

# ThymeBoxer Design Specification

Document v1.53

## Summary

ThymeBoxer is an original design for a simple mobile productivity app based on the concept of “time boxing,” which is essentially a combination to-do list and daily calendar. Unlike a traditional to-do list, time boxing focuses on accomplishing tasks within specific time windows. A “timed” mode enables stopwatch timing of each task in place of scheduling.

In the spirit of gamifying productivity, a user-defined reward system is included, with points granted for each task based on the difficulty level and time spent.

This is a work-in-progress.

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# Database Schema

## Settings Table

Field Name	Label	Type	Description
Id [PK]		Int	Primary key
listMode	List Mode	Short	1 = scheduled, 2 = timed
darkMode	Dark Mode	Boolean	True = dark, false = light; defaults to false
displayNotes	Display Notes in Task List	Boolean	Defaults to False
expandSubtasks	Expand Subtasks	Boolean	Defaults to True
swipeToDelete	Swipe to Delete	Boolean	Defaults to True
deleteConfirmation		Boolean	Defaults to True
defaultTime	Default Time	Short	1 = Earliest, 2 = Latest; defaults to 1
timeIncrement	Time Increment	Short	5, 10, or 15 minutes
rewards	Rewards	Short array	Stores four numbers, 100 maximum
weekend	Weekend	Short array	Stores days considered off work or school

## ListItem Table

Each record in this table represents a single task or appointment.

Field Name	Label	Type	Description
Id [PK]	N/A	Int	Primary key
itemType	Task or Appointment	Short	1 = Task, 2 = Appointment
description	Description	Char(40)	Required
Notes	Notes	Char(500)	Optional
dueDate	Due Date	LocalDate	Optional
startTime	Time	LocalTime	Required; based on <b>Default Time</b> in Settings
pinned	Pin	Boolean	Time is locked in
duration	Duration	LocalTime	Default to 30 minutes
timedDuration	N/A	LocalTime	Displayed on task row when in Timed mode
difficulty	Difficulty	Short	1, 2, or 3; default to 2
rewardPoints	Reward Points	Short	Total points awarded for completing task
priority	Priority	Short	1, 2, 3, or 4; default to 1 (no priority)
recurringDays	Monday, Tuesday, etc.	Short array	
dateCreated	N/A	LocalDate	
dateCompleted	N/A	LocalDate	


## SubTaskItem Table

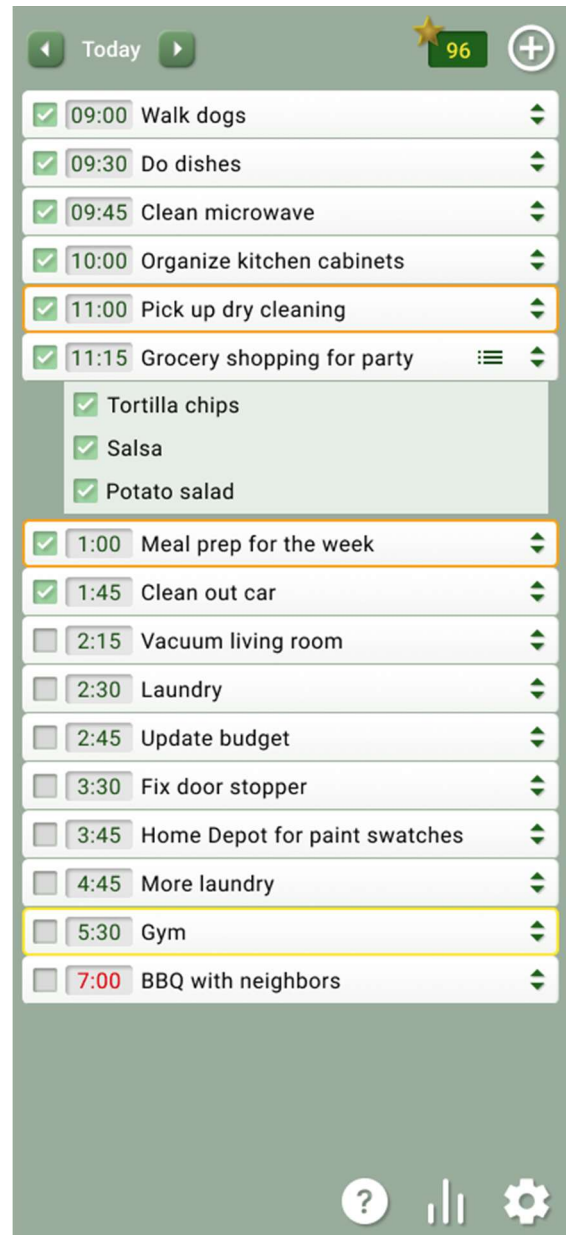
Each record in this table represents a single subtask which is linked to a record in the *ListItem* table.

