Habit Tracker

Technical Design Documentation

Written by: Brandon Mathew

Executive Summary

Recently, the industry has seen the rise of gamification being used as a tool to improve user Experience in software applications. Gamification works on two principles: urgent optimism and blissful productivity. Urgent optimism is the urge to immediately tackle an obstacle that is reasonably achievable. Blissful productivity is the tendency for people enjoying to work hard in-game. With to-do lists and gamification in mind, our group combined these two ideas to create the Habit Tracker web application.

The app effectively incorporates the user's daily itinerary. Only essential features were added into the app and the user only has to spend a minimal amount of time on the actual app. This is to ensure that the user's focus continues to be on time management and habit tracking. Following setup, the app is meant to be used once at the end of the day to check and update the user's progress.

The initial design for Habit Tracker is as follows. There are 3 views: **Todo**, **Character**, and **Rewards**. The main screen is the **Todo** view and this is where users can view their task backlog. Users create tasks to put into the app. A task has the following fields: *task description*, *EXP*, *reward*, and *due date*. Once a user completes a task they have inputted into the app, they can mark the task as complete in the app. Once this occurs the task's reward is added to the Rewards view. Additionally, the user's character gains EXP based on the task's specified EXP value. In the Rewards view, the user can redeem their rewards. In the Character view, the user can view all their character's information such as HP, EXP, tasks completed this week, and tasks missed this week.

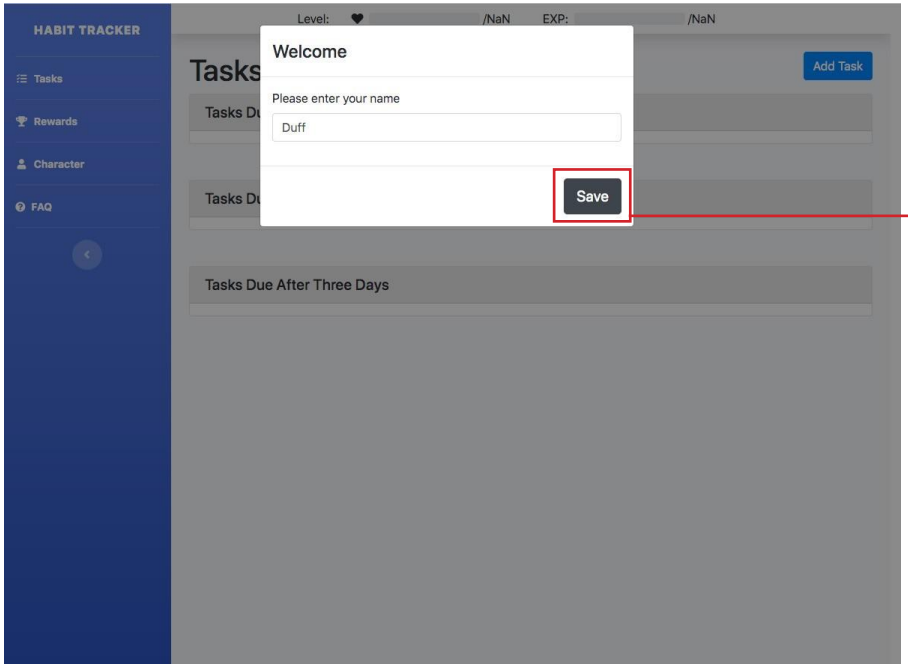
As development for Habit Tracker began, differences between the app's initial design and actual design arose. These differences are as follows:

	Proposed Design	**Actual Design**
Editing Tasks	Edit menu appears when user clicks the task "rectangle"/"bar"	A pencil icon is beside every task and clicking the icon brings up the edit task menu for that task
Horizontal Navbar	Shows all the pages that the user can switch to/see	Shows character information such as character name, HP, and EXP values. Showing all the different pages is now handled by vertical navbar

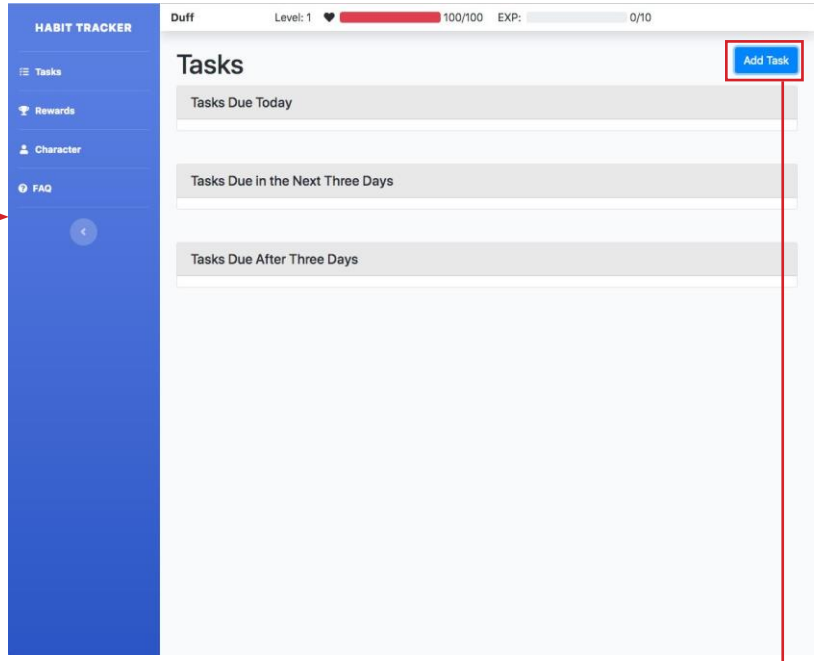
Vertical Navbar	Initially, did not envision the need for a vertical navbar	The vertical navbar shows all the pages that the user can switch to/see
Colour Coded Tasks based on EXP	Initially, did not have a clear system for assigning colours to different tasks	In the Task view, the tasks have different colours depending on different EXP points. This promotes consistency and recognition over recall design principle
Created FAQ Page	In the proposed design, the FAQ page was not created	To clear up any misunderstandings the user might have, the FAQ page was added
Alerts for failing tasks on level up	In the proposed design, the alerts were not created	To ensure the user knew what was happening in the app, alerts were added when the user failed a task and when the user leveled up

