or future problems occur due to poor service.

Lack of clarity on how to specifically report or describe problems. Residents have had difficulties with reporting problems that they face to the maintenance department. That's because they lack technical knowledge about their appliances and furniture. That makes the request harder for the maintenance department as they don't know what and who to send to the resident to fix the problem.

Given these issues that the residents and maintenance department deal with it is clear to see that there's a need for an application that helps them to carry-out maintenance requests.

b. Needs

These are the list of the needs from potential users of the application:

- Reaching the maintenance department quickly to report problems.
- Ability to report problems clearly to the maintenance department by using visual or textual aids and categorization.
- Faster respond to requests.
- Conclusive handling of requests.
- Writing complaints in an easy and efficient way.
- Specifying location of service request.
- Organizing requests to optimize service.
- Providing an overall good experience to the residents.

c. Product Overview

The K-Maintenance system is envisioned to automate the process of communication between the maintenance department, labor and community members. It is intended to make the activities of reporting issues, raising complaints and responding to them more of a seamless and intuitive process, with minimal human interference. Community members will be able to report problems they are facing by selecting the category and providing any additional details with their preferred format, whether it be a textual description, an image or even a video. One of the features of the system provide is the sorting algorithm that calculate the estimated time of arrival of the servicemen, according to the availability of labor and the urgency of the reported issues. Another system feature is the feedback modulo, where

users are able to express their satisfaction level towards the applied service. The system is designed to add many other features in upcoming releases.

2. Product features and user requirements

a. Requirements List

1. The system shall provide multiple maintenance services.
2. The system shall be user-friendly.
3. The system shall be platform independent.
4. The system shall allow the user to use KFUPM ID and password as credentials to login.
5. The system shall allow the user to request maintenance services.
6. The system shall allow the user to track their requests.
7. The system shall display the estimated time of arrival of the serviceman to the user.
8. The system should allow the user to see their previous requests.
9. The system shall allow the user to choose a preferred time for the service.
10. The system should allow the user to rate the service.
11. The system should allow the user to write their feedback about the given service.
12. The system should allow the user to attach images, videos, and documents while making the request.
13. The system should allow the user to select the category of their required service.
14. The system should allow the user to cancel their unhandled requests.
15. The system shall limit the user's requests to one request per category.
16. The system shall reset the limiter after 24 hours of placing the order.
17. The system shall allow the user to re-order their unhandled requests.
18. The system should allow the user to make suggestions to improve the service.
19. The system shall allow the user to issue service complaints.
20. The system may provide troubleshooting tips for small and frequent problems.
21. The system shall allow the user to select from pre-set frequent, common requests.
22. The system shall allow the user to specify the location of the request.
23. The system should display a queue of the number of requests if all the servicemen are busy.
24. The system shall analyze the priority of the request to sort it for the service provider.
25. The system shall allow the serviceman to view the assigned request.
26. The system shall allow the serviceman to confirm request handling.
27. The system shall allow the serviceman to report successful handling of the request.
28. The system shall allow the serviceman to report unsuccessful handling of the request and state the cause of failure.
29. The system shall allow the admin to view incoming requests.
30. The system shall allow the admin to assign requests to the serviceman.
31. The system shall allow the admin to sort requests by priority.
32. The system shall allow the admin to sort requests by time precedence.
33. The system shall allow the admin to sort requests by category.
34. The system shall allow the admin to view and respond to complaints.
35. The system shall allow the admin to view the servicemen ratings.

36. The system shall allow the admin to view the contact information of the user.

b. Requirements Categorization Table

Table 1 Requirements Categorization Table

Requirement Sr.	Brief description	Importance (High, Medium, Low)	Difficulty (High, Medium, Low)
R1	The system shall provide multiple maintenance services like electrical, plumbing and more.	High	Medium
R2	The system shall be user friendly. Simple user interface with multiple ways of interaction.	High	Low
R3	The system shall be platform independent. The system should be available in the web and multiple smartphone operating systems.	High	Medium
R4	The system shall allow the user to use KFUPM ID and password as credentials to login. The KFUPM login system should be integrated into the system.	High	Low
R5	The system shall allow the user to request maintenance services through the application.	High	Low
R6	The system shall allow the user to track their requests. The user can see the flow of the request handling.	High	Medium
R7	The system shall display the estimated time of arrival of the serviceman to the user. The user can see it by viewing request info.	High	Low
R8	The system should allow the user to see their previous requests. The user can access their list of previous requests in the system.	Medium	Low
R9	The system shall allow the user to choose a preferred time for the service. When requesting service, the user shall specify the time of request to avoid being absent in time of request.	High	Low

