Constructor University Bremen

Project Management Software Requirements

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Bricked Up

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1 Introduction

The goal of this Software Engineer (SWE) project is to create a final product that is a software management application. The application is intended to be web based compatible with any device aspect ratio. The web application is inspired by software such as but not limited to:Github, Microsoft Teams, Slack. The software should help other SWE teams to create their own organisations, full of members sub-teams and sub-projects, in hopes of improving productivity and shareholder satisfaction.

This document states the function and non-functional requirement of the software, the exact working criteria and measurement. Please note that the frontend and backend teams have a more in depth requirement that also include: the software tools used, software architecture, software API and internal component documentation, and justification of used software.

2 Functional Requirements

The final product is a general project management software that will help organisations initiate, plan, budget their projects. The following is the current list of **functional requirements**. Note that these may be subject to change.

1. Users should be able to login or register to the platform.
2. Users should be able to log out and delete their account.
3. Each account must be unique and identified by a valid email address.
4. Users should be able to change their passwords.
5. Users should be able to create: organisations, teams and projects.
6. Clear distinction in user privilege as follows from highest to lowest {Admin, Project Lead, Team member}
7. Any team member should be able to create a project and invite other org. members to said project.
8. Project manager should be able to promote other to PM and be able to remove members from the team.
9. If the PM leaves with no other PMs in a given project, the org. admin shall become the PM.

10. be able to schedule tasks
11. Each task should have the following: {budget, person(s) working on it, scope, priority}
12. Each task can be prioritised from: {High, middle, low}
13. Software should allow a team member to have more than one task at a time even if overlapping.
14. Users should be able to customise the software in respect to color, themes and font from a given selection.
15. Software is web-based and should be able to run on most browsers: {Firefox, Safari, Google Chrome, Microsoft edge}.
16. Software should remind team members who have high priority tasks via Email or other forms of communication.
17. Project encapsulation should exist where org. members that are not in the project do not have read/write access unless directly granted by the admin/PM.
18. Software will have a light and dark mode.
19. Software will allow the users too look and customise their accounts.
20. Software will allow for users to have a non-unique display name, different from the unique email address.
21. Software will allow users to find other users via search of display Name.
22. Software will prohibit access of restricted pages.
23. Software will allow the deletion of a user account and delete all user data from the Database (DB).
24. Support for multi-factor authentication (MFA) during login.
25. Ability to assign due dates to tasks and send automatic reminders. Users can set deadlines for tasks, and the system will send notifications via email or in-app reminders when due dates approach.
26. Integration with Google Calendar and Outlook for scheduling. Users can sync project deadlines and meetings with their external calendars, ensuring they stay updated.

27. Allow project managers to set project milestones. Managers can define key phases in the project, track progress, and set automatic alerts for milestone completion.

28. Track project progress with Gantt charts. Provides a visual timeline of tasks, dependencies, and progress to help teams manage workload efficiently.

29. Customizable Kanban boards for task tracking. Users can create and arrange tasks in a drag-and-drop interface for agile project management.

30. Provide a timeline view for all project tasks. A bird's-eye view of all project activities with deadlines, dependencies, and progress tracking.

31. Allow commenting and discussion on tasks. Team members can communicate directly within a task's page for better collaboration.

32. Enable file attachments to tasks and projects. Users can upload and attach documents, images, or spreadsheets to specific tasks for easy reference.

33. In-app notifications for task updates. Users receive real-time alerts on project changes, new assignments, and updates.

34. Time tracking for tasks and projects. Users can log the time spent on each task and generate reports.

35. Ability to generate project status reports. Auto-generate reports detailing progress, completed tasks, and pending issues.

36. AI-powered task prioritization. Automatically ranks tasks based on urgency and importance.

37. Custom workflows for different teams. Create templates that match different project types (e.g., software development vs. marketing campaigns).

38. Role-based access control for sensitive data. Restrict access based on user roles (e.g., Admin, Manager, Employee).

39. Archive completed projects while retaining access to reports. Store completed projects without cluttering the active workspace.

40. Custom user dashboards for different roles. Personalized dashboards based on the user's role and responsibilities.

41. Ability to duplicate tasks and projects for templates. Users can reuse previous project setups to save time.

42. Custom tags and categories for task organization. Tasks can be labeled with tags for easy filtering and searching.

43. Export reports in CSV, PDF, and Excel formats. Download reports in multiple formats for offline access.

44. Automated invoice generation for clients. Generate invoices based on project hours and expenses.

45. Expense tracking per project. Monitor spending and compare it against the project budget.

46. Budget forecasting tools. Predict future expenses based on current spending trends.

47. Automated alerts for overdue tasks. Notify users when a task is past due.

48. Task dependencies and blockers visualization. Show how tasks are connected and identify bottlenecks.

49. Peer review functionality for project submissions. Users can review and approve tasks before they are marked as complete.

50. Public and private projects within an organization. Choose which projects are visible to the entire company or restricted to select users.

51. AI-powered meeting summaries and action items. Auto-generate meeting minutes and highlight key tasks.

52. Support for multiple project templates. Predefined templates for different project types.

53. Time-off management integration. Track employee availability (e.g. vacations, etc.)

54. Dynamic workload balancing for teams. Adjust task assignments to balance workload across team members.

55. Keyboard shortcuts for power users. Use hotkeys for faster navigation and task management.

56. Auto-save feature for comments and notes. Prevent loss of important discussions due to accidental closure.

57. Ability to link related tasks across projects. Create dependencies between tasks in different projects.

58. Custom reporting dashboards. Generate tailored reports for different stakeholders.

59. Ability to create recurring tasks. Automate task repetition on a set schedule.

60. Assign subtasks within a main task. Break down larger tasks into smaller steps.

61. Task auto-assign based on workload or predefined rules. Assign tasks dynamically based on employee availability and/or skill set.

