



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

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FACULTY OF COMPUTING, UTM

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PROJECT 2

SECD 2613: SYSTEM ANALYSIS AND DESIGN

SECTION 01

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COURSE : BACHELOR OF COMPUTER SCIENCE
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1.0 Overview of The Project

To effectively manage the publication of a paper involving postgraduate students and their supervisor, it is crucial to establish a comprehensive task list. This list, which can be kept in an Excel sheet or a hardcopy format, should include deadlines, the individuals responsible for each part of the project, and a schedule for the paper's publication. A clear timeline must be outlined, specifying which tasks need to be completed by certain dates to ensure consistent progress.

Collaboration and communication are vital to the project's success. Lecturers must remain informed about all developments; for example, once a student completes a task, the supervisor should promptly review and provide feedback. To support this, reminders and alerts should be implemented to guarantee ongoing communication between students and supervisors. If either party fails to communicate within a set period, reminders should be sent to both the student and the supervisor to encourage necessary interactions. All these features should be integrated into a single system or application to facilitate progress tracking and uphold accountability throughout the project's duration.

2.0 PROBLEM STATEMENT

The current methods of thesis management within academic institutions are fraught with inefficiencies and limitations, stemming from reliance on manual processes and disparate tools. These challenges include:

1. **Inefficiency and Time Consumption:** Stakeholders, including students, faculty members, and administrators, expend considerable time and effort on manual tasks such as data entry, communication, and coordination. This not only detracts from their primary academic responsibilities but also results in decreased productivity and delays in the thesis management process.

2. **Lack of Real-Time Collaboration:** The absence of real-time collaboration features in existing tools impedes effective communication and coordination among stakeholders. This leads to delays in feedback dissemination, difficulties in scheduling reviews, and occasional duplication of efforts as individuals work with outdated information.

3. **Error-Prone Processes:** Manual management introduces a heightened risk of errors, including overlooking updates, mismanaging document versions, and missing deadlines. These errors undermine the accuracy and timeliness of thesis submissions, potentially impacting academic outcomes and student success.

4. **Limited Accessibility:** Accessibility to critical information is constrained by the fragmented nature of existing systems, which may involve locally stored files or single shared drives with restricted access. This limitation impedes transparency and collaboration among stakeholders, hindering the efficient management of thesis-related tasks.

5. **Poor Scalability:** Manual systems struggle to scale effectively with the growing volume of tasks and collaborations, leading to management challenges and decreased efficiency. As the complexity of thesis management increases, stakeholders face difficulties in maintaining the integrity and effectiveness of existing processes.

Addressing these challenges requires a comprehensive solution that leverages modern technologies to streamline thesis management processes, enhance collaboration, ensure data accuracy, improve accessibility, and facilitate scalability. By addressing these issues, academic institutions can optimize their thesis management workflows, ultimately enhancing the academic experience for students, faculty members, and administrators alike.

3.0 Proposed Solution

To address the inefficiencies and limitations in current thesis management practices within academic institutions, implementing a comprehensive and modernized Thesis Management System (TMS) can significantly improve the overall process. The TMS should

incorporate the following key features to streamline operations, enhance collaboration, ensure data accuracy, improve accessibility, and facilitate scalability:

1. **Automation of Manual Tasks:** Replace manual data entry tasks with automated processes wherever possible. Implement features such as automatic notifications, reminders, and updates to reduce the time and effort spent on administrative tasks.
2. **Real-Time Collaboration:** Incorporate real-time collaboration tools into the TMS, such as a shared dashboard for all stakeholders to view project statuses, provide feedback, schedule meetings, and collaborate seamlessly. This will enhance communication and coordination among stakeholders.
3. **Version Control and Deadline Management:** Implement robust version control mechanisms to track changes in documents and ensure that all stakeholders are working with the latest information. Integrate deadline management features to provide timely reminders and notifications for upcoming milestones.
4. **Centralized Information Hub:** Create a centralized platform where all thesis-related information, documents, feedback, and reviews are stored securely and accessible to authorized stakeholders. This will improve transparency and accessibility to critical data.
5. **Scalability and Flexibility:** Design the TMS to be scalable, allowing it to adapt to the evolving needs of academic institutions with increasing thesis volumes. Ensure that the system is flexible enough to accommodate changes in processes and workflows.

From an economic feasibility standpoint, the proposed solution would still require an initial investment into purchasing hardware such as a few servers to accommodate more users of the system and would imply the need to carry out maintenance work so that the server can function even during peak hours. However with the increasing usage of the system among the academic society, the stakeholders can expect to gain some amount of profit gradually. In terms of operational feasibility, the TMS is suitable to be used in universities given how the system

works to make the daunting tasks that are academic related more manageable and convenient to faculty members, admins and students alike. The proposed system also takes user-friendliness into consideration as the factor will affect whether the system will be the de-facto system where every members in the university would be able to use it as soon as possible, Technical feasibility wise, the system would not deviate greatly from the system before and as much as improvements were made, it would still perform the same tasks so that the stakeholders using the new system can easily pick up the new system. Furthermore, fewer expertise and personnel are needed to develop and lastly maintain the system.

4.0 Information Gathering Process

4.1 Method Used

The method for the information gathering process used in this project is the interactive method. The interactive methods that are involved in this project is interviewing. The interviewing process helps us to collect data on human and system information requirements. The purpose of the interview is to know the workflow of the current system, the issues of the current manual process system, and the features of the newly implemented system. In this interview process, the target interviewer is Dr. Muhammad Alif Ahmad. We conducted the interview face-to-face, and all of the team members were present during the interview session. We arranged the questions in a pyramid structure by starting with closed questions and worked our way toward open-ended questions. This allows us to get more generalized responses and also helps to warm up the interviewee about the topic and reluctance to address the topic.

4.2 Summary from Method Used

Interview Details of the interview: Date : 18th April 2024

Time of Interview : 10:00 a.m.

Topic : Thesis and Paper Review Management System

Interviewee Name: Dr. Muhammad Alif Ahmad

Interviewer Name : 1. Muhammad Amirun Irfan bin Samsul Shah

2. Kwan Zhi Ren

3. Ang Chun Wei

4. Ravinesh A/L Maran

Interview Platform : Webex

Closed Questions:

Interviewer: Will there be any integration with subsystems like Google Calendar or other apps?

