ThymeBoxer Design Specification

Document v1.81

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.

Table of Contents

Database Schema

Settings Table

Field Name	Label	Type	Description
id [PK]	N/A	Int	Primary key
listMode	List Mode	Short	1 = scheduled, 2 = timed
backlogSortMode	N/A	Short	1 = Newest to Oldest [default] 2 = Oldest to Newest 3 = Priority - Highest to Lowest 4 = Priority - Lowest to Highest 5 = Difficulty - Easiest to Hardest 6 = Difficulty - Hardest to Easiest 7 = Duration - Shortest to Longest 8 = Duration - Longest to Shortest 9 = Custom
darkMode	Dark Mode	Boolean	True = dark, False = light [default]
displayNotes	Display Notes in Task List	Boolean	Default to False
expandSubtasks	Expand Subtasks	Boolean	Default to True
swipeToDelete	Swipe to Delete	Boolean	Default to True
deleteConfirmation	Delete Confirmation	Boolean	Default to True
defaultTime	Default Time	Short	1 = Earliest [default], 2 = Latest
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
recurringTemplateId [FK]	N/A	Int	Foreign key
sortOrder	N/A	Int	Stores the position of this row in the backlog
itemType	Task or Appointment	Short	1 = Task, 2 = Appointment
listDate	N/A	LocalDate	Date where item appears (null if backlog)
description	Description	Char(40)	Required
notes	Notes	Char(500)	Optional
dueDate	Due Date	LocalDate	Optional
startTime	Time	LocalTime	Required; based on **Default Time** 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)
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)	Required; subtask description
completed	N/A	Boolean	

RecurringTemplate Table

Each record in this table represents a template for a recurring task and is linked to a record in the *ListItem* table.

Field Name	Label	Type	Description
id [PK]	N/A	Int	Primary key
description	N/A	Char(40)	Required
notes	N/A	Char(500)	Optional
defaultDuration	N/A	LocalTime	Default to 30 minutes
defaultTime	N/A	LocalTime	Required only if listMode = 1 (scheduled)
difficulty	N/A	Short	1, 2, or 3
priority	N/A	Short	1, 2, 3, or 4
recurringDays	N/A	Short array	Monday, Tuesday, etc.
pinned	N/A	Boolean	Time is locked in
dateCreated	N/A	LocalDate	