Navigational Map of System

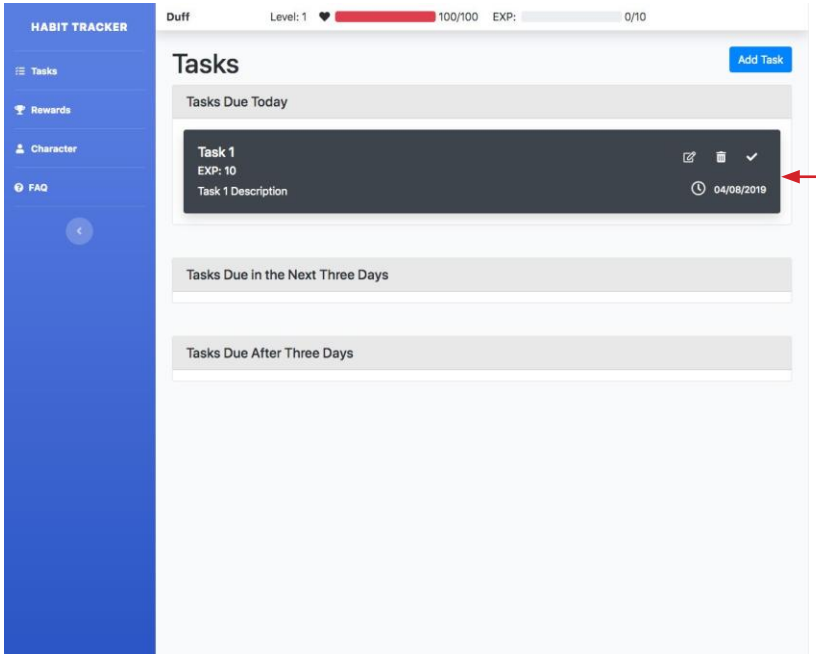
Creating New Task

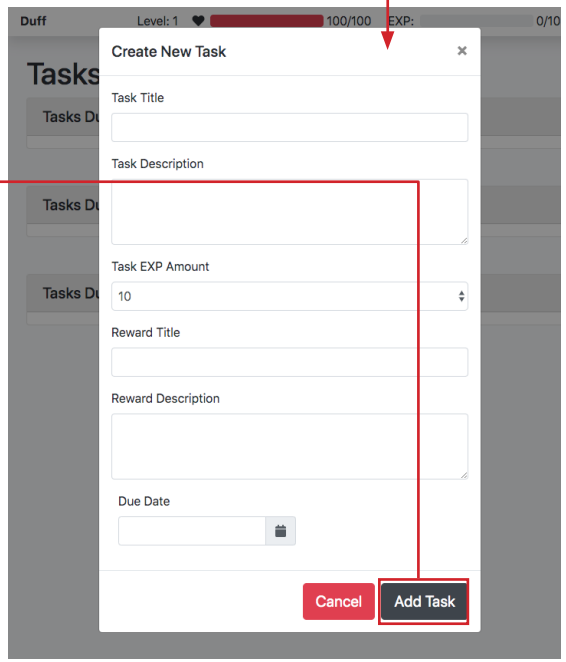


Initial Setup of the Habit Tracker application. Clicking Save closes the Welcome popup input form and shows the Home Page.



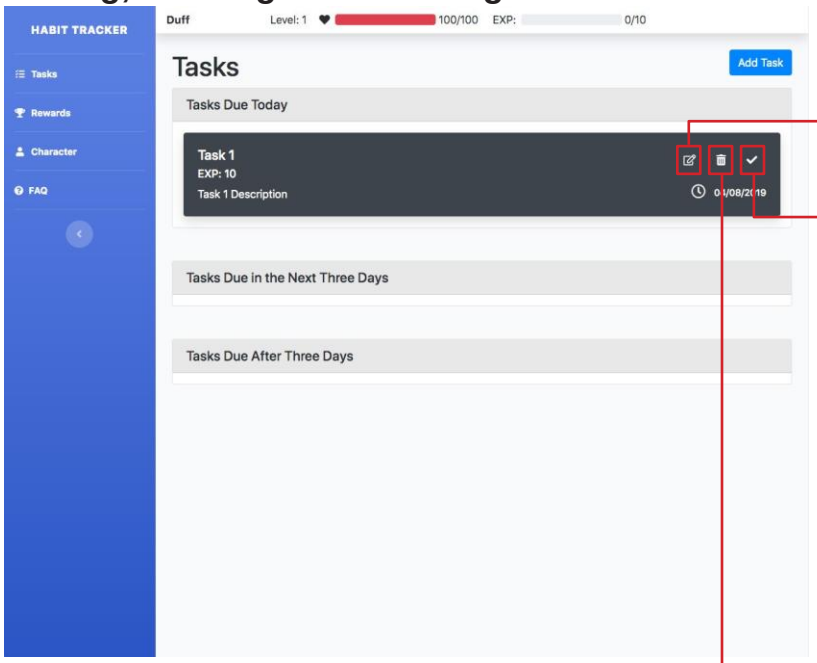
Clicking the Tasks link on the side navigation bar loads the home page. When loading the app, tasks is the default home page. Clicking the “Add Task“ button shows a popup input form that allows the users to add a task.