Interviewee: Yes, there will be several ways to do it. You can either connect in-house where students design it themselves. For example, for graphs, there will be immediate sharing with the supervisor. Instead of sharing a link through Google Drive and having the supervisor open, edit, and return it after commenting, in this system, the supervisor can open the document within the system and return it directly.

Interviewer: Can you provide specific examples where manual processes have proven inadequate?

Interviewee: Yes, particularly in collaboration tracking, progress monitoring, and reminders. Sometimes students need to remind the supervisor through WhatsApp or email. As a lecturer and supervisor, I receive at least 50 emails per day, and we are part of numerous WhatsApp groups. If we are unwell, we might miss some emails. In fact, 50 emails can be an understatement; 100 might be more accurate. Adding these reminders to our calendars is a quick solution, and having a system to manage these reminders through apps ensures we don't miss anything.

Interviewer: What is the budget consideration for developing and implementing the system?

Interviewee: We will use a free framework called Laravel. You just need to develop high-fidelity software, and then we will use free software for hosting. We will have someone develop it and later hire someone to maintain it. The costs will be based on the development done with Laravel. For server maintenance, we will have one person in charge.

Interviewer: Who are the stakeholders expected to benefit from this system?

Interviewee: Stakeholders will benefit by having a simplified way to manage their students. By minimizing the variety of apps and processes, it will be easier for both students and lecturers to manage paper reviews and theses.

Open Questions:

Interviewer: What specific challenges with the current manual process led you to develop this system?

Interviewee: The current process is entirely manual, leading to multiple versions of tasks and limited scheduling options for supervisors. With many students, it becomes challenging to track everyone's work. This system will allow us to remind students of deadlines within a single application.

Interviewer: What inspired you to create this new system, and what is your current goal?

Interviewee: The various challenges we face inspired me to create this system. My goal is for this system to become the main tool for writing theses and publishing, widely used by both students and supervisors. We hope it will become the standard system for supervisors and students.

Interviewer: How will user suggestions be incorporated into system development?

Interviewee: Once the system is operational, we can include an option for users to provide feedback. Over time, supervisors and students can suggest new features. These suggestions can be upvoted, and the most popular ones will have a higher chance of being implemented.

Interviewer: What hurdles need to be considered?

Interviewee: We need to develop the documentation and decide on the system's functions. Additionally, user training will be essential to teach system managers how to troubleshoot.

Interviewer: What factors do you consider when developing a new system?

Interviewee: The system must be cost-effective and adaptable to multiple operating systems, making it easy to package for platforms like Android and iOS.

Interviewer: What key performance indicators are you looking to improve in the new system?

Interviewee: We want all functionalities to be integrated into one platform for a seamless experience. The system should include a task listing feature where tasks are detailed, including deadlines and responsibilities assigned to students and supervisors, similar to what you might do in Excel or with hardcopy lists. It should also have a scheduling feature to plan when papers will be published, with a timeline indicating what tasks need to be completed by specific deadlines. Tracking progress is essential, allowing lecturers to monitor ongoing tasks.

Specifically, lecturers need to be able to collaborate and communicate on all progress points. For example, once a student completes a task, the supervisor should be able to review and provide comments within the system. Additionally, the system should have a robust reminders and alerts feature. If there is a lack of communication between the student and the supervisor, the system should automatically send reminders to ensure both sides stay engaged and on track.

5.0 Requirement Analysis

The requirement analysis conducted for the university task management system aimed to understand the needs and expectations of users, including students, faculty, and staff. It involved gathering and documenting functional and non-functional requirements such as user roles, task prioritization, notifications, and ease of use. The analysis also focused on integration with existing university systems and scalability for future expansion. By identifying these key requirements, the university will be able to design and develop a system that meets the specific needs of its users effectively and efficiently.

5.1 Current Business Process

Task management systems play a crucial role in enhancing productivity and organizing workflows among undergraduates, postgraduates and lecturers. This section aims to analyze the current business process of a typical task management system, including scenarios and workflows involved.

Scenarios:

1. **Task Listing:** Users initiate the process by listing the task within the system. They provide details such as task name, description, due date, and priority level.
2. **Task Scheduling:** After creating a list of tasks, users can create a schedule to assign tasks and allocate time for different tasks in the list. The system displays the list of tasks each with their appointed timeframe.
3. **Task Tracking:** Users update the status of tasks as they progress. They can mark tasks as in progress, completed, or delayed, providing real-time visibility into the task's status.
4. **Reminders and Alerts:** The system sends notifications to the assignees with task details and deadlines. The system also sends specialized alerts to the users when the due date is near.
5. **Task Collaboration:** Different users can collaborate on tasks by sharing files, comments, and updates within the system. This fosters communication and teamwork. The system helps in clarifying the ambiguity for different tasks by allowing users to message each other in specialized groups and incorporates some type of video conferencing to better strengthen communication among different users.

Workflow:

1. Task Listing:

- User logs into the task management system.
- User selects the "Create Task List" option.
- User fills in details such as task name, description, and due date.
- User saves the list of tasks, notifying changes to the supervisors.

2. Task Scheduling:

- Supervisor receives a notification about the newly assigned task from the users.
- Supervisor reviews task details and accepts or rejects the task.
- If accepted, the user starts working on the task and updates its status.

3. Task Tracking:

- Users can view a dashboard displaying all tasks and their statuses.
- Users can filter tasks by status, due date, or priority level.
- Users receive automated reminders for approaching deadlines.

4. Task Collaboration:

- Users can comment on tasks, share files, and discuss updates.
- Users receive notifications for any comments or updates on tasks.

5. Task Completion:

- Users mark the task as completed once finished.
- Other members are notified of the task completion.
- Task history is updated with the completion timestamp.

The current business process of a task management system involves scenarios like task creation, assignment, tracking, prioritization, and collaboration. The workflow ensures seamless task management, communication, and productivity within the organization. Implementing best practices and integrating features to enhance user experience and efficiency can further optimize the task management process.