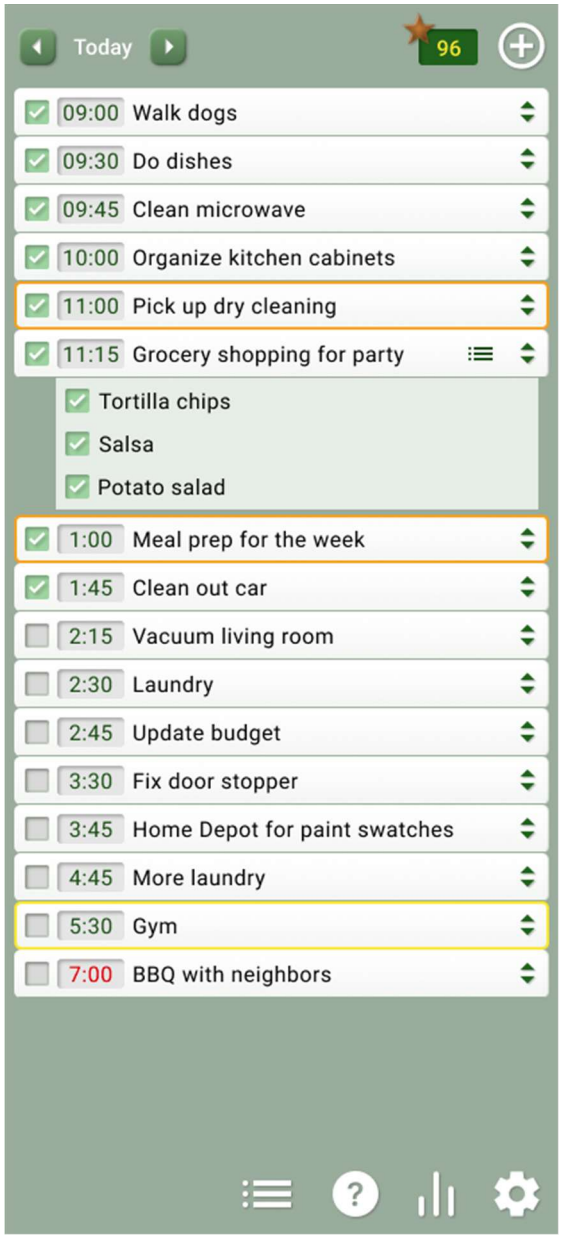
RecurringSubTaskTemplate Table

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

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

Interface

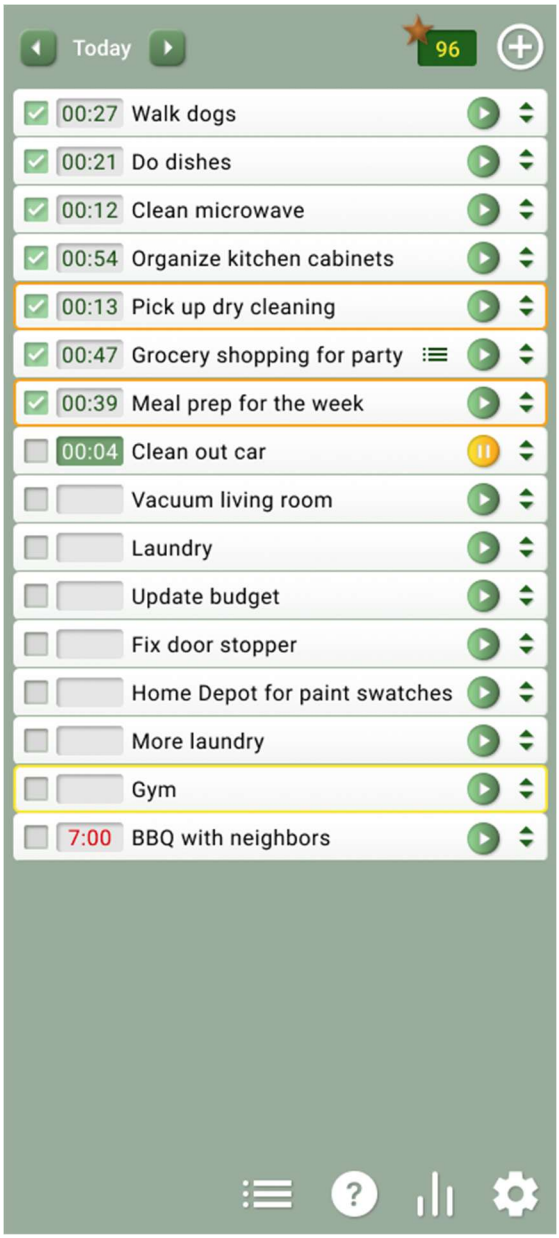
Main Screen – Scheduled Mode



- 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 "Today" or 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. Reward points are calculated for each task as difficulty level * the number of 5-minute increments. For example, in scheduled mode, a moderately difficult task with a 30-minute duration would be 2 * 30 / 5 = 12.
- Tapping the ⊕ icon or tapping on a task row opens the New Task / Edit Task screen.
- The main list displays:
  - All tasks and appointments with a **listDate** of the day being viewed, including appointments and recurring tasks set for that day.
  - Both complete and incomplete tasks.
- Lower right corner:
  - Backlog icon opens the Backlog screen.
  - Help icon opens a help screen.
  - Report icon opens a chart screen with reward points graph over time [phase 2].
  - 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.
  - Tapping the ☰ icon expands or closes the subtasks associated with that row. The **Expand Subtasks** setting determines the initial state.
  - Check the box to complete the task. Marking a task complete:
    - Determines if there are incomplete subtasks. If any subtasks have not been completed, display a dialog reading "This task contains incomplete subtasks. Do you want to mark them all as complete?" with **Complete All**, **Leave Incomplete**, and **Cancel** buttons.
    - Updates the corresponding record in *ListItem* with **dateCompleted**. The same holds true for recurring tasks (the *RecurringTemplate* table is unaffected).
    - Calculates reward points as difficulty * duration / 5 minutes = reward points, then saves that number in **rewardPoints**.
    - Adds the reward points for this task to the total reward points for the day and updates the display at the top of the screen. If total reward points pass the threshold for any award, show confetti animation and update the icon shown in the upper right.

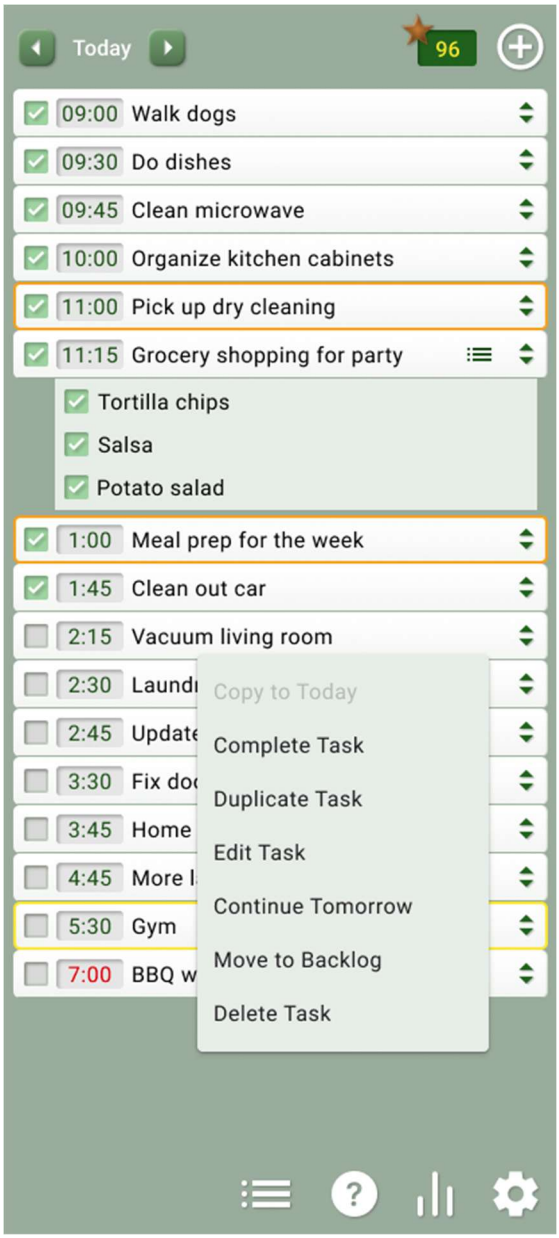
Main Screen – Timed Mode

- 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.
- A reward points readout is displayed in the upper right, based on the total reward points of completed tasks for the day.
- 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.
    - If a timer is already running for one task and another timer is started on a different task, pause the timer on the first task.
- Marking a task complete:
    - Determines if there are incomplete subtasks. If any subtasks have not been completed, display a dialog reading “This task contains incomplete subtasks. Do you want to mark them all as complete?” with **Complete All**, **Leave Incomplete**, and **Cancel** buttons.
    - Stops the timer and saves the duration in the **timedDuration** field of the *ListItem* table. If the timer was never started, use the planned duration.
    - Updates the corresponding record in *ListItem* with **dateCompleted**.
    - Calculates reward points as difficulty * timedDuration / 5 minutes = reward points (rounded to the nearest whole number), then saves that number in **rewardPoints**.
    - Adds the reward points for this task to the total reward points for the day and updates the display at the top of the screen. If total reward points pass the threshold for any award, show confetti animation and update the icon shown in the upper right.