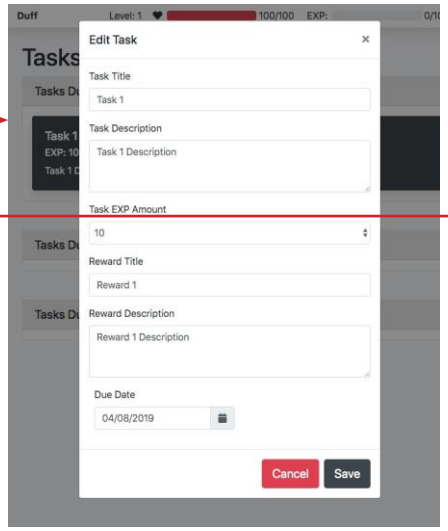


Once the form is filled out. Clicking the “Add Task“ button redirects the user to the Task page where tasks can be seen.

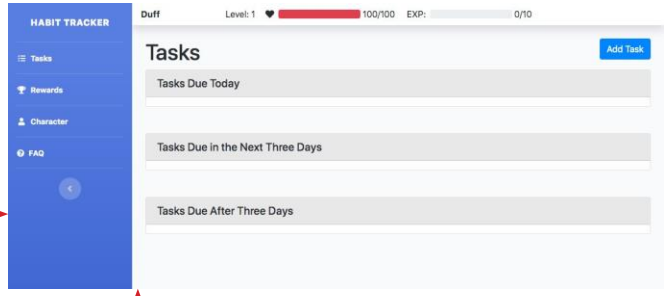
Editing, Deleting and Claiming a Task

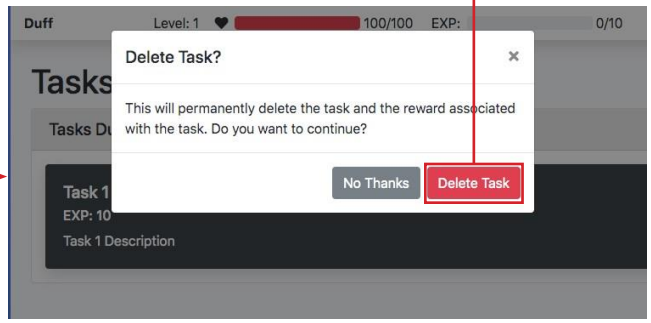


Clicking the Edit Task Button shows an Edit Task form.
Clicking the “Claim Task” button removes the task from its respective task list.



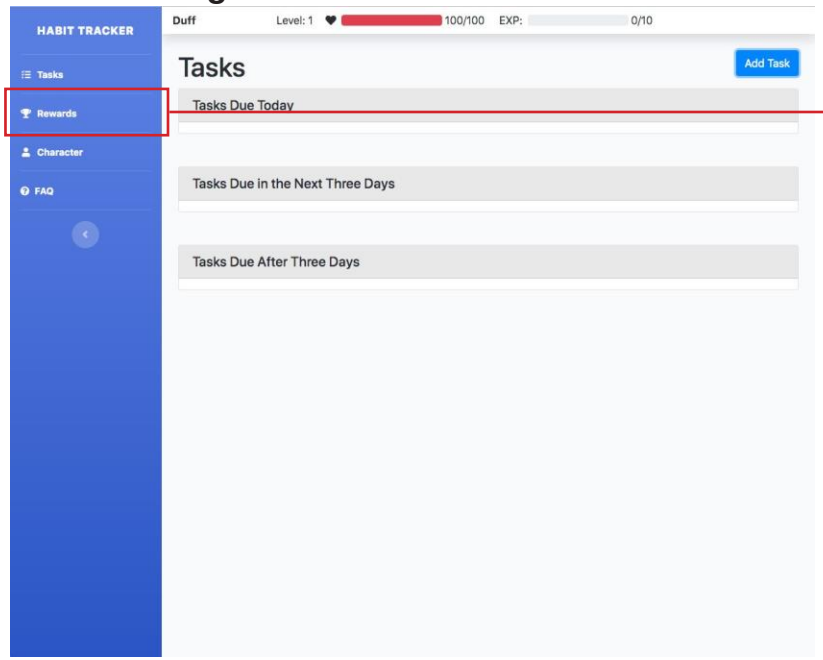
Clicking either Save or Cancel closes the form and loads the Task page