5.2 Functional Requirements

In the dynamic and fast-paced environment of a university, efficient task management is crucial for ensuring smooth operations and effective collaboration among faculty, staff, and students. A comprehensive task management system tailored to the unique needs of a university can streamline processes, enhance productivity, and improve overall organizational performance. Below is a list of functional requirements:

1. User Management

- **User Roles:** The system should support different user roles such as administrators, faculty members, staff, and students, each with specific access permissions.
- **User Profile:** Users should be able to create profiles, edit personal information, and set preferences related to task management.

2. Task Creation and Assignment

- **Task Creation:** Users should be able to create tasks, specify due dates, add descriptions, and assign tasks to specific individuals or groups.
- **Task Priority:** Users should be able to assign priorities to tasks to indicate their relative importance and urgency.
- **Task Notifications:** The system should send notifications to users for new tasks, updates, and approaching deadlines.

3. Calendar Integration

- **Calendar View:** The system should provide a calendar view to display tasks, deadlines, and events for better visibility and planning.
- **Integration:** Integration with popular calendar platforms like Google Calendar or Outlook to sync tasks and deadlines.

4. Progress Tracking

- **Task Status:** Users should be able to update the status of tasks (e.g., in progress, completed, pending) to track progress.
- **Progress Reports:** Generate reports and analytics on task completion rates, delays, and bottlenecks for better decision-making.

5. Collaboration Features

- **Commenting:** Users should be able to comment on tasks, ask questions, and provide updates for seamless collaboration.
- **File Sharing:** Support for file uploads and sharing related to tasks for better coordination.

6. Reminders and Alerts

- Reminders: Allow users to set reminders for important tasks or deadlines to avoid missing key milestones.
- Alerts: Push notifications or email alerts for critical updates or urgent tasks.

A well-designed task management system tailored to the specific needs of a university can significantly enhance operational efficiency, improve communication and collaboration, and ultimately contribute to the overall success of the institution. By adhering to the functional requirements outlined in this report and leveraging intuitive user interfaces, universities can create a productive and organized work environment for all stakeholders.

5.3 Non-Functional Requirements

Non-Functional Requirements:

2.1 Performance:

- The system should be able to handle a large volume of tasks concurrently without any significant degradation in performance.
- Response times for task updates and notifications should be fast to ensure timely communication.
- The system should be scalable to accommodate potential growth in users and tasks without impacting performance.

2.2 Reliability:

- The system should be highly reliable, with minimal downtime for maintenance or updates.
- It should have robust backup and recovery mechanisms to ensure data integrity and availability.
- Error handling should be clear and provide informative messages to users when issues arise.

2.3 Security:

- Data security should be a top priority, with user authentication, authorization mechanisms, and encryption protocols in place to protect sensitive information.
- Access controls must be finely tuned to ensure that only authorized users can view and modify tasks.
- Regular security audits and updates should be performed to address any vulnerabilities promptly.

2.4 Usability:

- The system should have an intuitive user interface that is easy to navigate, with clear instructions for creating, assigning, and updating tasks.
- Accessibility features should be built-in to ensure all users, including those with disabilities, can efficiently use the system.

- Customization options for task views, reminders, and notifications can enhance user experience.

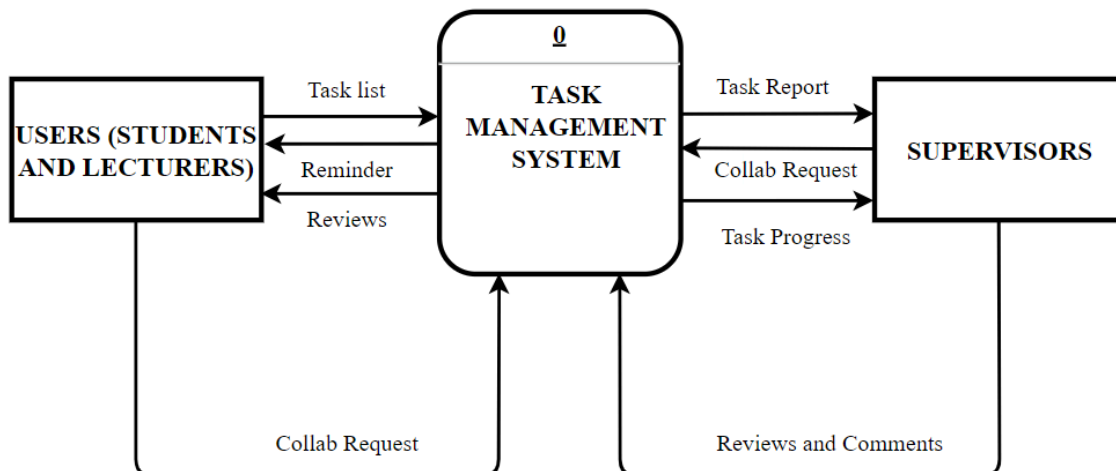
2.5 Scalability:

- The system should be designed to accommodate the increasing number of users, tasks, and departments within the university.
- Integrations with other university systems, such as student information systems or resource management tools, should be seamless and scalable.
- Load balancing mechanisms should be implemented to distribute tasks and optimize performance during peak usage times.