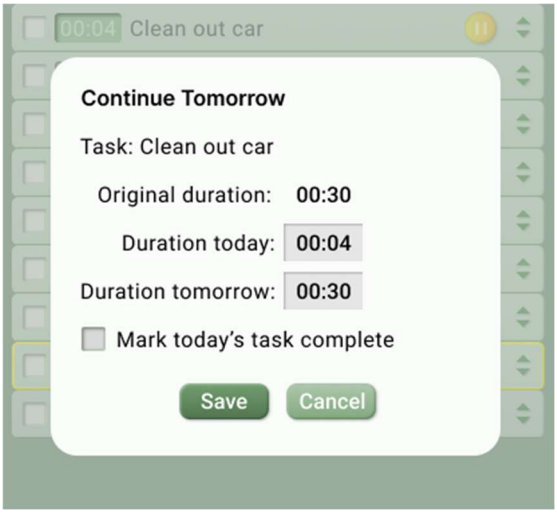


Main Screen – Long-Press Task

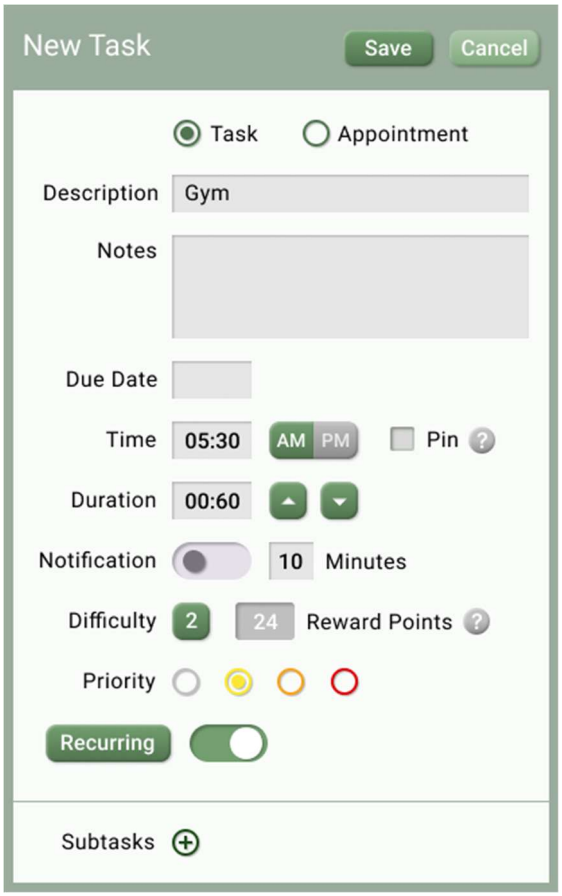
- The menu includes the following selections:
  - **Copy to Today** [only available when displaying task list for dates other than current day]
    - This should duplicate the task for today and leave the original.
  - **Complete Task** or **Complete Appointment**
  - **Duplicate Task** or **Duplicate Appointment**
  - **Edit Task** [same functionality as short press on task]
  - **Continue Tomorrow** popup displays the following:
    - Task description
    - Original [planned] duration
    - Duration today [editable; defaults to original duration or elapsed time if using Timed mode]
    - Duration tomorrow [editable; defaults to original planned duration]
    - Checkbox "Mark today's task complete"
    - **Save** and **Cancel** buttons
    - Task will be duplicated for the following day with specified duration
  - **Move to Backlog**
    - Item will be removed from this screen and added to the backlog [**listDate** removed from this record in the *ListItem* table].
    - In the case of appointments, display a popup dialog reading "This is an appointment. Moving it to the Backlog will remove the appointment date. Are you sure?" with **Yes** and **Cancel** buttons.
  - **Delete Task** or **Delete Appointment**



Continue Tomorrow Popup:

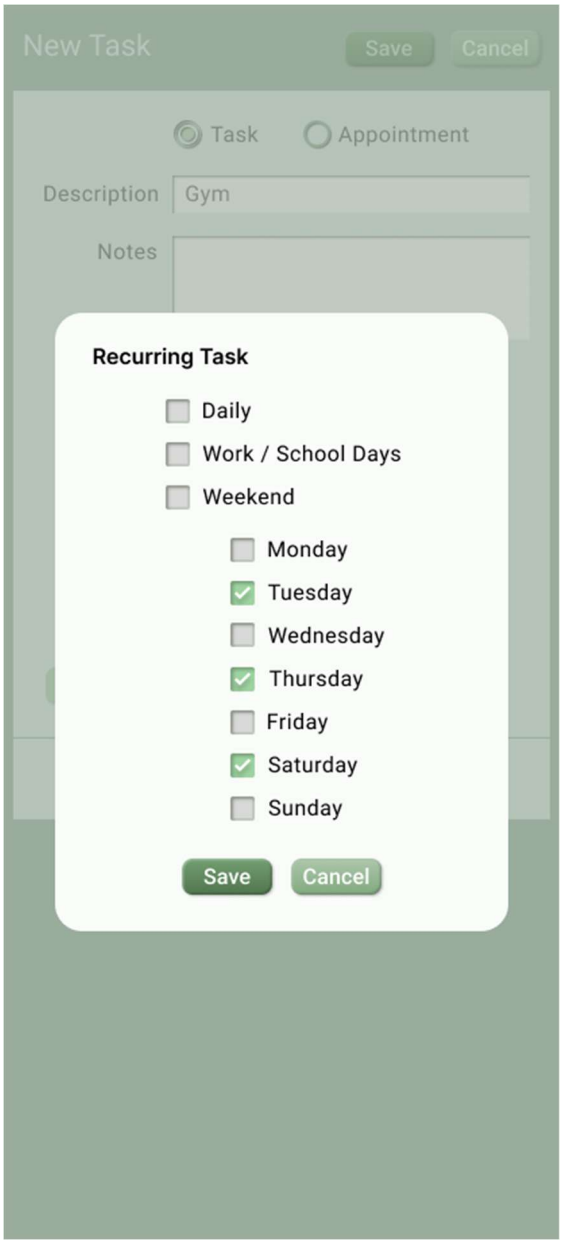


New Task / Edit Task



- 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** [required]
- **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* and type is *Task*, populate using the **Default Time** setting.
  - If **List Mode** setting is *Timed*, this field will be empty for new tasks.
  - Upon tapping out of this field, determine if there are time conflicts with any pinned tasks or appointments for the day. If so, display a warning dialog reading "this time conflicts with <task description> scheduled for <time>. Automatically select an available time slot?" with **Yes** and **Cancel** buttons.
- **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** defaults to *00:30*, with a minimum value of *00:05*.
  - Arrow buttons increment or decrement by the **Time Increment** setting; default is 15 minutes.
- **Notification** defaults to off and 10 minutes.
- **Difficulty**
  - Displays number *1*, *2*, or *3*. The default is *2*.
  - 1 = "Easy," 2 = "Moderate," 3 = "Difficult."
  - Tapping the Difficulty button 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 button display.
- **Reward Points** is 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 * 30 / 5 = 12. When in timed mode, default to the planned duration. At completion, update to the actual elapsed time.
- **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 13.
- Upon **Save**:
  - Check for conflicting appointments and pinned tasks where due date, time, and/or duration overlap with another. If there is a conflict, display a popup warning "The date, time, or duration conflict with the following:" followed by the description, due date, time, and duration of the conflicting appointment(s).
  - Update the *ListItem* table with changes and return to the main screen.