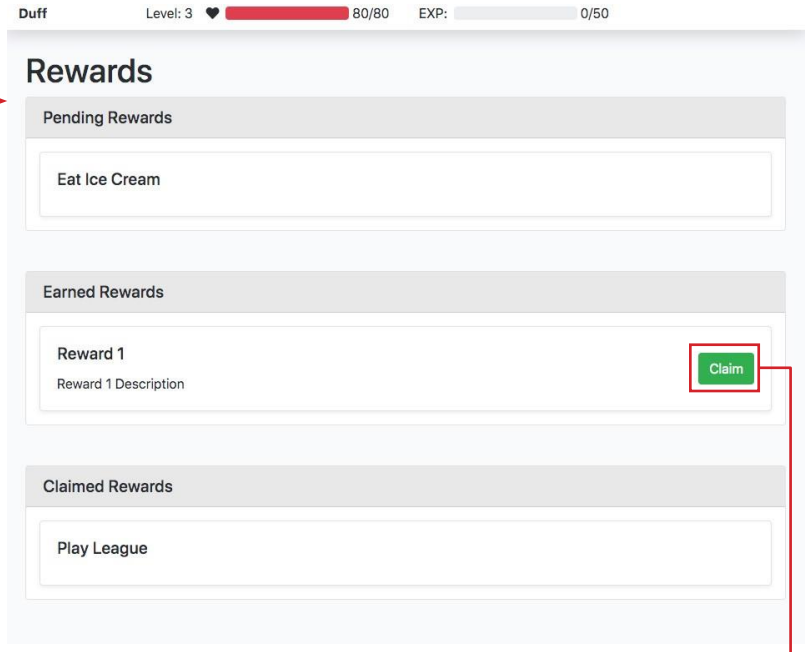


“Delete Task” button deletes the task and loads the Task page

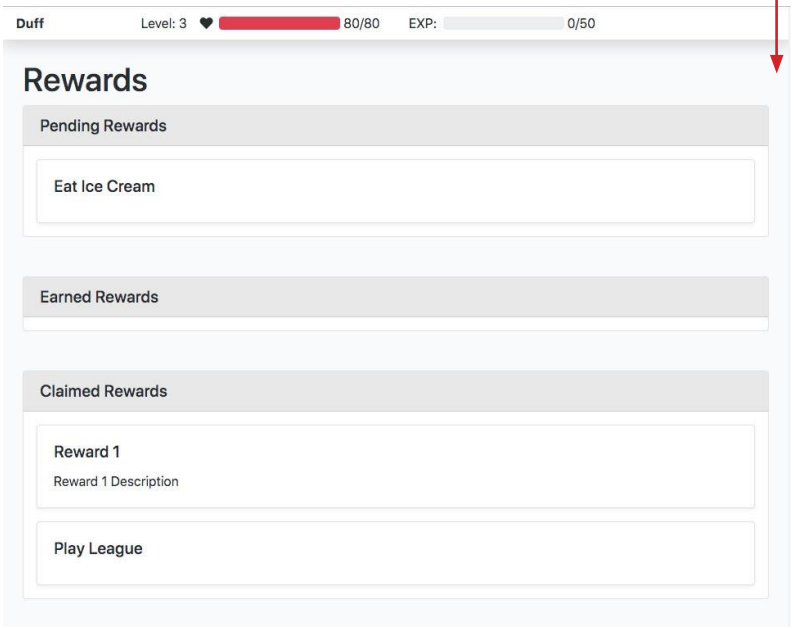
Rewards Page



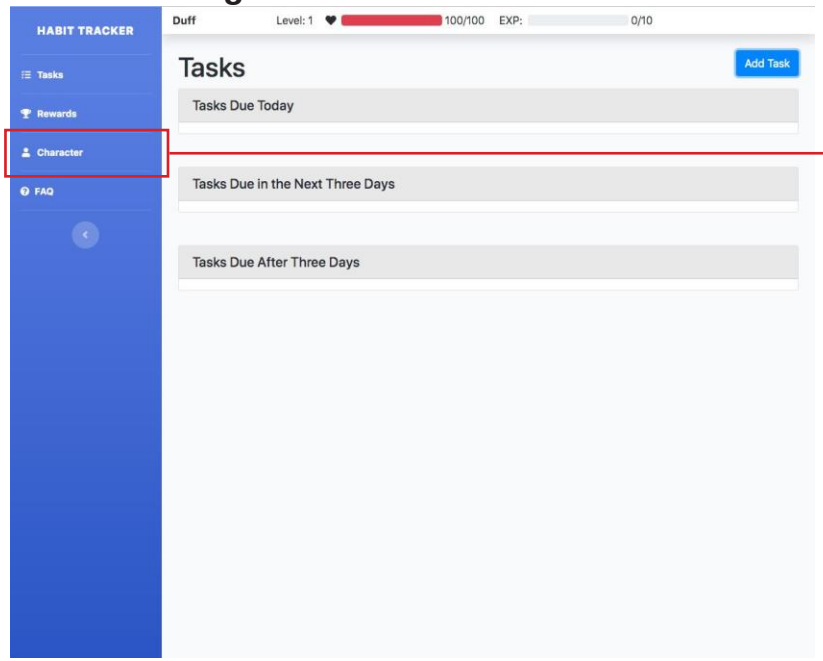
Click on the Rewards link on the Navigation Bar to load the Rewards section



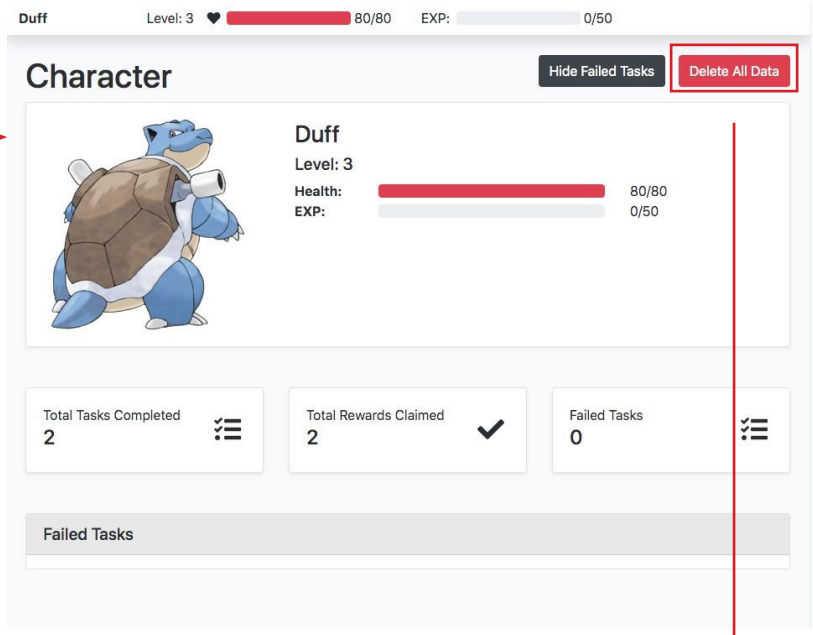
Rewards show three different reward list sections (Pending Rewards, Earned Rewards, Claimed Rewards)
When the “Claim” button is clicked, the Earned Reward gets moved to the Claimed Reward section.