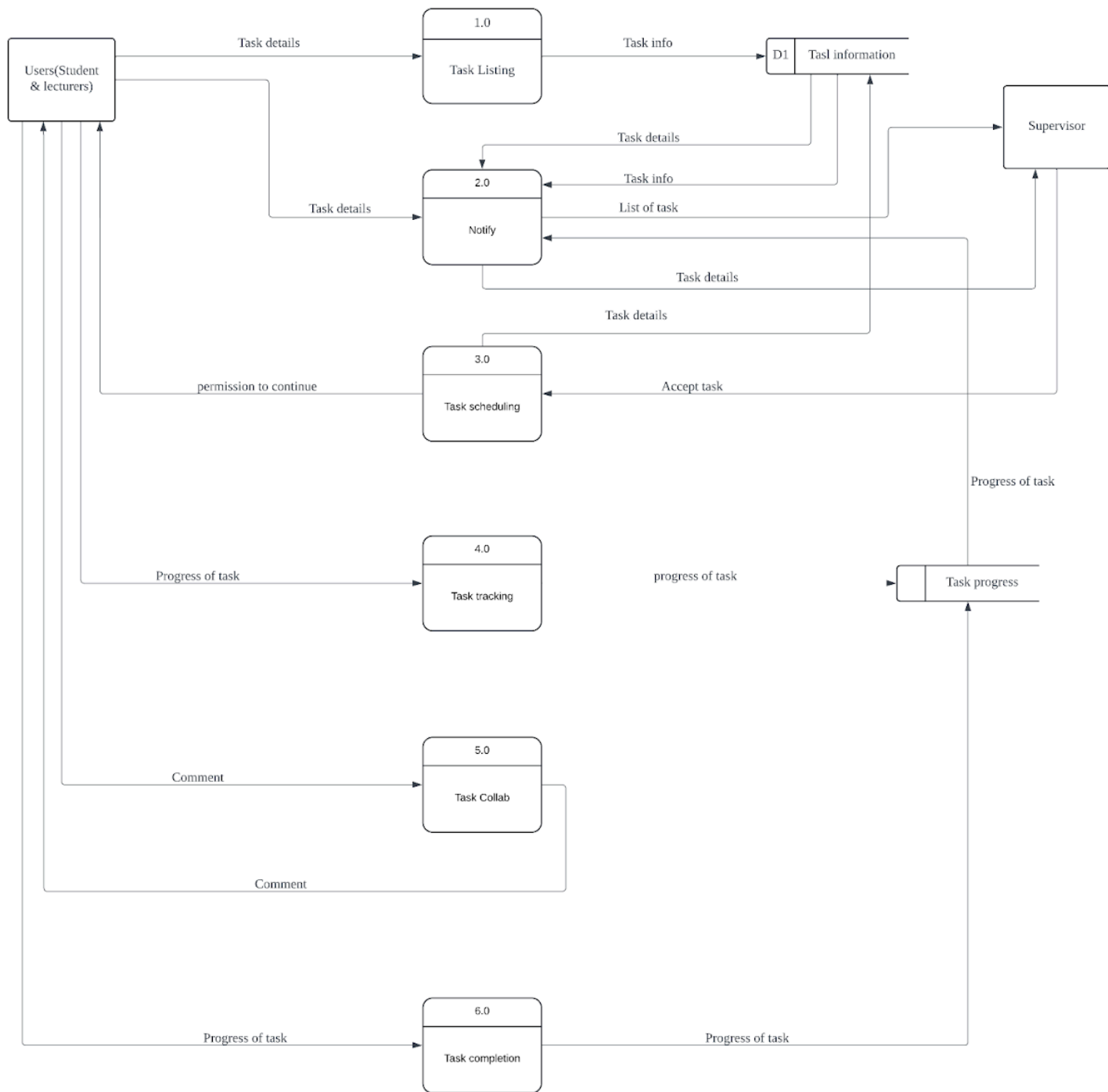
A university task management system should meet a wide range of non-functional requirements to ensure its success in an academic environment. By prioritizing performance, reliability, security, usability, scalability, and compliance, developers can create a robust system that enhances productivity and collaboration across departments within the university. It is crucial that these non-functional requirements are carefully considered and implemented to meet the diverse needs of users and ensure the system's effectiveness in facilitating task management within the university setting.