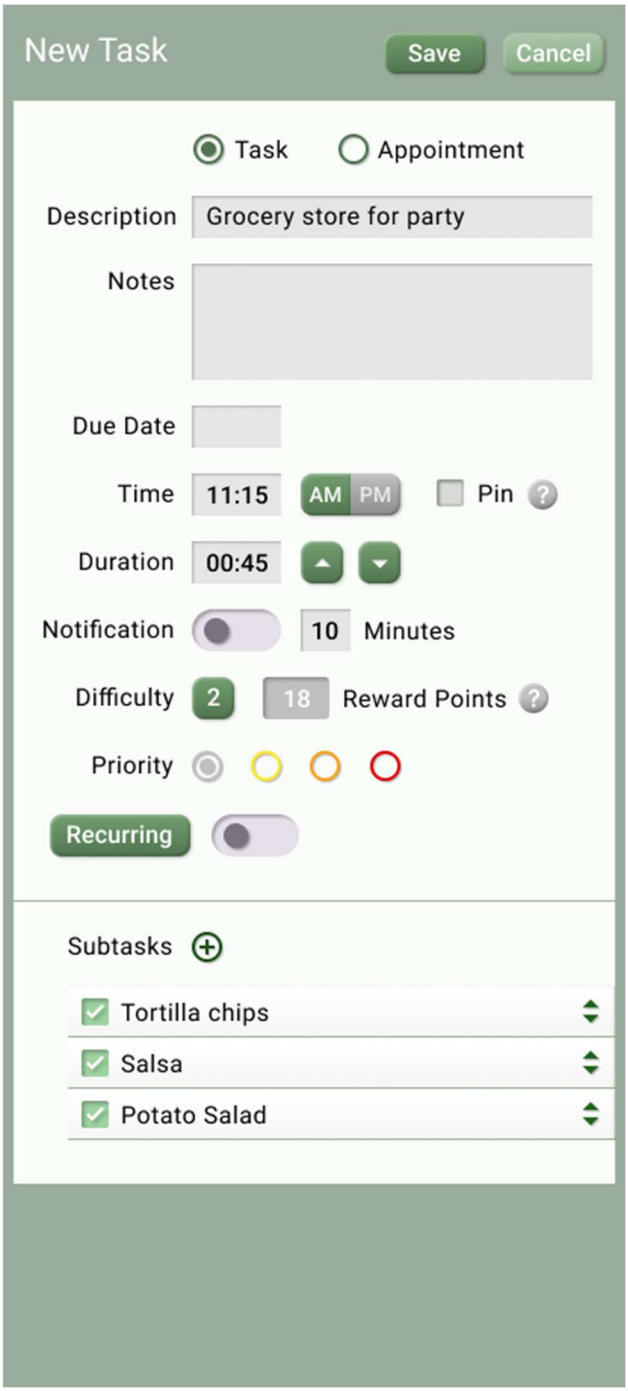
New Task / Edit Task – Recurring Tasks

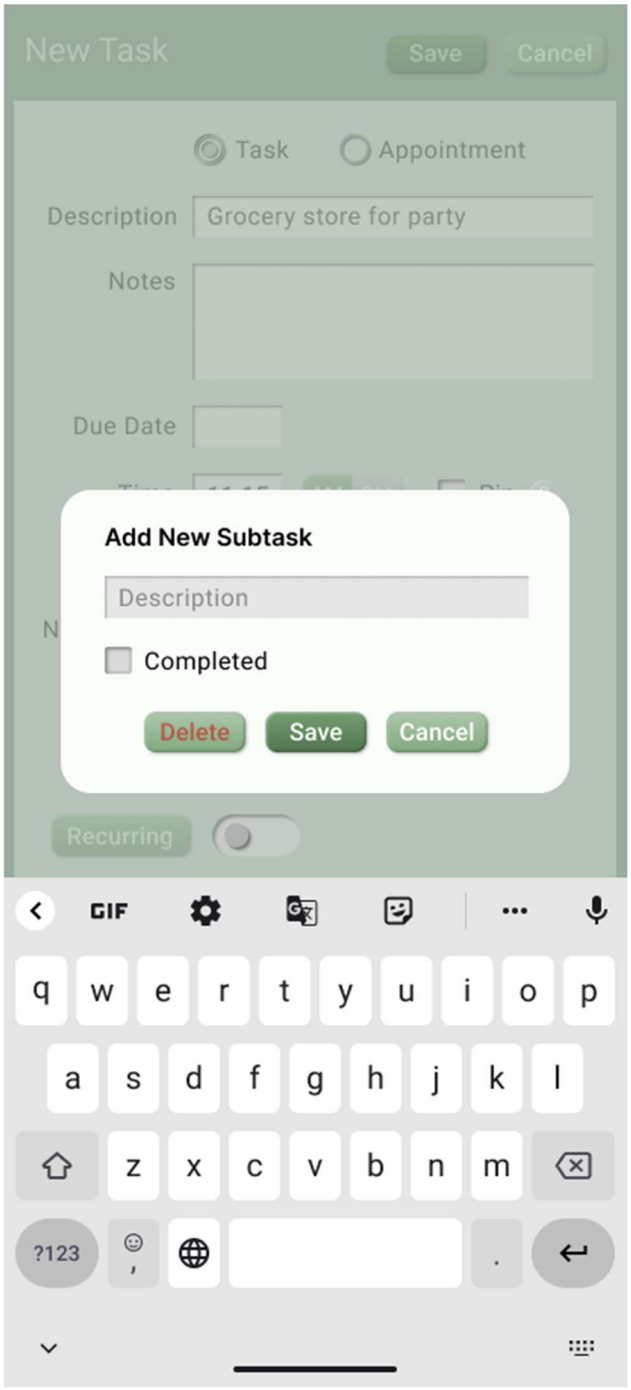


- **Recurring** button and toggle switch.
- Toggle is off by default.
- Tapping the **Recurring** button opens a dialog with checkboxes:
    - If the Task radio button is selected in the New Task screen, the label of this dialog will read "Recurring Task". If the Appointment radio button is selected, 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 *RecurringTemplate* table.
    - Clicking the **Cancel** button closes the dialog without making changes to the *RecurringTemplate* 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.
- When editing an existing recurring task, if any settings are changed, display a dialog reading "Make this change to all future instances of this recurring task or only this one?" with buttons for **This instance only**, **This and all future instances**, and **Cancel**.
- When a new recurring task is saved:
    - Insert new record(s) in the *RecurringTemplate* table and the *RecurringSubTaskTemplate* table (if applicable).
    - Insert new record(s) in the *ListItem* table and the *SubTaskItem* table for the current day (if applicable, based on the recurring days selections).

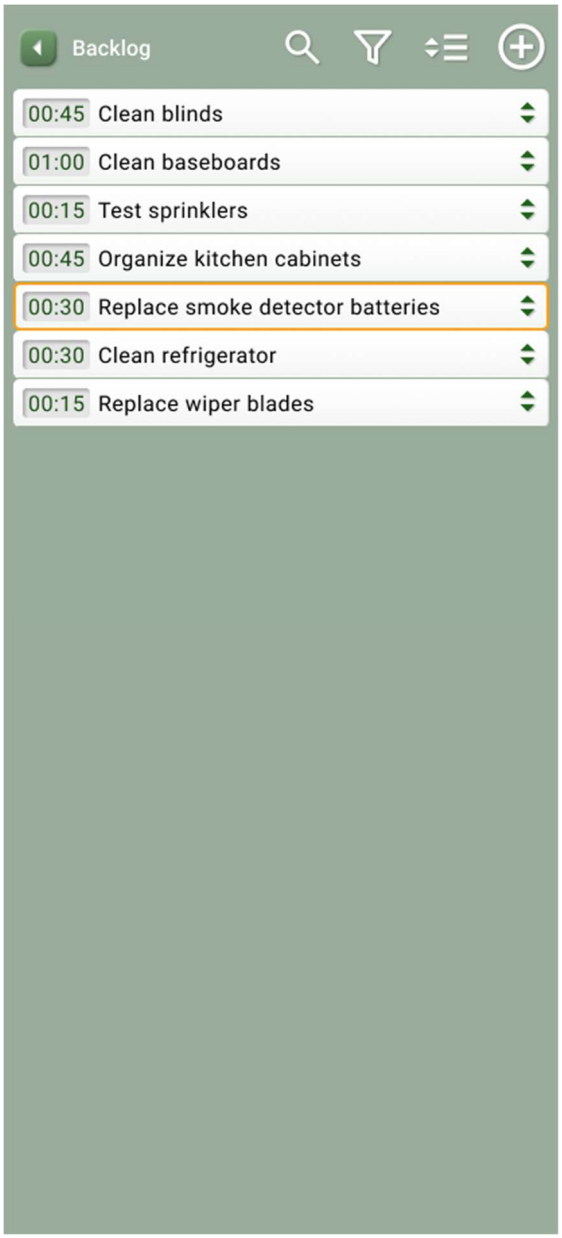
New Task / Edit Task – Subtasks

- 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.