Field Name	Label	Type	Description
Id [PK]	N/A	Int	Primary key
listItemId [FK]	N/A	Int	Foreign key
description	Description	Char(40)	Subtask description
completed	N/A	Boolean	

# Interface

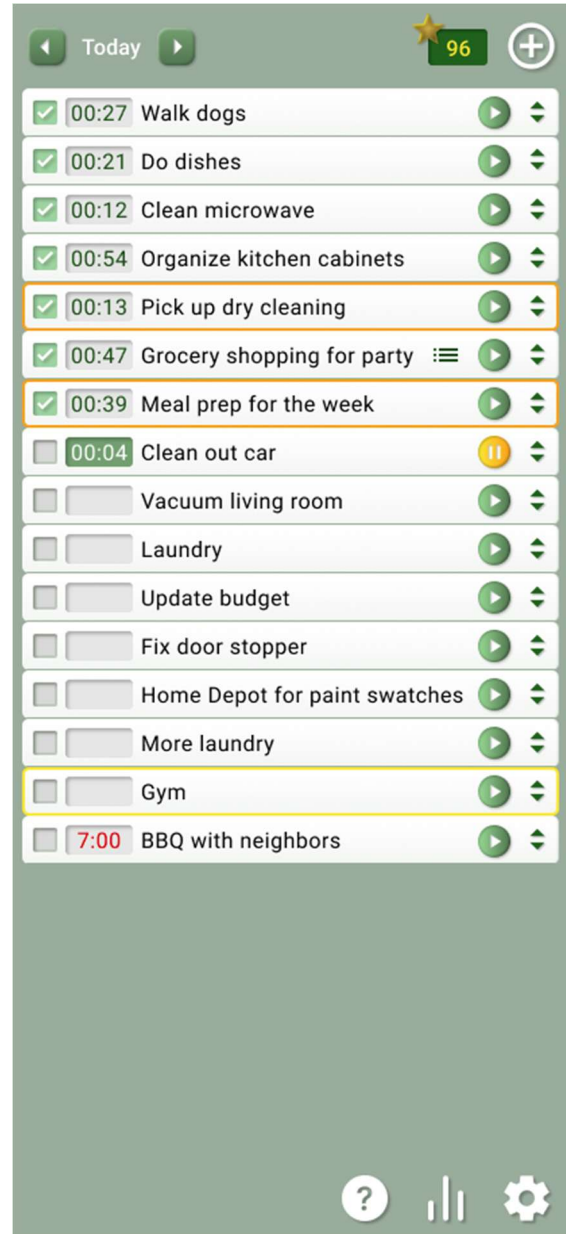
## Main Screen – Scheduled Mode

- The top bar displays either **Today** or (if not the current day) a date. Default to the current day.
- Arrows are displayed on either side of the “Today” text to move forward or back one day.
- Tapping on the date opens a calendar.
- A reward points readout is displayed in the upper right, based on the total of completed tasks for the day.
- Tapping the  icon or tapping on a task row opens the New Task / Edit Task screen.
- The main list displays:
  - Recurring tasks set for that day.
  - Incomplete tasks.
  - Both tasks and appointments that are due today.
- Lower right corner:
  - Help icon opens a help screen.
  - Report icon opens a chart screen with reward points graph over time.
  - Gear icon opens settings screen.
- Task row:
  - Tap to open the Edit Task screen for that task.
  - If task priority is 2, 3, or 4, frame task with the associated priority color.
  - Move tasks by dragging the arrow icons on the far right. This will adjust the time for all the rows below it, except for pinned tasks and appointments. If a pinned task is encountered when changing times, the task(s) before the pinned item should be moved below it.
  - When a moved task is dropped, set time to the slot following the duration of the task above it.
  - Check box to complete the task. Upon completion:
    - Update the corresponding record in *ListItem* with *dateCompleted*.
    - Add the reward points for this task to the total reward points for the day. If total reward points pass the threshold for an award, show confetti animation and update the icon shown in the upper right.