5.4 Logical DFD AS-IS System

5.4.1 Context Diagram

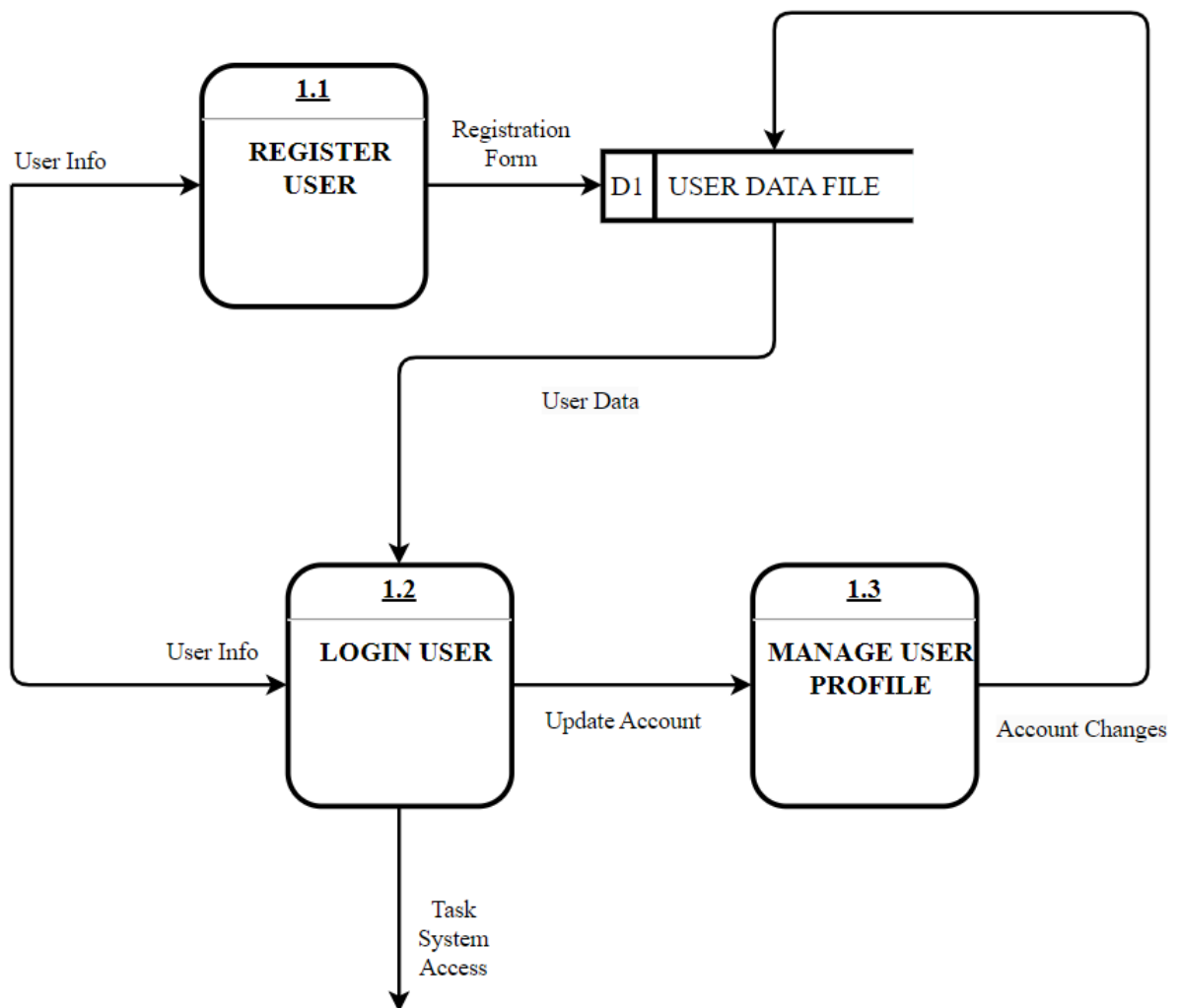


5.4.2 Level 0 Diagram

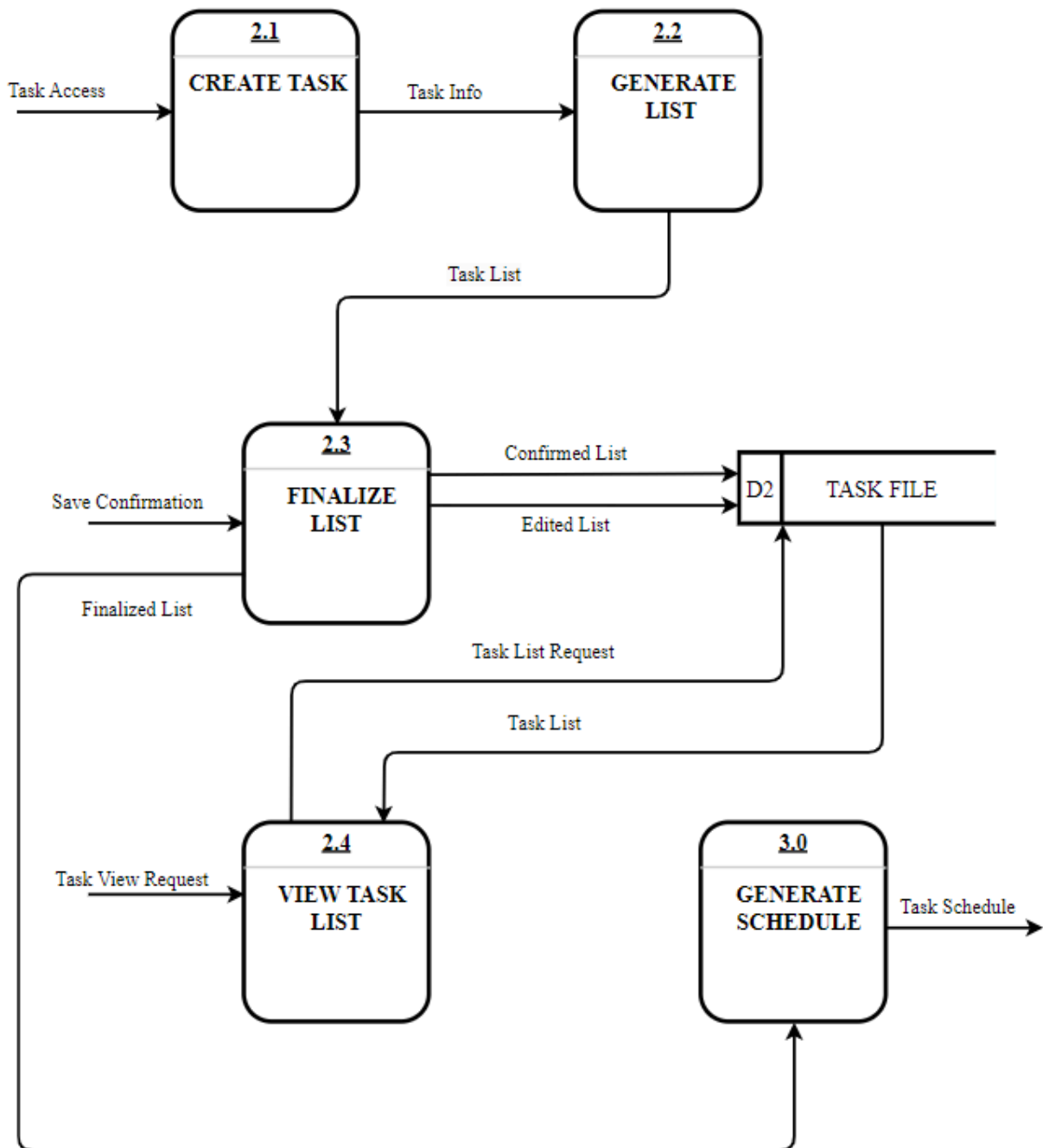


