

Software Project Management

Assignment 1



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Submitted To:

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Effort Estimation of Mualij

1. User Stories

Each core feature of *Mualij* is broken down into user stories. These stories represent the requirements from an end-user perspective, capturing both user interactions and system responsibilities.

User Authentication and Registration

1. **As a doctor**, I want to register with verification so that only verified professionals can join.
2. **As a user**, I want to log in with my credentials or Google for easy access.

Question and Answer System

3. **As a doctor**, I want to post questions with tags so that I can receive relevant answers.
4. **As a user**, I want to upvote, downvote, and comment on posts to engage with the community.

Post Creation

5. **As a user**, I want to create posts (with text, images, or links) in a community to share relevant information and insights.

AI Model Integration

6. **As a user**, I want to input parameters for heart disease prediction and view the AI-generated results.
7. **As a user**, I want the system to analyze X-ray images for pneumonia detection and provide diagnostic results.

Profile Management

8. **As a doctor**, I want to edit my profile to showcase my expertise.
9. **As a user**, I want to view and manage my activity and profile details.

Community Management

10. **As a user**, I want to create and join communities for specialized discussions.
11. **As a community moderator**, I want to add/remove members and manage content within my community.

Search and Notification System

12. **As a user**, I want to search for posts, doctors, and communities by keywords to quickly find relevant information.
13. **As a user**, I want to receive notifications on new replies or posts in the communities I follow.

Frontend and Backend Development

14. **As a user**, I want an intuitive interface to navigate easily.
15. **As a developer**, I need APIs and a secure database to handle data storage and flow effectively.

2. Assigning Story Points

Each user story is assigned story points based on complexity, estimated effort, and potential risks. We use the Fibonacci sequence (1, 2, 3, 5, 8, 13) for assigning story points.

User Story	Story Points
Register with verification	5
Login with credentials or Google	3
Create posts with text, images, or links	5
Post questions with tags	5
Upvote, downvote, and comment	3
Heart disease prediction input and results	8
Pneumonia detection from X-rays	13
Edit profile details	3
View and manage profile	3
Create and join communities	5
Manage community members and content	8
Search for posts and doctors	5
Receive notifications	8
Intuitive user interface	8
Backend setup (APIs and database)	13

Total Story Points = 95

3. Determine Team Velocity

Velocity is the average number of story points the team can complete per sprint. Based on team experience, we assume a **velocity of 20 story points per sprint**.

4. Calculate the Number of Sprints

Based on the calculations from earlier, we can determine the required number of sprints using the total story points and team velocity. Given that the total story points amount to 95 and the team velocity is 20 story points per sprint, we use the formula:

Number of Sprints = Total Story Points / Velocity per Sprint = $95 / 20 = 4.75$ sprints

Since partial sprints cannot effectively cover all tasks, we round up to 5 sprints to ensure the entire workload is managed within the estimated timeframe.

5. Estimate Effort per Sprint

Each sprint is set at two weeks, with each team member working 40 hours per week. For a team of 3 members:

$$\text{Effort per Sprint} = 2 \text{ weeks} \times 40 \text{ hours/week} \times 3 \text{ team members} = 240 \text{ hours}$$

6. Adjust Effort per Sprint for Overhead

Allow for a 10% overhead to cover non-project tasks, such as meetings, documentation, and other activities, which reduces effective hours:

$$\text{Adjusted Effort per Sprint} = 240 \times 0.9 = 216 \text{ hours}$$

7. Calculate Total Effort

With 5 sprints at an adjusted effort per sprint of 216 hours:

$$\text{Total Effort} = 5 \text{ sprints} \times 216 \text{ hours per sprint} = 1080 \text{ hours}$$

8. Add Buffer for Risk and Uncertainty

To account for potential risks, unexpected delays, or changes in requirements, add a 15% buffer:

$$\text{Risk-Adjusted Total Effort} = 1080 \times 1.15 = 1242 \text{ hours}$$

9. Final Estimation Summary

Here is the final complete estimate:

1. **Total Story Points:** 95
2. **Velocity:** 20 story points per sprint
3. **Number of Sprints:** 5
4. **Effort per Sprint:** 216 hours (with 10% overhead)
5. **Total Effort:** 1080 hours
6. **Risk-Adjusted Total Effort:** 1242 hours

Result

The final estimated effort for completing the Mualij project, including a buffer for risk and uncertainty, is **approximately 1242 hours**. This estimate provides a comprehensive view of the project's scope and effort required.