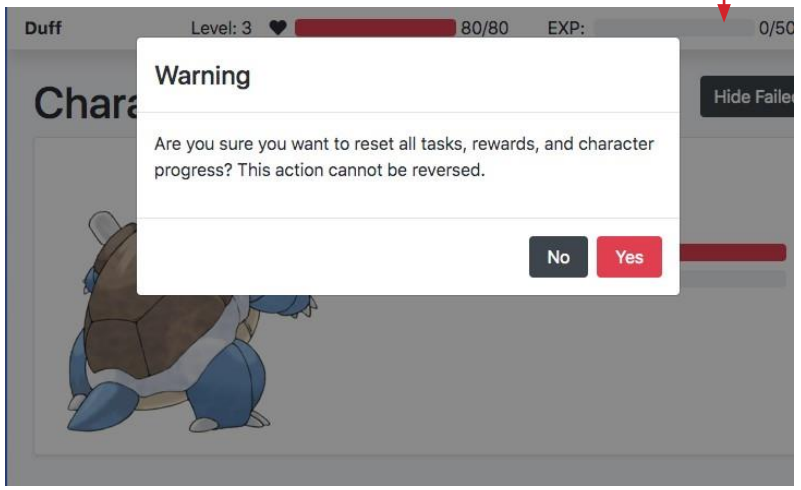
Character Page



Click on the Character link on the Navigation Bar to load the Character page

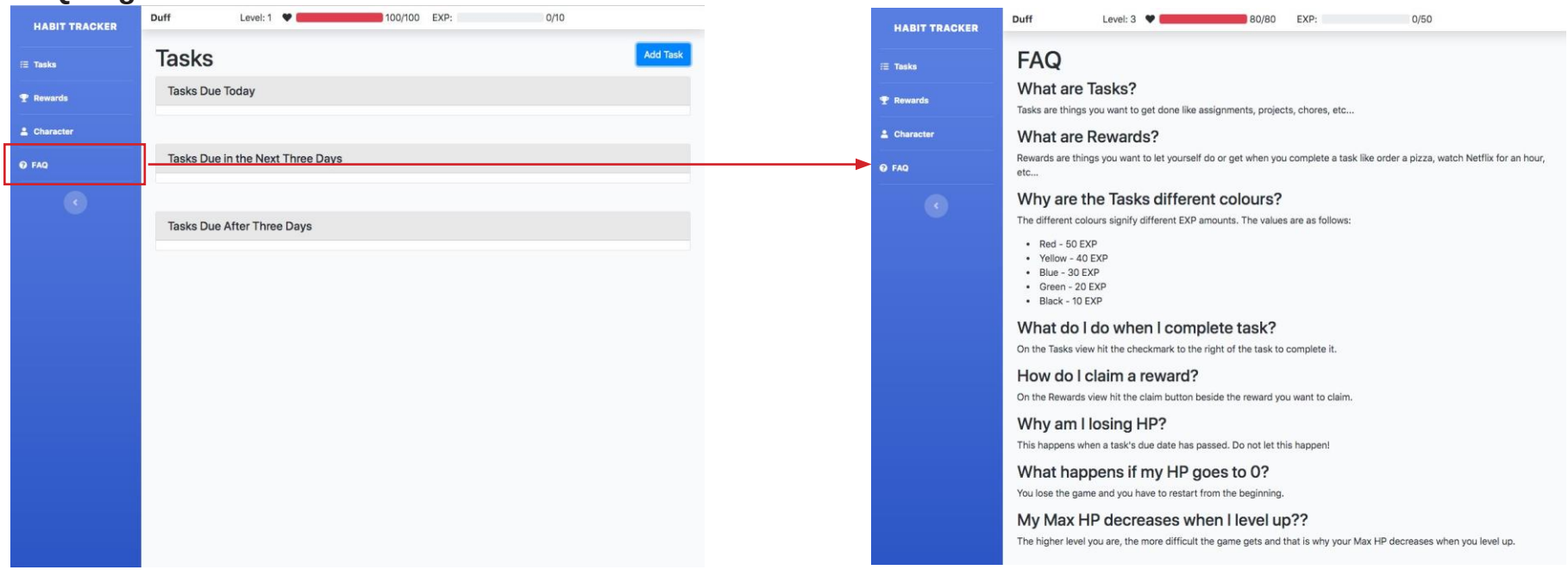


“Delete All Data” button shows a warning and delete confirmation.



Clicking the “Yes” button deletes all tasks, rewards and character data.

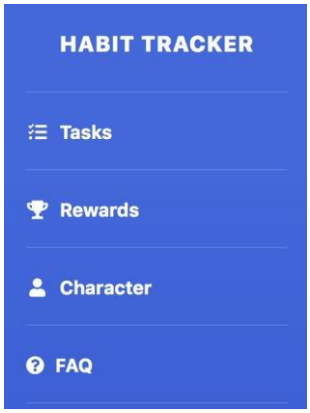
FAQ Page



The FAQ link on the Navigation Bar to load the FAQ page

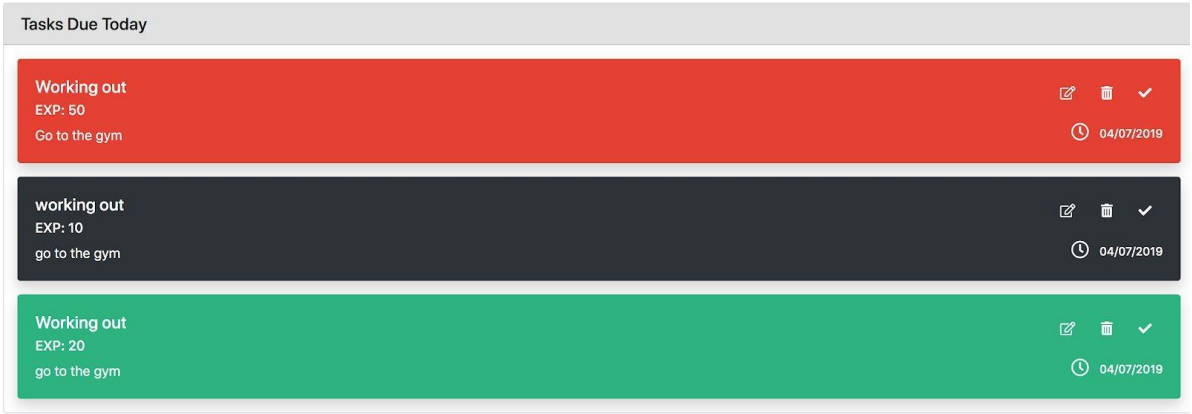
Design Principles

1. **Alignment** - The overall application follows a coherent set of alignment rules to help ease the user's cognitive load. Both vertical and horizontal navigation bars maintain consistent positioning and alignment throughout all views, allowing the user to have a constant navigational and informational anchor point. This forces each view to have a consistent "active" window size, and within each view all children elements are centered on the screen. All text within elements are justified to the right or left, providing the best alignment cues.



