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**Final Project**

**Part I. Research and Problem Selection**

**Goal**

Create a task management system that combines the best aspects of Digital Game-Based Learning (DGBL) like Vortex or Duolingo, organization tools like Google Calendar and Todoist, and the playful charm of a virtual office assistant. The user would have access to a comprehensive platform that helps them stay organized and productive while keeping them motivated and engaged. Gamified features would incentivize task completion, while virtual assistants would offer friendly reminders and assistance along the way. Simple and effective like Google Calendar, I would implement a user-friendly interface for scheduling appointments, meetings, and reminders. Inspired by Todoist, I would create a seamless task management system, allowing users to create, prioritize, and organize their tasks. I would offer integration with popular email services and other tools, allowing users to streamline their workflow and maximize efficiency. I would provide users with customization options to tailor the interface and functionality to their preferences and needs.

**Research Notes**

In a special issue of the Computers Journal published on July 18, 2023, titled 'Effect of Digital Game-Based Learning on Student Engagement and Motivation,' researchers discuss the challenge of student engagement in academia, worsened by the shift to online learning during the COVID-19 Pandemic. Traditional teaching methods are less effective due to the high engagement expectations set by modern entertainment. According to their findings, online activities initially boosted engagement, but have since lost their appeal and effectiveness over time. To counter this, Digital Game-Based Learning (DGBL) and gamification are proposed as innovative solutions to enhance student motivation and learning. The study investigated engagement in academia by exploring the impact of DGBL on student motivation and engagement, particularly considering gender disparities. The study involved undergraduate students using game-based and conventional quizzing tools. Findings indicated that DGBL significantly enhanced engagement and motivation when juxtaposed with traditional methods. The inclusion of leaderboards improved performance for select individuals but posed potential demotivation for others. Notably, female students demonstrated a slightly higher affinity for the games than their male counterparts but preferred less comparative elements. Overall, DGBL contributed to a more enjoyable and engaging learning experience. They found that:

* Consistent use of game-based learning can sustain high levels of student engagement.
* The motivational aspects of game elements, such as rewards and leaderboards, can lead to increased student motivation.
* Interactive and experiential learning through games can lead to deeper understanding and retention of subject material.
* Games often require strategic thinking, problem-solving, and decision-making, which translates into improved cognitive and social skills.

In another study published in an issue titled 'Gamification in Mobile-Assisted Language Learning,' featured in a 2021 issue of Computer Assisted Language Learning, researchers conducted a systematic review focusing on Duolingo, a widely-used language learning application. The study encompassed an analysis of various research articles exploring the integration of gamification in mobile language learning. It investigated Duolingo's efficacy in helping users learn new languages compared to conventional methods, assessed the influence of gamification elements such as points, leaderboards, and badges on user engagement and motivation, evaluated the quality of language skills acquired through Duolingo, gathered user feedback on its interface, usability, and learning experience, and appraised the overall educational value.  
Gamification in Mobile-Assisted Language Learning (MALL) offers innovative approaches to language learning by utilizing mobile technology and game mechanics to enhance motivation, engagement, and skill development. It introduces features like leaderboards and rewards to motivate learners, fostering a sense of achievement and competition that encourages continuous engagement through instant feedback. Furthermore, they provide visible progress indicators, allowing learners to monitor their achievements and identify areas for improvement, promoting self-regulation and goal-setting. By integrating game mechanics, learning becomes not only enjoyable but also less stressful. They found that:

* Gamification in MALL can improve language accuracy, confidence, and overall learning outcomes.
* Effective gamification in MALL requires thoughtful design that aligns with teaching principles. Research suggests that adding game elements simply isn't enough; these elements must be integrated in ways that enhance learning experiences.
* Learner feedback can inform the development of features that are engaging, educational, and user-friendly.

**Part II. Design a Solution**

**Software Outline**

* Task and Event Management: My software will offer a comprehensive platform to organize meetings, events, tasks, and deadlines. Users can schedule their day efficiently with an intuitive interface that allows for easy addition, modification, and deletion of events and tasks. They can set reminders and due dates to ensure they stay on track.
* Customization: To cater to different user preferences, the software will offer extensive customization options. Users can choose which features to activate or deactivate, such as notification settings, task categorization, and visual themes. This flexibility ensures the software meets the unique needs of each user, whether they are students, professionals, or project managers.
* Integration with Other Tools: Integration with popular email services like Gmail and Outlook and online learning platforms like Moodle, Canvas, and D2L will streamline users' workflows. This feature will enable users to import school assignments with due dates or receive task-related notifications directly from their email. Additionally, it will facilitate seamless management or professional commitments by syncing with work calendars and communication tools like Slack and Microsoft Teams.
* Gamification Elements: To keep users engaged and motivated, the software will incorporate gamification elements such as leaderboards and rewards. Users will earn points and badges for completing tasks, meeting deadlines, and achieving milestones. Leaderboards will foster a healthy sense of competition among users, encouraging continuous improvement and productivity.
* Social Features: The social aspect of the software will allow users to add coworkers, classmates, or friends. This feature will enable collaborative project management by sharing tasks, tracking collective progress, and staying updated on each other's developments. Users can send messages, provide feedback, and ask questions within the platform, promoting effective communication and teamwork.
* Virtual Assistant: A virtual assistant, inspired by Duo from Duolingo, will enhance user experience by offering helpful tips, encouragement, and reminders. The assistant will provide personalized suggestions based on user behavior and preferences, ensuring they make the most out of the software's features.

**Pseudocode**

Task Management System

* Initiation: Set up the initial lists and objects such as tasks, events, users, integrations, leaderboard, and virtual assistant.
* User Management: Functions to add users and find users by ID.
* Task Management: Functions to create and prioritize tasks.
* Event Scheduling: Functions to schedule events.
* Integration with Other Tools: Functions to add email and learning platform integrations.
* Gamification Features: Functions to complete tasks and update points and view the leaderboard.
* Social Features: Functions to add friends and send messages.

Supporting Classes

* User: Manage user attributes and actions like adding tasks, events, integrations, friends, earning points, and receiving messages.
* Task: Manage task attributes and actions like setting priority and marking as complete.
* Event: Manage event attributes.
* Email Integration: Handle email integration details.
* Learning Platform Integration: Handle learning platform integration details.
* Leaderboard: Manage and update leaderboard based on user points.
* Virtual Assistant: Provide feedback to users.

Utility Functions

* Find user by ID: Locate a user by their ID.
* Generate unique task ID: Create a unique ID for each task.
* Generate unique event ID: Create a unique ID for each event.
* Find task by ID: Locate a task by its ID.

Citations

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