Backlog

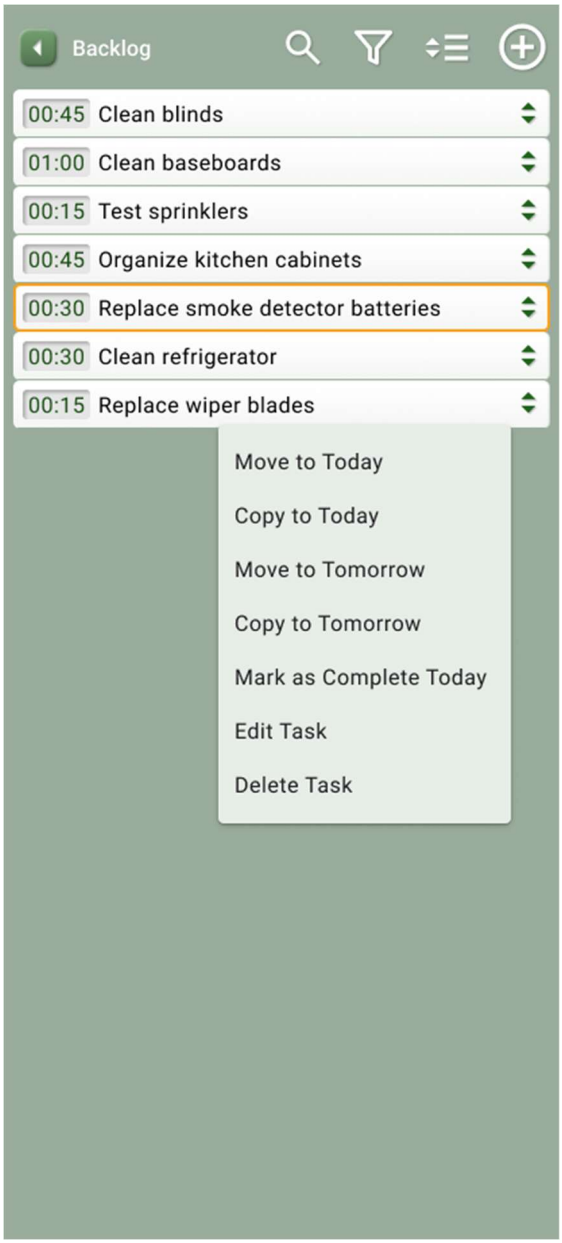


- When the button is tapped on the main task list screen, the backlog will appear. This list contains items that were moved from the main list or added from this screen [items with a null **listDate** in the *ListItem* table].
- Tapping the icon or tapping on a task row opens the New Task screen. When a task or appointment is added or edited from the Backlog screen, specifying a due date for an appointment is optional. If no date is entered, the appointment will remain in the backlog. If a date is entered, the appointment will be created on that date and will not appear in the backlog after saving. This is an intentional exception to the rule on the main screen, where a due date is required for appointments.
- No confirmation dialog or warning is shown when a dated appointment is saved from the backlog—it is assumed the user understands that entering a date will place the appointment on that date's task list rather than in the backlog.
- Task row:
  - Displays the duration and description of each task or appointment (not the time).
  - 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.
- **Search** opens a popup text box with Search button
- **Filter** options:
  - **Date Range**
  - **Tasks** or **Appointments**
  - **Priority**
  - **Difficulty**
  - **Duration**
- **Sort** options [the number in brackets represents the value in the **backlogSortMode** field of the *Settings* table]:
  - [1] **Newest to Oldest** is the default
  - [2] **Oldest to Newest**
  - [3] **Priority – Highest to Lowest**
  - [4] **Priority – Lowest to Highest**
  - [5] **Difficulty – Easiest to Hardest**
  - [6] **Difficulty – Hardest to Easiest**
  - [7] **Duration – Shortest to Longest**
  - [8] **Duration – Longest to Shortest**
  - [9] **Custom**

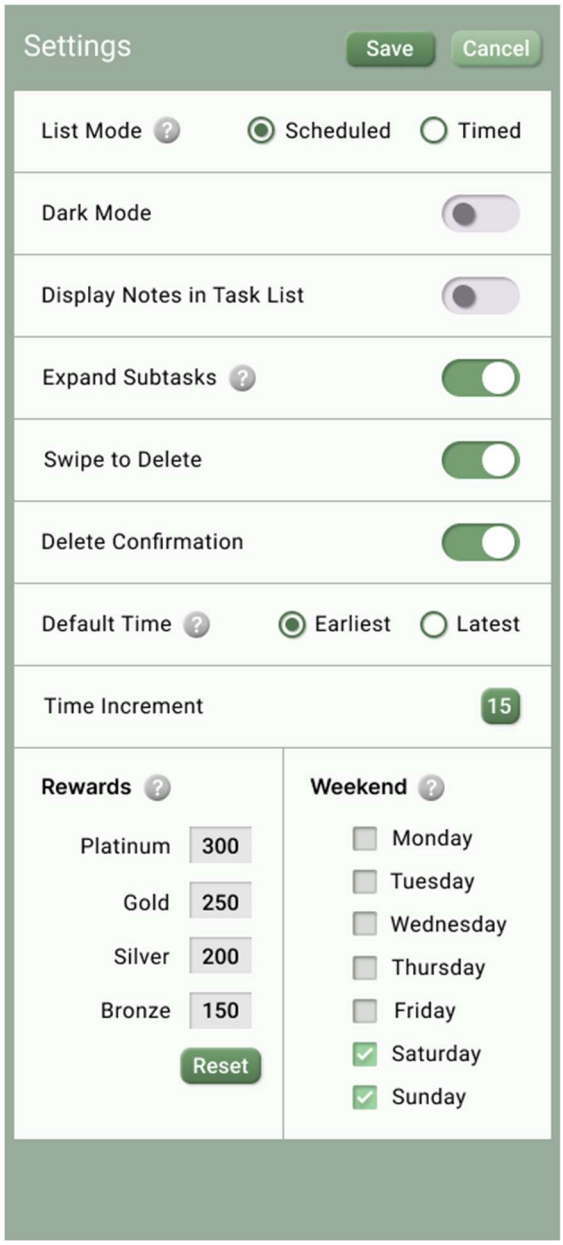
  A **sortOrder** field (integer) is stored in the *ListItem* table to support custom ordering in the Backlog. When the user selects Custom sort, backlog items are displayed in ascending **sortOrder** order. Dragging an item to a new position updates the **sortOrder** values of all affected records immediately. The last-used sort mode is stored in the *Settings* table (**backlogSortMode**) and restored on next launch. Selecting any non-custom sort option displays items in the chosen order without modifying the stored **sortOrder** values, so the custom arrangement is preserved for later use.
  Note that when a non-custom sort order is selected, the

Backlog – Long-Press Task

- The menu includes the following selections:
  - **Move to Today** updates the **listDate** field of this record in the *ListItem* table with today's date.
  - **Copy to Today** duplicates the *ListItem* record and updates the **listDate** field with today's date. The original record (with a null or blank listDate) remains.
  - **Move to Tomorrow** updates the **listDate** field of this record in the *ListItem* table with tomorrow's date.
  - **Copy to Tomorrow** duplicates the *ListItem* record and updates the **listDate** field with tomorrow's date. The original record (with a null or blank listDate) remains.
  - **Mark as Complete Today** updates the **listDate** and **dateCompleted** fields of this record in the *ListItem* table with today's date.
  - **Edit Task** opens the Edit Task screen [same functionality as short press on task].
  - **Delete Task** or **Delete Appointment**
    - Check *Setting* table's **deleteConfirmation** value. If true, display message reading…



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** is off by default.
- **Display Notes in Task List**
- **Expand Subtasks** determines the initial display of subtasks in the main task list, which can then be toggled open or closed.
- **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, 10, 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, with a minimum value of *4*, *3*, *2*, and *1* in the four fields.
  - 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 13.

* Dark mode is implemented using Material 3's built-in light and dark theme variants, generated from the app's seed color. No per-component color overrides are required. A future enhancement may allow users to select a custom seed color, which will regenerate the full color palette automatically without changes to individual UI components.