2. **Hierarchical Categorization** - In the Tasks view, the tasks are all broken up into three distinct category (Today's Tasks, Tasks in Three Days, and Tasks Due After Three Days) as opposed to just one long list for all tasks. The categorization uses a nest structure to display the child elements within their parent elements. The parent elements are themselves organized vertically to offer further direction on the "importance" of tasks, with the most important being the Tasks Due Today.

3. **Color** - In the Tasks view, the tasks have different colours based on different EXP values and the text within the colour task rectangles is white to ensure visibility through contrast.



4. **Confirmation** - In the Character view when the user decides to delete all their data, a confirmation in the form of a dialog window establishes the consequences clearly and concisely. The dialog ends with a clear “Yes” or “No” question, with actionable verbs as options.

5. **Consistency** - Fonts differ between the navigational menu and the active page area in size, but all child elements are consistent, allowing the user to orient themselves even when focused on a small part of the screen. Aesthetic consistency is further improved by enforcing related colouring of tasks based on their EXP granted. Rewards are categorized into 3 groups: Pending, Earned, and Claimed. This is similar to tasks and the action to “claim” a reward is consistent with the action to “finish” a task, which enhances the application’s internal consistency.

6. **Contour Bias** - The application does not have many features that require deep reflection or thought provocation, hence all rectangular shapes in the application are rounded rectangular shapes, in order to ease the user’s perception against the contour bias of sharp edges and shapes.

7. **Garbage In-Garbage Out** - In the task view, when a new task is added, the input form forces sensible defaults for all required fields, helping ensure that when the values are used later on they can be reliable, and will not produce erroneous/useless output.
8. **Highlighting** - “Save” and “Completed Task” buttons are green ,“Reset” and “Delete Task” buttons are red to bring attention to these elements.

9. **Legibility** - Visual clarity of text is ensured with suitable color combinations, color contrasts, and character spacing.

10. **Readability** - The FAQ page strives to maintain good readability, through use of simple and concise vocabulary. It lowers the cognitive load required by the user to understand the functions of the app, by providing instructions in a question and answer manner.

Rather than going through long prose on what each screen does, the users can find the question closest to his problem and the associated answer immediately.

11. **Signal-to-Noise Ratio** - Throughout the app, all text and indicators are concise to have a higher ratio number, to ensure minimal cognitive load and promote long term use. The ratio number might be too high and may introduce some ambiguity and that is why we added the FAQ page to ensure all users understand everything about our app and avoid common misunderstandings.

12. **80-20 Rule** - Tasks are atomic and as a result won't need to be modified for 80 percent of the time. To allow for easier access to the most used functions of the application (claiming tasks, rewards, character progression), edit and add task menus are implemented as additional pop ups which provide a greater degree of control and flexibility. The FAQ page focuses on the "80 percent" of problems or uncertainty the user might have regarding the app rather than outline all the app's functions and their consequences.

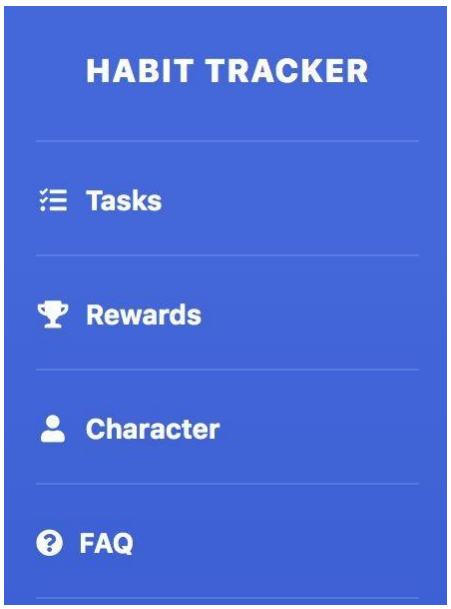
13. **Similarity** - To help the user prioritize tasks, they are grouped by colour based on EXP. This allows the user to compare different tasks they have entered, or judge the importance of a task no matter where they are in the task list. Fonts and Font Sizes are similar across the views of the app.

14. **Progressive Disclosure** - All the information in the app is split into different views and creation/edit forms. This ensures that only relevant information is displayed; information that is rarely accessed is hidden behind extra option buttons like "Edit" and "Add".

15. **Cost-benefit -** The activities that the application allows the user to perform, such as adding and editing tasks, consist of at most 2 to 3 chained tasks. That is the most "EXPensive" activity in terms of cognitive and mental load. All other tasks such as finishing activity, character management, reward management require only 1 click, making the cost minimal on the user. All deadlines end at 12 pm to minimize cost of micro managing time. EXP values are discrete, and date selection happens with a mini-calendar to minimize cognitive cost associated with using the application.

16. **Constraints -** When creating new tasks, there is a physical constraint where the user can select 10 - 50 EXP points in discrete intervals of 10 points. This was designed to simplify usability and complexity and minimize unintentional inputs.

17. **Iconic Representation** - There are corresponding icons right beside each menu item. Pictorial images are used to improve recognition for the user and to allow them to easily identify the menu items without having to read.