## Main Screen – Timed Mode


- Timed mode (configured in Settings) is nearly identical to Scheduled mode, but instead of scheduling tasks, a stopwatch function allows the user to time each one. Tasks may still be scheduled if desired.
- Appointments are still scheduled, with the time appearing in red text.
- The play button on each row starts the timer, and changes to a pause button while the timer is running.
- Marking the task complete stops the timer and saves the duration in the **timedDuration** field of the *ListItem* table.

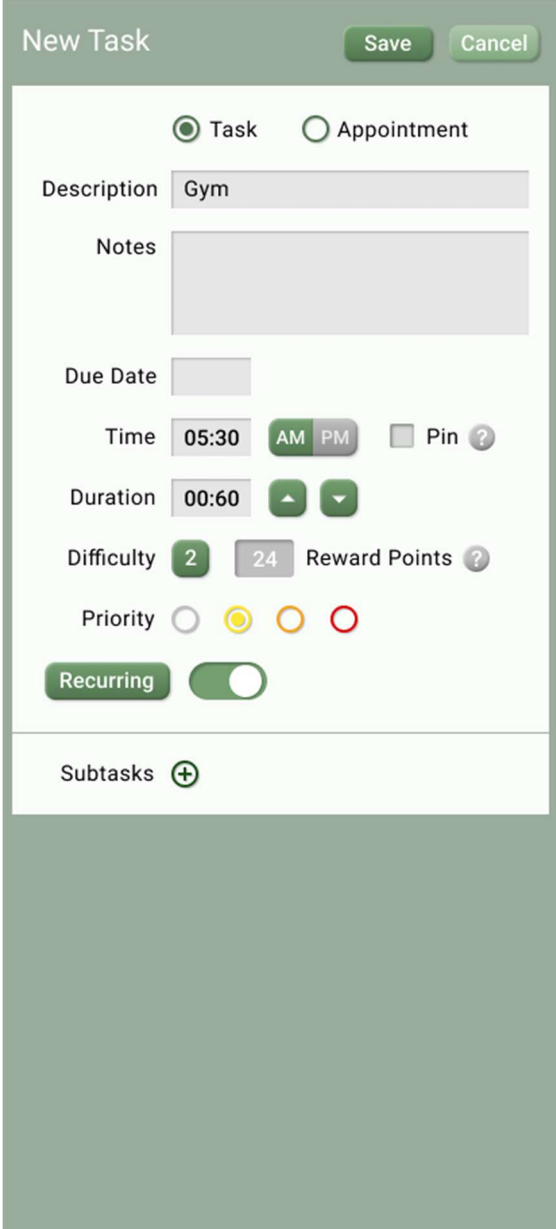


## Main Screen – Long-Press Task

- The menu includes the following selections:
  - **Copy to Today** [only available when displaying task list for dates other than current day]
  - **Complete Task** or **Complete Appointment**
  - **Duplicate Task** or **Duplicate Appointment**
  - **Edit Task** [same functionality as short press on task]
  - **Continue Tomorrow**
    - Popup requests time spent today; defaults to original Duration; **OK** and **Cancel** buttons.
    - Task will be duplicated for the following day with original Duration.
  - **Delete Task** or **Delete Appointment**