62. Track the history of task modifications (who changed what and when). Maintain a record of who changed what and when.

63. Task completion approval system (e.g., require manager validation). Require manager approval before marking tasks complete.

64. Ability to create private tasks visible only to assigned members. Hide sensitive tasks from unauthorized users.

65. Customizable task automation rules (e.g., auto-change priority if overdue). Set predefined conditions for task transitions.

66. Allow merging of duplicate tasks. Consolidate duplicate tasks to avoid redundancy.

67. Ability to split a large task into smaller, trackable chunks. Manage large projects more effectively.

68. Provide a backlog feature for future tasks. Store ideas and tasks that aren't ready for execution yet.

69. Integrated team chat for each project. Real-time messaging within the platform.

70. Ability to tag users in comments and task discussions. Notify team members when they are mentioned in the chat.

71. Read receipts for comments and messages. Show when messages have been seen.

72. Discussion forums for each project. Dedicated spaces for team discussions.

73. Announcement feature for team-wide updates. Automatically translate messages into the user's preferred language.

74. Project-based polls and surveys for decision-making. Notify all users about important project changes.

75. Visual workload heatmap to track team capacity. Collect team input for better project planning.

76. Automated conflict detection for overlapping task assignments. Optimize project workflow by identifying inefficiencies. The system will automatically detect and flag situations where a team member is assigned to multiple tasks with conflicting deadlines. It will alert project managers and suggest rescheduling or reassigning tasks to avoid overload and delays.

77. Auto-adjust task deadlines based on workload constraints. When assigning new tasks, the system will analyze the team's current workload and auto-adjust deadlines to prevent overburdening employees. It can redistribute tasks dynamically or suggest alternative timelines.

78. Drag-and-drop rescheduling for project timelines. Users can adjust deadlines, dependencies, and task durations using a simple drag-and-drop interface on a Gantt chart or timeline view, making project adjustments intuitive and efficient.

79. Allow assigning multiple project leads for co-management. Enables projects to have more than one lead, allowing shared responsibilities. This ensures continuity if one lead is unavailable and facilitates better collaboration on large projects.

80. Option to set "out of office" periods for task auto-reassignment. Team members can set their "out of office" status for specific dates. If a task is assigned to an unavailable member, the system can automatically reassign it to another available team member or notify the project manager to take action.

81. Customizable task views (list, calendar, timeline, etc.). Users can switch between different task views, such as a simple list, a calendar view, a timeline view (like a Gantt chart), or a Kanban board. This allows flexibility in managing and tracking work based on personal or team preferences.

82. Automated daily/weekly project summary reports. The system generates and sends summary reports on project progress, completed tasks, overdue items, and upcoming deadlines. Reports can be sent via email, or in-app notifications based on user preferences.

83. Time spent per task tracking with productivity analytics. Tracks how much time each user spends on specific tasks and provides insights into productivity. This data can help identify inefficiencies and optimize workload distribution.

84. Custom goal tracking for teams and individuals. Users and teams can set specific goals (e.g., complete 10 tasks per week, resolve 90

85. Predictive analytics for estimating project completion times. The system uses historical project data and current task progress to predict when a project will be completed. It can identify potential delays and suggest actions to keep the project on track.

86. Cost and budget tracking dashboard. Displays real-time financial data related to a project, including planned vs. actual expenses, resource costs, and budget forecasts. Helps project managers stay within budget and adjust financial planning if necessary.

87. Performance scorecards for individual team members. Generates a performance scorecard for each team member, based on factors like completed tasks, meeting deadlines, time spent on work, and contribution to project success. Helps in performance reviews and team evaluations.

88. Comparative project performance analysis (track multiple projects together). Allows managers to compare the performance of multiple projects simultaneously, identifying which ones are on track, at risk, or delayed. This helps in resource allocation and strategic planning.

89. Exportable and shareable interactive reports. Users can generate reports with project data and export them in various formats (PDF, Excel, CSV). Reports can include interactive charts, visual insights, and filters for better analysis.

90. AI-powered Smart Suggestions for Task Assignments The system analyzes team members' workloads, past performance, skills, and availability to recommend the most suitable person for each task. This helps in fair distribution of work and maximizes efficiency.

3 Non-functional Requirements

These requirements are more towards the backend and features that the users may not directly experience but are crucial for the design and development of secure, scalable, maintainable and economic software.

1. Data privacy and not allowing unwanted or malicious users to access sensitive/unauthorised data.
2. The software must be dependable and must be resilient and minimise failure and have graceful failure if failure cannot be avoided.
3. The software should be efficient, scalable and have low overhead.
4. The frontend should be designed and implemented in a structured modular manner for easier expansion and re-factoring.
5. Software minimises excessive back-end request of redundant data and instead will cache the data unless said data is updated/modified.

4 Productivity Measurement

The main way that productivity of the team will be measure is via Github issues. Each team has their own repository with respective issues that are automatically closed via a pull request. The benefit of this method is that instead of measuring lines of code, we measure how much functionality each team member has contributed. This method also encourages for the developers to write efficient and DRY code as there is no punishment for having fewer lines of code. The whole Github organisation can be found by clicking this link.

Another measurement is meeting participation. Each week the whole team has a stand-up meeting with the fronted and backend having individual weekly meetings. If a team member misses 3 meetings unexcused, or is late by more than 20 minutes, the team member will lose 5% of their grade as punishment. This is done to incentive each member to participate in meetings and keep communication as optimal as possible.