18. **Immersion** - The app incorporated gaming elements of immersion to turn an old boring to-do list into an engaging to-do list. Our Habit Tracker provides clear defined goals and challenges that the user can overcome. A prominent trope in RPGs is the concept of character customization or character building. This is a form of human simulation where it allows the user to visualize themselves and see how their own actions affect them.

19. **Forgiveness** - With the gamification aspect, there was a need to ensure that the user has enough of a challenge to make it engaging. This was done through penalties to health for missing tasks, and eventually your character having to restart. That being said, novice users are EXPected to miss a few tasks. As a result, the difficulty curve is adjusted in such a way in which the health of the character goes down as the user's level increases. This allows a beginner user some leniency to miss more tasks at lower levels, while still providing a challenge as the game progresses.

20. **Hick's law** - Each task, reward or the navigation bar has at most 4 choices of actions that can be performed. This in combination with appropriate iconography and conveniently sized buttons (Fitts' Law) reduces the kinematic and cognitive load on the user.

Heuristic Evaluation

Interaction & User Activity

Are the goals of this app clearly defined to the user?

The app implicitly defines its goals (of levelling up) to the user. There is EXPlicit information but it is in the FAQ. The app should take into account users who are not gamers / have no concept of "levelling up", and have a brief popup letting them know that the goal is for them to level up via completing tasks on time.

When clicking an icon, does the proceeding action correspond with the user's intention?

Because of how simple and specific the buttons are, clicking the buttons will trigger an action that the user would EXPect if the user just read the button's text. For example, "rewards" indicates that there is a list of rewards there; "tasks" indicates that there is a list of tasks; "FAQ" leads to a Frequently Asked Questions page etc.

Is there a clearly defined action sequence for adding tasks?

Yes and no. When the app is launched for the first time, the tasks screen will be blank. When a user adds a task (and that button is the most prominent on the page), they will see it on the tasks screen in front of them after filling / submitting the fields. Thus, it becomes obvious to the user that the logical sequence will be to add the task first before continuing. However, there is no EXPlicit indicator as to where the user should start.

Do all the buttons work properly? Will they yield the same result as written?

Yes. Every button in the app corresponds to an action EXPlicitly defined in the button's text. "Rewards" will take the user to the Rewards Page. "Character" will take the user to their Character Profile etc.

What can the user perceive or see when they are using the app?

Yes and no. The user can see very clearly that adding a task will show up on the task screen. However, the user will not know that the reward has been added to the reward page unless they chose to go to the Rewards Page on there own accord. There is no indicator or reason provided to check the other pages.

Can the user interpret what is happening?

Somewhat. When the user levels up or fails a task, there is an alert that tells the user exactly what happened. Any of the other tasks such as claiming a reward or claiming a task do not have any alerts that occur. The user will have to check the EXP bar on their own accord to see how much EXP they gained and their current EXP values.

Can the user make adjustments if they made a mistake that affects their HP / EXP calculation?

When the user adds a task, they are given the opportunity to edit that task's information, including date and EXP value. This is great because if a user makes a mistake in the task information (such as giving too much EXP to an unimportant task, or putting the wrong date), they can edit that mistake that prevent future calculational errors. Unfortunately, a user cannot edit a task whose completion date has already passed. This is problematic - especially if the user accidentally selects a past date for a task that should be upcoming. The task will show up as a missed task, the user will lose HP (and possibly lose the game), and they have no way correcting that fatal mistake.

Interactivity

What is the Diversity of the interactions available to the User?

There is moderate to basic interaction diversity. The user is able to change pages, create tasks, edit tasks, delete tasks, claim tasks, and claim rewards. Based on the goals and features of the app, the interaction diversity cannot be significantly increased.

What is the Flexibility available to the User?

The tool is very flexible because the user is the one who defines all the fields in the tasks. By doing so, the user is in control of how difficult or easy the game will be. Additionally, the tasks are exactly whatever the user wants them to be. This ensures the tasks completely suit the user’s unique needs.

What is the app’s Genre?

The app is Annotation-based. This is because the user does not create new representations and they do add information. The user does add information by filling out information to create tasks. The user only creates tasks and rewards that are pre-structured by the app. The user does not create something completely new in terms of representations in the app.

What is the Anatomy of most app's interactions?

The anatomy of most of the app's interactions is manual. This is because the user is not "speaking" to the UI elements such as typing commands into a console. Instead the user is "using their hands" and grasping and manipulating a representation. An example is using the mouse cursor to claim a task.

What type of focus does the app's interactions have?

The type of focus that most of the app's interactions have are Indirect. For example, the user does not act on the actual representation of the task, which is represented by a rectangle. Instead the user has to click icons such as the trash can to delete the task instead of swiping or dragging the task into a trash can.

What kind of flow does the app have?

The app has a discrete flow because actions occur instantaneously in time as opposed to occurring over a span of time in a fluid manner. An example is claiming tasks. The user would just press the "Claim" button and the action will occur instantaneously.

Metaphor, Semiotics, Representation

How are semiotics used for the User?

Graphical signs were used to give representations. For example, beside each menu items, there were corresponding icons to allow the user to interpret and get meanings from graphical signs.

Do the graphics used represent the actions of its object accurately?

The graphics represent extremely common metaphors and tropes. The graphics used can be easily associated with its corresponding action. The heart represents HP - a common RPG trope that is metaphorically used to illustrate vitality. Rewards is associated with a trophy icon. Trophies are typically given out in real life events to celebrate victory or an achievement of some sort. Similarly, unlocking a reward is an in-game achievement used to commemorate the user's hard work and tenacity.

Are representations appropriate for the tasks?

Representations can affect how we perceive and how we understand something. Representations are tools for and extension of the mind. This app alone, Habit Tracker, is a great representation of a to-do list. Habit Tracker has a context of use; it is a game and also a productivity tool.

Are representations reflective or EXPeriential?