R10	The system should allow the user to rate the service. The user can rate the service on a scale of 5 stars.	Medium	Low
R11	The system should allow the user to write their feedback about the given service. The user can add comments to the rating of service to further describe their experience.	Medium	Low
R12	The system should allow the user to attach images, videos, and documents while making the request. The user can include attachments in their request from their phone or computer to further explain the problem to the serviceman.	Medium	Medium
R13	The system shall allow the user to select the category of their required service. The user can select from categories when creating service requests.	High	Low
R14	The system should allow the user to cancel their unhandled requests. If the request has not been handled the user can cancel it and it will be removed.	Medium	Low
R15	The system should limit the user's requests to one request per category. The user cannot make more than one request in the same category to avoid spamming.	Medium	High
R16	The system shall reset the limiter after 24 hours of placing the order. The user can make requests in the previously selected category.	High	High
R17	The system shall allow the user to re-order their unhandled requests. If a request is left unhandled the user can re-order it to try to get it done.	High	Medium
R18	The system should allow the user to make suggestions to improve the service through suggestion boxes.	Medium	Low
R19	The system shall allow the user to issue service complaints. The user can raise	High	Low

	complaints to the admin regarding given service.		
R20	The system may provide troubleshooting tips for small and frequent problems through textual help.	Low	Low
R21	The system shall allow the user to select from pre-set frequent, common requests. The user can select from a list of frequent requests for quick request creation.	High	Low
R22	The system shall allow the user to specify the location of the requests by building number, room number.	High	Medium
R23	The system should display a queue of the number of requests if all the servicemen are busy to indicate when's the user service will be sent.	Medium	Medium
R24	The system shall analyze the priority of the request to sort it for the service provider. This will help the admins with assigning requests.	High	High
R25	The system shall allow the serviceman to view the assigned request. The serviceman can check the list of assigned requests to view description and location.	High	Medium
R26	The system shall allow the serviceman to confirm request handling to notify the admin of completed requests.	High	Low
R27	The system shall allow the serviceman to report successful handling of the request to indicate that the request has been handled successfully.	High	Low
R28	The system shall allow the serviceman to report unsuccessful handling of the request and state the cause of failure to indicate that the request has been handled unsuccessfully.	High	Low

R29	The system shall allow the admin to view incoming requests to check the list and manage it.	High	Medium
R30	The system shall allow the admin to assign requests to the serviceman to send service to the users.	High	Medium
R31	The system shall allow the admin to sort requests by priority.	High	High
R32	The system shall allow the admin to sort requests by time precedence.	High	High
R33	The system shall allow the admin to sort requests by category.	High	High
R34	The system shall allow the admin to view and respond to complaints. The admin can manage users' complaints through the application.	High	Low
R35	The system shall allow the admin to view the servicemen ratings to overlook servicemen performance.	High	Low
R36	The system shall allow the admin to view the contact information of the user to contact them in case of users' absence or emergency.	High	Low

3. Stakeholders, Users and User Characteristics

a. Stakeholders, Users, User characteristics

1. Stakeholders
    a. KFUPM administration
    b. KFUPM students
    c. KFUPM faculty members
    d. KFUPM residents
    e. KFUPM Maintenance Department

2. Users

   a. KFUPM Maintenance Department labor
   b. KFUPM community members
   c. KFUPM Maintenance Department administration

3. User Characteristics

a. KFUPM Maintenance Department labor:
   - Low technical knowledge
   - Smart devices with modest abilities

b. KFUPM community members:
   - Average to high technical knowledge
   - Smart devices with average to high abilities

c. KFUPM Maintenance Department administration:
   - Average to high technical knowledge
   - PCs and Smart devices with high abilities

b. User/Functionality Matrix

Table 2 User / Functionality Matrix

User	Main functionalities	Typical Computer Literacy (High, Average, Low)	Typical Educational Level (High school, College degree)	Expected Frequency of System Usage (Several times a day, Daily, Weekly, Monthly)
User	R4-R15 , R17-R19 , R21,R22	High	High school	Weekly
Admin	R29-R36	Average	College degree	Daily
Serviceman	R25-R28	Low	Diploma	Daily

c. Constraints

- The project must be implemented using the simplified Rational Unified Process.
- UML must be used as a modeling language.
- Modeling work must be done on Enterprise Architect.
- MS Project must be used for project management and tracking.

d. Assumptions

- KFUPM Maintenance Department administration is responsible for training labor.
- Existing system that deals with servicemen management (availability, working hours, salary, reward system, etc.)

e. Dependencies

- This system is given the ability by KFUPM ICTC Department to use KFUPM Login System.
- The maintenance department's cooperation in developing the system.
- Sufficient budget to complete the project.

4. System Requirements

a. Use Cases Diagram