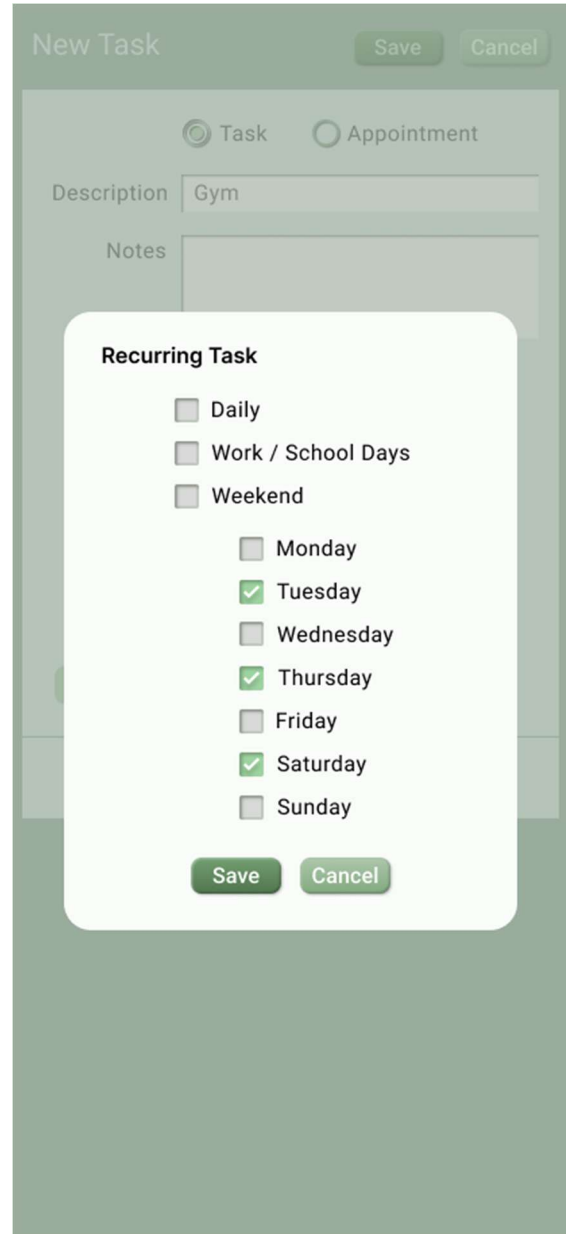
## New Task / Edit Task

- When the  button is tapped on the main task list screen, the top bar will display “New Task”. When a task row is tapped in the list, the top bar will display “Edit Task”.
- **Task** and **Appointment** radio buttons
  - Default to Task.
  - If Appointment is selected, open a date picker.
- **Description** [optional]
- **Notes** [optional]
- **Due Date** [optional for tasks and required for appointments]
  - Default to null for tasks.
  - Note that appointments will only appear in the main task list on the due date and cannot be moved by dragging.
- **Time**
  - If **List Mode** setting is *Scheduled*, populate using the **Default Time** setting.
  - If **List Mode** setting is *Timed*, this field will be empty for new tasks.
- **Pin** check box will cause that time slot to be fixed in position, as with appointments. Other tasks cannot occupy that time or overlap with the duration of this task.
- **Duration**
  - Default to 00:30.
  - Arrow buttons increment or decrement by the **Time Increment** setting; default is 15 minutes.
- **Difficulty**
  - Displays number 1, 2, or 3. The default is 2.
  - 1 = “Easy,” 2 = “Moderate,” 3 = “Difficult.”
  - Tapping the Difficulty display opens a dialog with radio buttons for Easy, Moderate, and Difficult.
  - Selecting any difficulty level (even the current difficulty level) closes the dialog and updates the Difficulty display.
- **Reward Points**
  - Uneditable. This displays the result of Difficulty level \* the number of 5-minute increments. For example, a moderately difficult task with a 30-minute duration would be  $2 * 6 = 12$ .
- **Priority**
  - Four colors—gray (default; no priority), yellow, orange, red.
  - In storage, Gray = 1, Yellow = 2, Orange = 3, and Red = 4.
- **Recurring** – See the following page.
- Tapping any  icon opens a popup with the associated context-sensitive help topic, shown on page 9.
- Upon **Save**:
  - Check for conflicting appointments where time and duration overlap with another.
  - Write changes to the *ListItem* table and return to the main screen.