5.4.3 Child Diagram

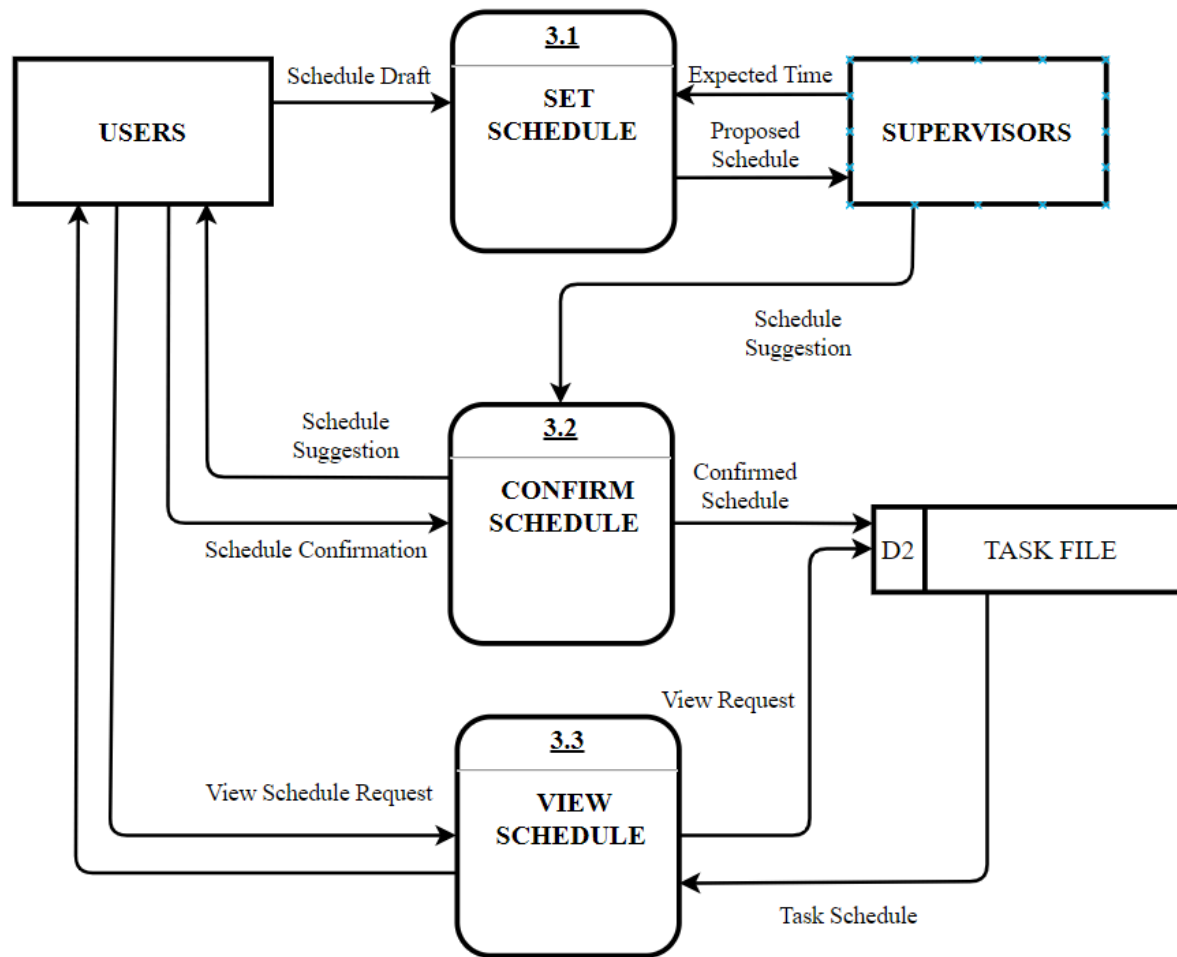
1.0 User Account Management



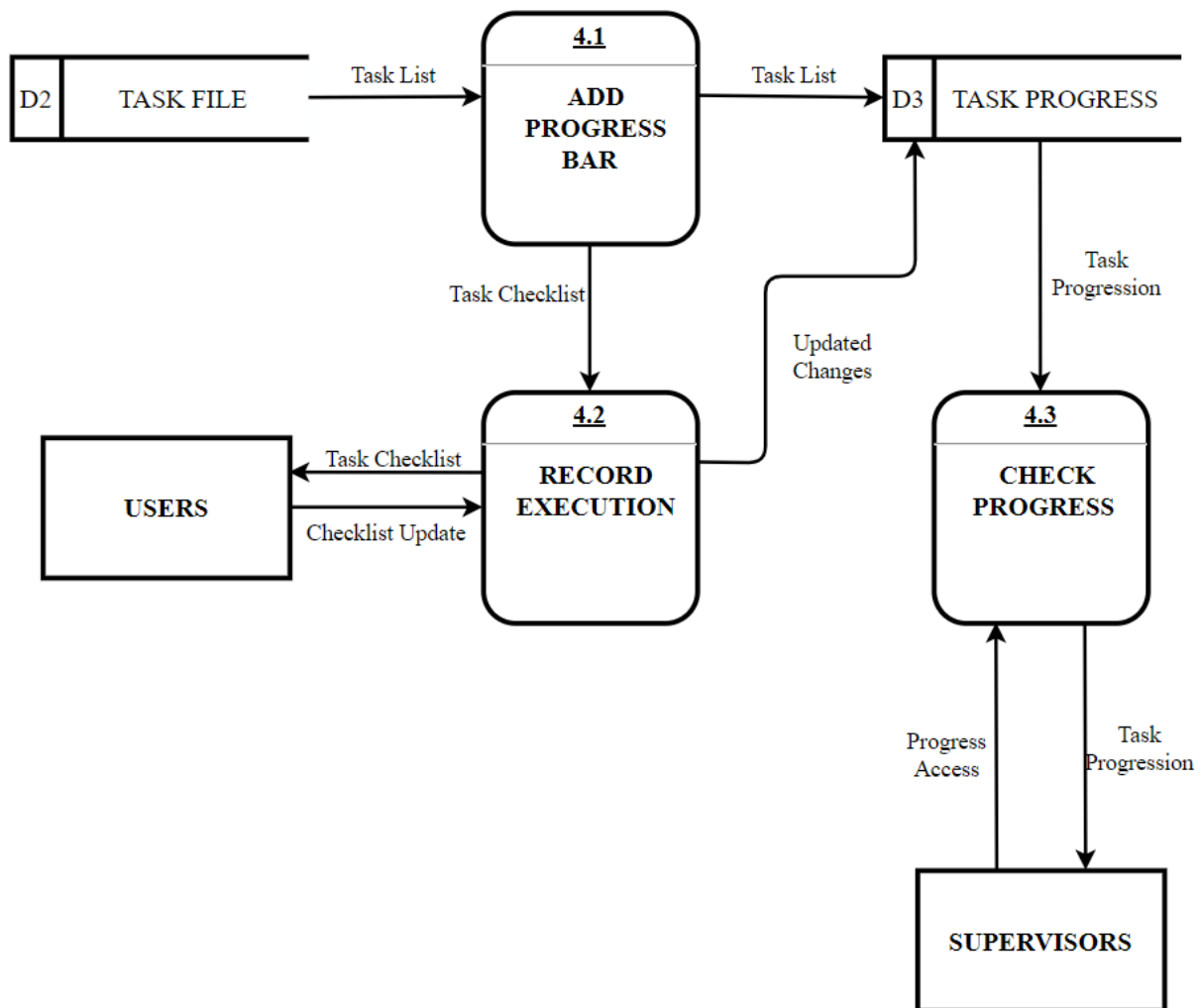