Notifications

ThymeBoxer uses WorkManager to schedule task reminders reliably, including when the app is closed or the device has been restarted.

Scheduling

When a task or appointment is saved with notifications enabled, a WorkManager OneTimeWorkRequest is scheduled for the notification time (the task's startTime minus the user-specified lead time, which defaults to 10 minutes). If the task is edited or deleted, any existing WorkRequest for that item is cancelled by tag (using the ListItem ID as the tag) and rescheduled if applicable.

Notification Content

Each notification displays:

- Title: The task or appointment description
- Body: "Starting in [lead time] minutes" or "Starting now" if lead time is set to 0
- Action button: "Mark Complete" — tapping this marks the task complete without opening the app

Permissions

On Android 13 (API 33) and above, the app must request the POST_NOTIFICATIONS permission at first launch. If permission is denied, the Notification toggle in the New Task / Edit Task screen should be disabled with an explanatory note.

Edge Cases

- If a task's scheduled time has already passed when the app launches (e.g., after a device restart), the notification is not sent retroactively
- Notifications are not generated for backlog items, since they have no scheduled date or time
- If a recurring task is regenerated at startup, its notification is scheduled at that time using the template's defaultTime and the user's default lead time

Startup

Upon each app launch, perform the following steps in order:

Step 1 – Initialize Today's Recurring Tasks

Query the *RecurringTemplate* table for all templates whose **recurringDays** field includes the current day of the week. For each matching template, check whether a *ListItem* record already exists for today with a matching **recurringTemplateId**. If no such record exists, create a new *ListItem* record populated from the template's fields (**description**, **notes**, **defaultDuration**, **defaultTime**, **difficulty**, **priority**, **pinned**), with **listDate** set to today and **rewardPoints** calculated from difficulty and duration.

If the app has not been launched on one or more previous days, do not back-fill recurring tasks for those missed days. Only today's recurring tasks are generated.

Step 2 – Load Today's Task List

Populate the main task list with all *ListItem* records where **listDate** equals today, plus any records where **dueDate** equals today (tasks and appointments). Sort by **startTime** ascending, with unscheduled Timed mode tasks appearing at the bottom.

Step 3 – Conflict Check

Check all of today's tasks and appointments for **startTime** / **duration** overlaps among pinned tasks and appointments. If any conflicts are found, display a non-blocking banner or badge indicator rather than an intrusive popup, since the user may not intend to resolve them immediately.

Step 4 – Calculate Today's Reward Points

Sum the **rewardPoints** field for all *ListItem* records where **dateCompleted** equals today. Display this total in the upper right of the main screen and apply the appropriate reward tier icon (Bronze / Silver / Gold / Platinum) based on the thresholds defined in Settings.

Step 5 – Apply Display Preferences

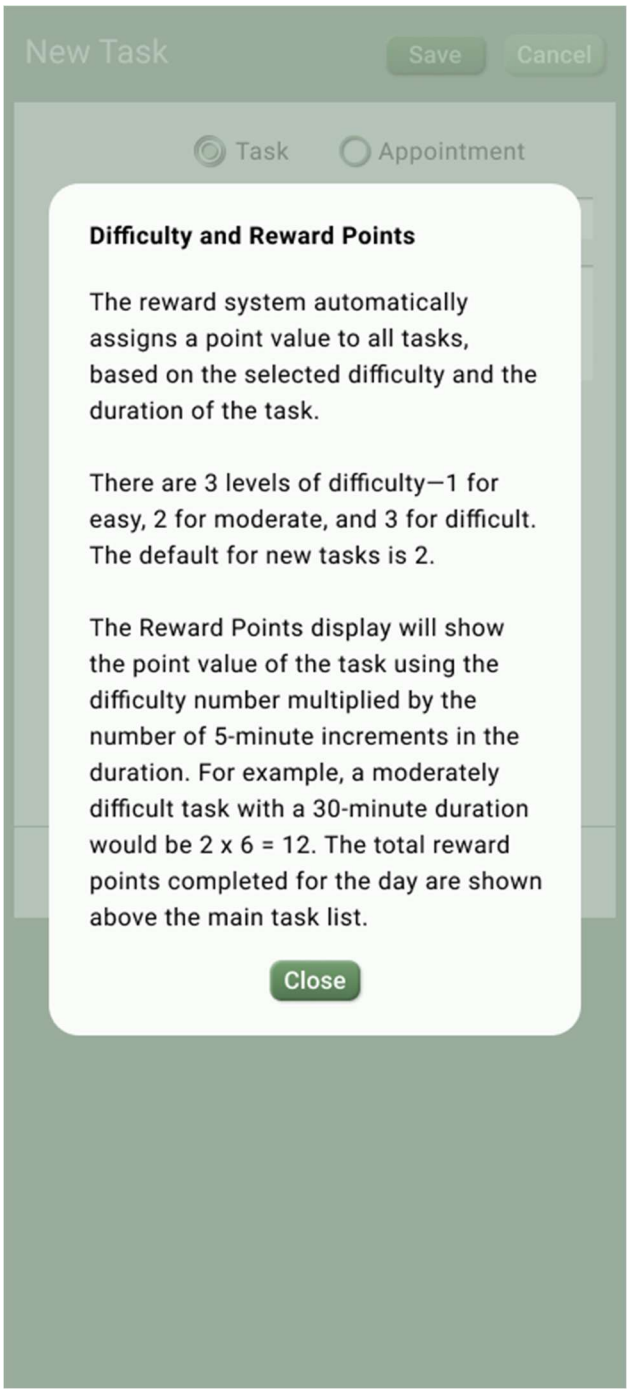
Apply the **expandSubtasks** setting (expand or collapse subtask rows), **displayNotes** setting, and **darkMode** setting.