## New Task / Edit Task – Recurring Tasks

- **Recurring** button and toggle switch.
- Toggle is off by default.
- Tapping the **Recurring** button opens a dialog with checkboxes:
  - If the Task radio button is selected in the New Task screen, the label of this dialog will read “Recurring Task”. If the Appointment radio button is selected, it will read “Recurring Appointment”.
  - The top three selections automatically select the appropriate days of the week in the lower part of the screen:
    - Daily [selects all seven days]
    - Work / School Days [selects the days *not* chosen as weekend days in Settings]
    - Weekend [selects the days chosen as weekend days in Settings]
      - Monday
      - Tuesday
      - Wednesday
      - Thursday
      - Friday
      - Saturday
      - Sunday
  - Similarly, selecting all of the days *except* those chosen as weekend days in Settings causes the Work / School Days box to be checked in the upper part of the screen, and selecting all of the days chosen as weekend days in Settings causes the Weekend box to be checked.
  - Clicking the **Save** button writes the numeric equivalent of the selected days to the **recurringDays** field in the *ListItem* table.
  - Clicking the **Cancel** button closes the dialog without making changes to the *ListItem* table.
- If the toggle switch is off, turning it on opens the same dialog box.
- Whether the toggle switch is on or off, unchecking all the boxes in the dialog and saving will cause the toggle switch to be off.
- Having any box checked in the dialog and saving will cause the toggle switch to be on.



## New Task / Edit Task – Subtasks

- Tapping the **+** button opens the Add New Subtask dialog.
- If an existing subtask row is tapped instead, the same dialog opens with the title “Edit Subtask”.
- Upon **Save**, write the changes to the **description** and **completed** fields in the *SubTaskItem* table and return to the New Task / Edit Task screen.
- Upon **Cancel**, return to the New Task / Edit Task screen.
- Upon **Delete**, a popup confirmation reading “Are you sure?” appears with **Yes** and **Cancel** buttons.

The screenshot shows the 'New Task' screen with the following details:


- Title:** New Task
- Buttons:** Save, Cancel
- Task Type:**  Task,  Appointment
- Description:** Grocery store for party
- Notes:** (Empty text area)
- Due Date:** (Empty date field)
- Time:** 11:15 AM PM, Pin ?
- Duration:** 00:45 (with up/down arrows)
- Difficulty:** 2, 18 Reward Points ?
- Priority:** (Four colored circles: grey, yellow, orange, red)
- Recurring:** (Toggle switch, currently off)
- Subtasks:** **+** button and a list of three items: Tortilla chips, Salsa, and Potato Salad, each with a checkmark and a dropdown arrow.

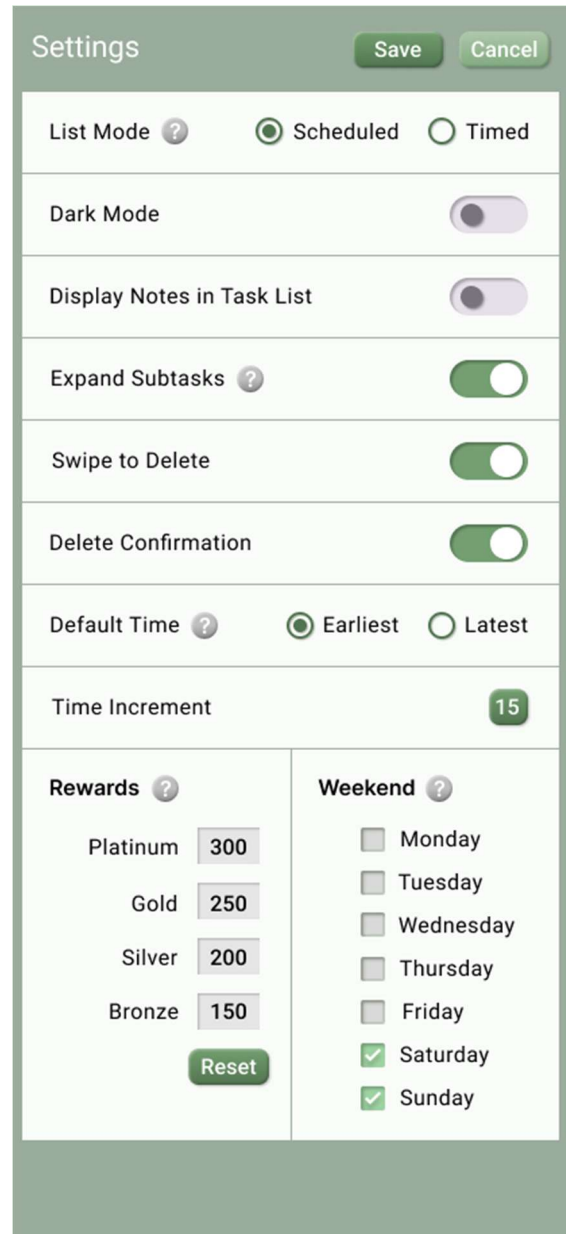
The screenshot shows the 'New Task' screen with the 'Add New Subtask' dialog open. The dialog contains:

- Title:** Add New Subtask
- Description:** (Text input field)
- Completed:**  Completed
- Buttons:** Delete, Save, Cancel

The background 'New Task' screen is dimmed. A keyboard is visible at the bottom of the screen.

## Settings

- **List Mode**
  - **Scheduled** [Default] the main task list will show the scheduled time for all tasks.
  - **Timed** – the main task list incorporates a stopwatch timer for each row, enabling the user to time each task.
- **Dark Mode** [toggle; off by default]
- **Display Notes in Task List**
- **Swipe to Delete**
- **Delete Confirmation**
  - Removes the “Are you sure?” dialog when swiping to delete an item in the main task list, long-pressing an item and selecting Delete from the menu, or clicking the **Delete** button in the Add / Edit Subtask dialog.
  - Defaults to on.
- **Default Time** [for New Tasks]
  - **Earliest** - time will be one increment earlier than the earliest scheduled task for the day
  - **Latest** - time will be one increment following the duration of the last scheduled task for the day
- **Time Increment**
  - Opens a dialog allowing the selection of 5 minutes or 15 minutes.
  - Defaults to 15 minutes.
- **Weekend** - choose day(s) considered off work or school.
  - Radio buttons with days of week.
  - Saturday and Sunday are selected by default.
- **Rewards**
  - Default values, all are editable:
    - Platinum [300]
    - Gold [250]
    - Silver [200]
    - Bronze [150]
  - Validation on **Save**:
    - Maximum value of 500 in any one field.
    - Entries must be unique and in descending order.
  - Tapping the **Reset** button returns values to default settings.
- Tapping any  icon opens a popup with the associated context-sensitive help topic, shown on page 9.



The screenshot shows the 'Settings' screen with a green header and 'Save' and 'Cancel' buttons. The settings are organized into sections: 'List Mode' (radio buttons for Scheduled and Timed), 'Dark Mode' (toggle), 'Display Notes in Task List' (toggle), 'Expand Subtasks' (toggle), 'Swipe to Delete' (toggle), 'Delete Confirmation' (toggle), 'Default Time' (radio buttons for Earliest and Latest), and 'Time Increment' (a numeric field set to 15). Below these are two columns: 'Rewards' with input fields for Platinum (300), Gold (250), Silver (200), and Bronze (150), and a 'Reset' button; and 'Weekend' with checkboxes for Monday through Sunday, where Saturday and Sunday are checked.