2.0 Task Listing



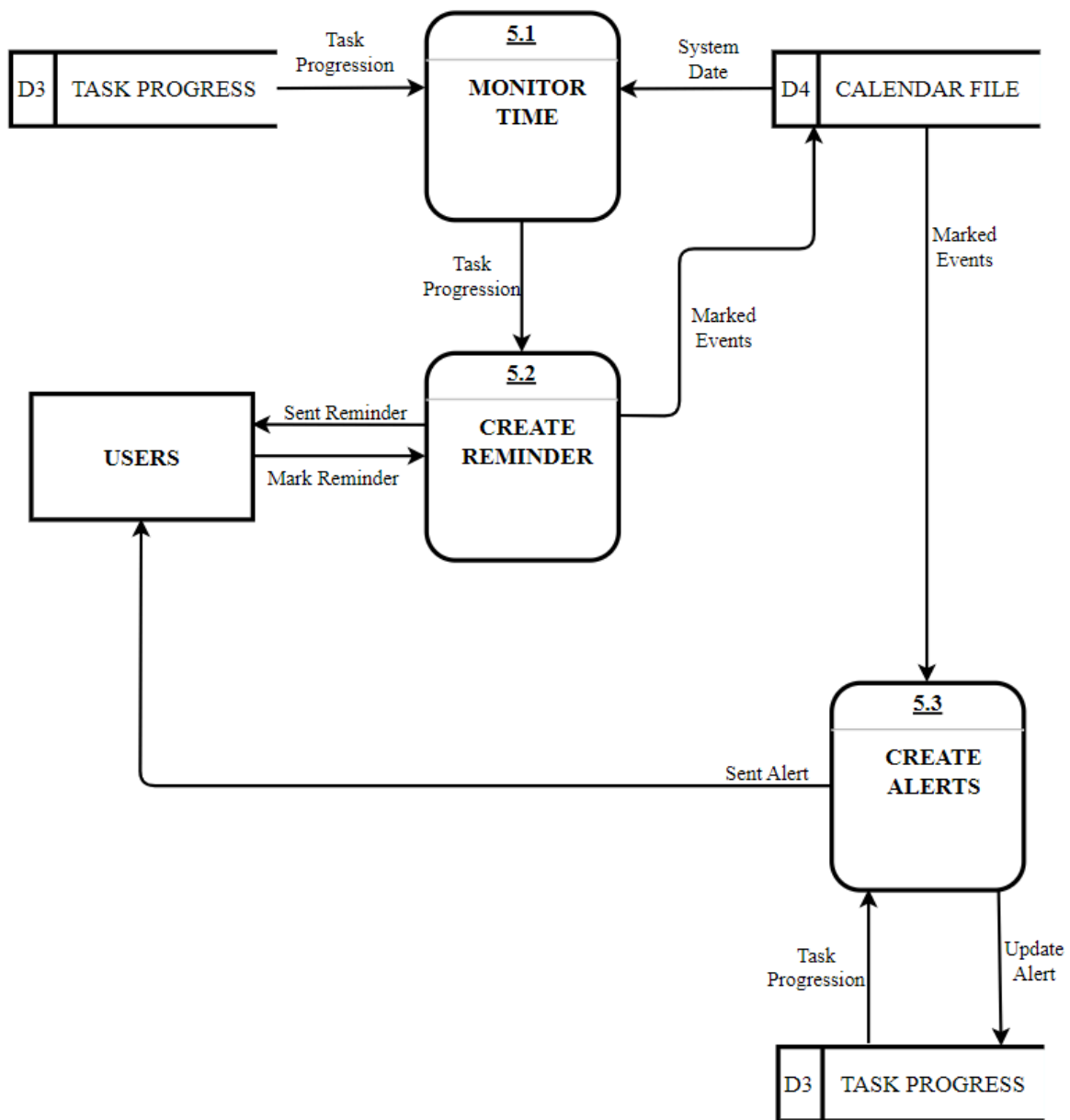
3.0 Task Schedule



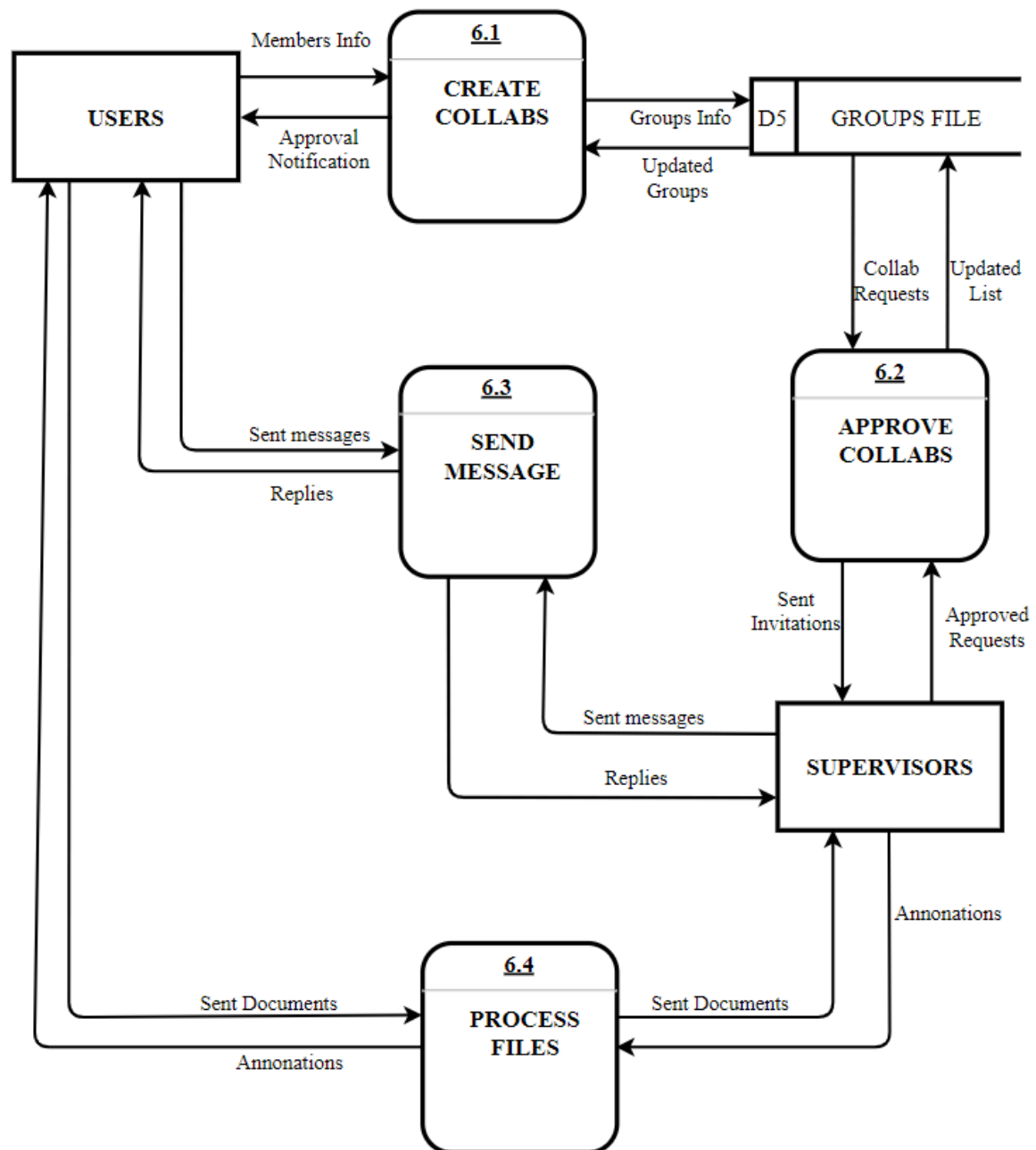
4.0 Track Progress