Context-Sensitive Help Popups

Screen	Label	Content
New Task / Edit Task	Pin [Time]	**Pin** 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 *not* pinned, moving it up or down in the list will update the scheduled time of both that task and other unpinned tasks.
	Difficulty / Reward Points	**Difficulty and Reward Points** The reward system automatically assigns a point value to all tasks, based on the selected difficulty and the duration of the task. There are 3 levels of difficulty—1 for easy, 2 for moderate, and 3 for difficult. The default for new tasks is 2. 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 2 x 6 = 12. The total reward points completed for the day are shown above the main task list.
Settings	List Mode	**List Mode** There are two ways of using the task list—Scheduled and Timed: In **Scheduled** 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. In **Timed** 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.
	Expand Subtasks	**Expand Subtasks** 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.

	Default Time	**Default Time** This selection determines the initial value of the **Time** field when adding new tasks, which can then be edited if needed. Selecting **Earliest** 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. Selecting **Latest** will set the time to follow the last scheduled task for the day, taking that task's duration into consideration.
	Rewards	**Rewards** Depending on your level of mobility and other factors affecting productivity, a typical daily score for *you* 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. A maximum value of 500 is allowed in any one field, and all entries must be unique and in descending order. Click the **Reset** button to return to the default values.
	Weekend	**Weekend** 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 *not* marked as weekend days in this screen.

Example Context-Sensitive Help Popup



Additional Technical Information

This section has been updated to reflect current Android development best practices as of early 2025. The project uses Kotlin with Jetpack Compose for a modern, declarative UI approach.

Architecture and Platform

Item	Detail
Language	Kotlin
UI Framework	Jetpack Compose (declarative UI)
Architecture Pattern	MVVM (Model-View-ViewModel)
Minimum SDK	API 26 (Android 8.0 Oreo)
Target SDK	API 35 (Android 15)
Build System	Gradle with Kotlin DSL (build.gradle.kts)
Authentication	None required

Note: The minimum SDK has been raised from API 23 to API 26. This still covers approximately 97% of active Android devices and allows access to modern date/time APIs (java.time) without the need for desugaring workarounds.

Libraries and Dependencies

Core Jetpack Libraries

Library	Purpose
Room	Local SQLite database with Kotlin coroutines support. Handles the *Settings*, *ListItem*, and *SubTaskItem* tables.
ViewModel	Manages UI-related data in a lifecycle-aware way. Survives configuration changes (e.g., screen rotation).
Navigation Compose	Handles screen transitions within Compose. Replaces the older fragment-based Navigation Component.
DataStore	Modern replacement for SharedPreferences. Stores user preferences with type safety.
WorkManager	Schedules recurring task notifications reliably, even if the app is closed.

UI and Compose Libraries

Library	Purpose
Material 3 (Material You)	Google's latest design system for Compose. Provides themed components, color schemes, and dynamic theming for dark mode.
Compose Foundation	Core building blocks including lazy lists (replaces RecyclerView), gestures, drag-and-drop, and swipe-to-dismiss.
Compose Animation	Built-in animation APIs for the confetti reward animation and screen transitions.

Other Libraries

Library	Purpose
Kotlinx Serialization	JSON serialization for database export/import and backup files.
Timber	Lightweight logging utility for development and debugging.
Hilt	Dependency injection framework recommended by Google for Android. Simplifies wiring ViewModels, repositories, and database instances.

Key Changes from Original Technical Spec

The following items from the original specification have been updated or replaced:

Original	Updated To	Reason
XML Layouts + ConstraintLayout	Jetpack Compose	Declarative UI is now the standard; easier to generate and maintain with AI assistance.
RecyclerView	LazyColumn (Compose)	Built into Compose; handles task lists, drag-and-drop, and swipe gestures.
Material Design Components	Material 3 (Material You)	Latest version with built-in dynamic theming and dark mode support.
ViewBinding	Removed (not needed)	Compose eliminates the need for view binding entirely.
LiveData	Kotlin StateFlow / Compose State	StateFlow integrates more naturally with Compose and Kotlin coroutines.
API 23 minimum	API 26 minimum	Enables native java.time support and covers 97%+ of devices.
API 34 target	API 35 target	Updated to current Android 15.
(not specified)	Hilt (dependency injection)	Recommended by Google; reduces boilerplate when wiring app components.

Data Storage and Backup

Data Storage

- **Room database** for structured data (*ListItem*, *SubTaskItem* tables)
- **DataStore** for app preferences (*Settings* table)

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

Recommended Project Structure

The following package structure follows standard MVVM conventions for a Compose-based Android project:

com.thymeboxer/ *Root package*

- **data/** *Data layer*
  - **database/** *Room database, DAOs, entities*
  - **repository/** *Repository classes (bridge between data and UI)*
- **ui/** *UI layer*
  - **screens/** *Compose screens (Main, EditTask, Settings)*
  - **components/** *Reusable Compose components (TaskRow, SubtaskList)*
  - **theme/** *Colors, typography, dark/light theme definitions*
- **viewmodel/** *ViewModels for each screen*
- **di/** *Hilt dependency injection modules*
- **util/** *Utility classes (date formatting, reward calculations)*

Recommended Build Sequence

Phase	Component	Description
1	Project Setup	Create the Android Studio project with Kotlin, Compose, and all dependencies configured in build.gradle.kts.
2	Database Layer	Room entities, DAOs, and database class for Settings, ListItem, and SubTaskItem. Repository classes.
3	Theme and Navigation	Define the color scheme (green/white), dark mode theme, typography, and Compose navigation graph.
4	Settings Screen	Full Settings UI with all toggles, reward configuration, and weekend selection. Validates save logic.
5	New Task / Edit Task	Task creation and editing form including subtasks, recurring task dialog, priority, and difficulty.
6	Main Screen (Scheduled)	Task list with time slots, drag-to-reorder, completion checkboxes, reward points display, and date navigation.
7	Main Screen (Timed)	Stopwatch timer functionality layered onto the main screen.
8	Backlog	Task list with duration display, drag-to-reorder; search, filter, sort, and add functions.
8	Context Menus and Help	Long-press context menu, context-sensitive help popups, and the Continue Tomorrow flow.
9	Rewards and Reports	Confetti animation, reward tier icons, and the reward points chart screen.
10	Polish and Testing	Edge cases, validation messages, swipe-to-delete, delete confirmations, and overall UX refinement.