## Context-Sensitive Help Popups

Screen	Label	Content
New Task / Edit Task	Pin [Time]	<p><b>Pin</b></p> <p>Whether you are using Scheduled tasks or Timed tasks, checking this box will cause the entered time and duration of this task to be unavailable for other tasks, in the same way as appointments. When a task is <i>not</i> pinned, moving it up or down in the list will update the scheduled time of both that task and other unpinned tasks.</p>
	Difficulty / Reward Points	<p><b>Difficulty and Reward Points</b></p> <p>The reward system automatically assigns a point value to all tasks, based on the selected difficulty and the duration of the task.</p> <p>There are 3 levels of difficulty—1 for easy, 2 for moderate, and 3 for difficult. The default for new tasks is 2.</p> <p>The Reward Points display will show the point value of the task using the difficulty number multiplied by the number of 5-minute increments in the duration. For example, a moderately difficult task with a 30-minute duration would be <math>2 \times 6 = 12</math>. The total reward points completed for the day are shown above the main task list.</p>
Settings	List Mode	<p><b>List Mode</b></p> <p>There are two ways of using the task list—Scheduled and Timed:</p> <p>In <b>Scheduled</b> mode, each task requires a specific time. If you don't enter a time for new tasks, that field will be populated automatically based on the Default Time setting. The main task list will show the scheduled time for all tasks.</p> <p>In <b>Timed</b> mode, scheduling a time for each task is optional, and the main task list will include a stopwatch-style timer for each row, enabling you to time each task. If you do include a scheduled time for a task, it will appear on that row in the list until you start the timer, after which it will show the elapsed time and then the final time spent after completing the task.</p>
	Expand Subtasks	<p><b>Expand Subtasks</b></p> <p>If this setting is activated, any subtasks associated with tasks and appointments in the main task list will be automatically expanded for viewing upon opening the app. They can then be closed and opened as needed. If this setting is not activated, subtasks will be closed on startup.</p>

	Default Time	<p><b>Default Time</b> This selection determines the initial value of the <b>Time</b> field when adding new tasks, which can then be edited if needed.</p> <p>Selecting <b>Earliest</b> will set the time to the first slot of the day or following the last complete task. The scheduled time of any unpinned tasks that follow the new task will be adjusted.</p> <p>Selecting <b>Latest</b> will set the time to follow the last scheduled task for the day, taking that task’s duration into consideration.</p>
	Rewards	<p><b>Rewards</b> Depending on your level of mobility and other factors affecting productivity, a typical daily score for <i>you</i> might be significantly more or less than someone else’s. These fields allow you to customize the number of points that are appropriate for your abilities and personal goals. Needless to say, Platinum should be tough to achieve.</p> <p>A maximum value of 500 is allowed in any one field, and all entries must be unique and in descending order. Click the <b>Reset</b> button to return to the default values.</p>
	Weekend	<p><b>Weekend</b> Select the days which you consider to be your “weekend” days—in other words, the days you are off work or school. This simplifies adding recurring tasks. For example, if you add a new recurring task and select “Weekend,” the corresponding day boxes will be automatically checked based on this setting. Similarly, adding a new recurring task and selecting “Work/School Days” will automatically check the boxes that are <i>not</i> marked as weekend days in this screen.</p>

## Additional Technical Information

- Architecture Pattern: MVVM (Model-View-ViewModel)
- Minimum API Level: 23 (Android 6.0 Marshmallow)
- Target API Level: 34 (Android 14)
- No authentication requirements

## Libraries

### Jetpack Components

- Room: For local database management (much easier than raw SQLite)
- ViewModel & LiveData: For implementing MVVM architecture
- Navigation Component: For handling screen transitions

### UI Components

- Material Design Components: For consistent, modern UI elements
- RecyclerView: For efficiently displaying the task lists
- ConstraintLayout: For flexible UI layouts that work across device sizes

### Others

- Timber: For better logging during development
- WorkManager: For scheduling recurring task notifications
- DataStore: For storing user preferences
- ViewBinding: For type-safe interaction with UI elements

## Data Storage and Backup

### Data Storage

- Use Room database for structured data
- Use DataStore for app preferences

### Backup Strategy

- Implement automatic database export to a JSON file in the app's private directory
- Keep completed tasks for at least 120 days by default

### Possible Historical Data Enhancements

- Optionally integrate with Android's Auto Backup feature
- Add a setting allowing users to customize retention period (30/60/90 days or forever)
- Archive older data instead of deleting it outright
- Add a "compact database" option that permanently removes old data for users with storage constraints
- Add a manual "Export/Import" feature in Settings for user-controlled backups