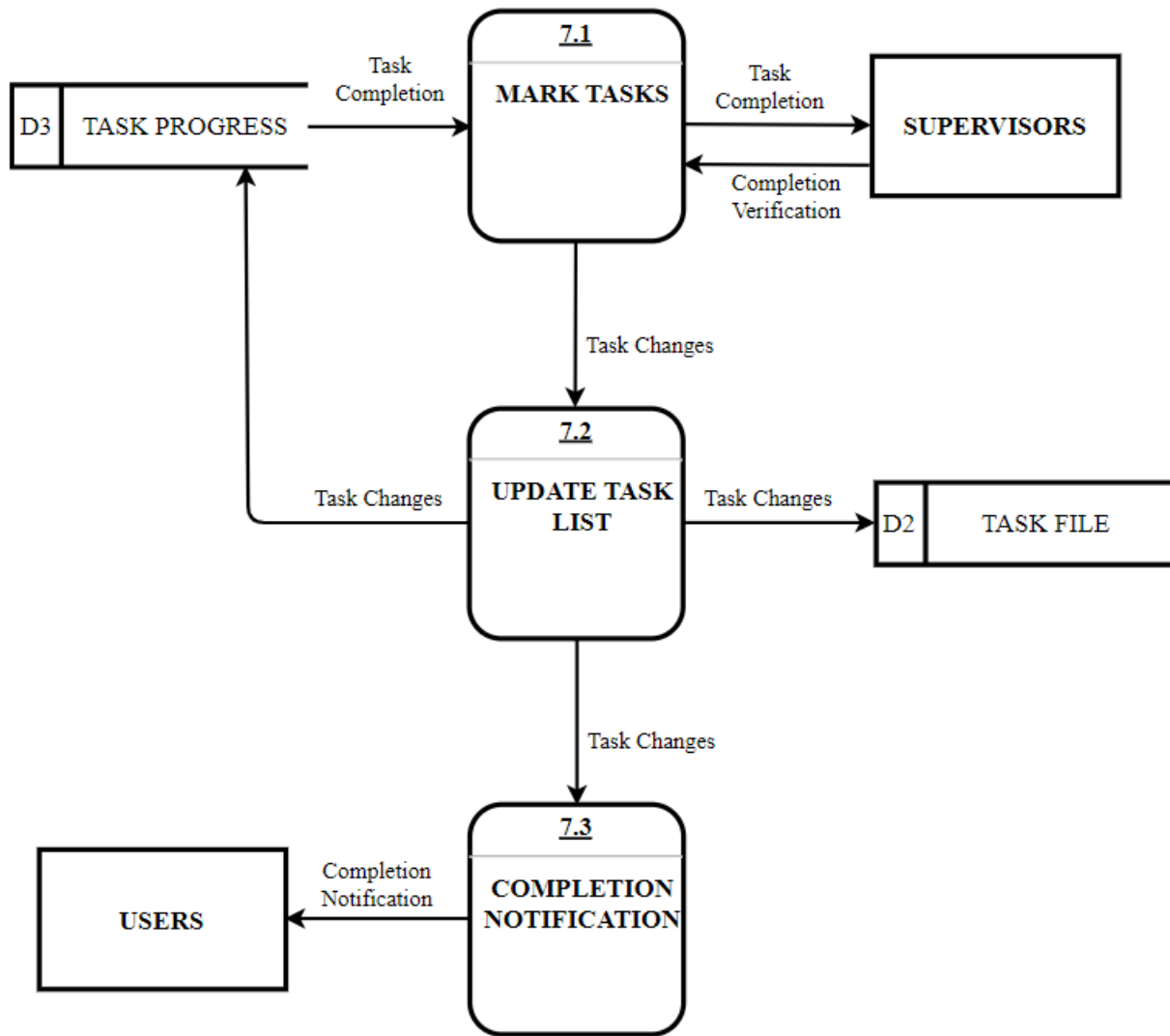
5.0 Reminders and Alerts



6.0 Collaborations



7.0 Task Completion



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