EXPeriential representation was used laying out different tasks. It is laid out and grouped in a way that it can be perceived and interpreted without requiring mental effort to make sense of it.

How were metaphors used?

This app is a big metaphor for paper pencil to-do list app.

Design Perception

Are the relationship between entities easily perceivable?

The relation between tasks and rewards is simple and a well defined 1 to 1 mapping, making it easy to understand and use implicitly. How ever the relationship between health and level, and health and tasks are a bit ambiguous as they rely on the user having previous knowledge of RPG games. In order to understand that not completing a task reduces your health, and when your health reaches 0 you have to restart, you need to visit the FAQ page and this information is EXPlicit. If there were animations when tasks are claimed or they EXPire indicating gaining Experience or taking damage, the knowledge could become more implicit and easier to understand.

Is there a large cognitive load associated with the most used functions of the app?

The most used function of the app is adding tasks and rewards and claiming them. These process are streamlined by removing unnecessary options and restricting the user input, minimizing the cognitive load associated with these tasks.

Does the layout of the application allow for ease of task selection and execution?

Most complex functionality is hidden behind buttons, but all the buttons to display this functionality are displayed with large iconic indicators or concise words such as “Add Task”. Since users focus on what is their current task and what they need to do, consistent anchored navigation and separation of the tasks and character pages allow the user to efficiently select and perform their required task.

Do the metaphors used map well to the actions the applications allows and the changes it emits?

The whole app is a mix of two different metaphors, the to-do list and a RPG character simulator. The to-do list acts as the metaphor that is used to assist in the inputting of tasks, manipulating them and finishing them. The RPG simulator acts as the metaphor for tracking your progression, and quantifying it in a the “level” domain. By keeping the number of mappings form the two domains to a minimal amount, the user can easily understand the application based on knowledge from the independant metaphors.

Does app provide meaningful value for the completion of tasks?

Since it merely acts as tracker for your tasks, and your progression in completing them it, may seem to have no value. But it allows for a way for younger audiences to have a structured way to track responsibilities and time management capabilities in a fun and intuitive manner. The rewards system adds to the value of completing tasks in real life by letting you set a real life reward. Since many people only order out once every two weeks, or treat themselves after a hard workout; the rewards acts as an easy way to link rewards to tasks and make them actionable and acts as a handy coupon book to store all your hard earned rewards.

Is it easy to compare and perceive the similarities and differences between related objects?

All tasks have an EXP value, and they are inherently designed to be compared, as opposed to a traditional to-do list where it is much harder to compare tasks unless its in ascending or descending order. The restriction of the EXP value to predetermined intervals allows for comparison between many different tasks based on importance, and encourages the user to select tasks in relation to each other based on effort required. The colour coded display of the tasks make it easy for the user to visually perceive and compare tasks efficiently, and the categorization of task in the display based on upcoming due dates allow the user to make comparisons along 2 measures/axis easily.

User Learning Curve

What does the app do to ensure the user's working memory is not full?

The app stores information about all the tasks that have been entered by the user and displays it on the Tasks view. The information about the user's current HP and EXP is at the top of the page. These two examples show how the user does not have to commit these pieces of information to the working memory.

What are the mental models that the app relies on for the user to understand how the app works?

The app relies on the user's mental model of paper to-do list. To-Do lists work by putting one's own tasks onto the list and then one would remove tasks off the list once the tasks are actually completed. The app's tasks work in a similar fashion.

How does the layout of objects consider the impact of user's selective attention?

The app is structured so that the relevant information is only present. All the app's information is split into the various views/webpages. An example is all the Character information is on the Character page. If the user only wants to look at all the Character information they would go to the Character page.

How does the user acquire information from the app?

The user acquires information from the app solely from their visual senses. The app does not have any other outputs other than visual output. Maybe in future iterations, the app can incorporate audio output to accelerate the user understanding the app.

General Usability

Is this program easy to learn for the User?

The program is very easy to use. There are little time and effort required to maneuver and navigate the program. All buttons are tasks are clearly laid out. There is no learning curve needed to use the program.

How is the throughput for the User?

The program is very easy to use. The program is designed minimalistically; there are only four pages.

To what extent can this program accommodate changes to tasks, is it adaptable to the users needs?

The program accommodate changes to tasks. Once the User has created a new task, the User can edit any details about the task or even delete the task without interfering the game. The User can delete all the data if needed.

How is the attitude engendered in the User?

Positive attitude will be received by the User by the system with the reward system and as the character levels up from ticking off completed items.

Is there Visibility of system status that the system keep the User informed about what is going on?

The app keeps the user informed about what is going on through appropriate feedback. For instance, in the task page, the user can view different pending tasks, and once completed, the system give the User feedbacks with rewards and increase in EXP points. From this visibility of system status the User will feel rewarded and feel motivated to continue to complete other pending tasks.

Is there a help and documentation for the User?

Yes there is a help documentation for the User. It is listed as one of our menu items. The User can view the FAQ section, if the User has any questions.

Improvements

Here are some features that the team would like to add to the app in the future:

- The ability to compete with friends (a PvP system).
- Repeatable tasks, with the possibility of reward “streaks” of completing repeatable tasks (similar to how Duolingo has streaks for completing lessons daily).
- Using other technologies to ensure user actually completed their tasks (ex: pulling heartbeat data from a user’s Fitbit to see whether user actually did workout); implementing an anti-cheat algorithm / locks to discourage cheating.
- There should be a pop-up indicating to the user where to start and go from there (“start here!”).
- There should be something letting a new user know what the overall objective of the game is, without them having to resort to the FAQ via a popup or something similar.
- The Rewards Page and changes to the Character Profile should be highlighted upon any changes made to it, as the user cannot see those pages without clicking them..
- Various chart views that would allow the user to see a weekly and monthly overview of the various tasks and rewards completed and claimed respectively.
- If the tasks were organized based on date and time, a calendar view would have been a complementary view.