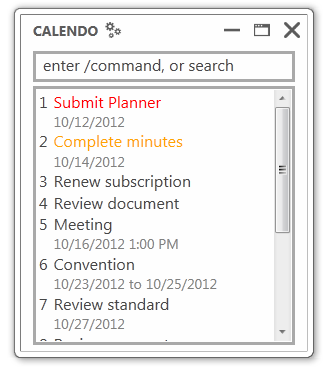
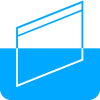
**Calendo**



|  |  |  |  |
| --- | --- | --- | --- |
| passport_portriat | cs2103_rahij | Picture |  |
| **Nicholas Kwan** | **Rahij Ramsharan** | **Jerome Cheng** | **Pallav Shinghal** |
| Team Leader, Data Storage Developer, Specification Writer | Google Calendar Integration, Network Developer | User Interface Developer, System Tester | User Input Processing, Component Tester |

**User Guide**

1. **Introduction**

**1.1. About Calendo**

Calendo is a task planner that allows you to manage tasks efficiently in an easy way. It integrates with Google Calendar so that tasks could be retrieved online from any computer. Its offline mode ensures that you can stay in check even without access to the Internet.

**1.2. System requirements**

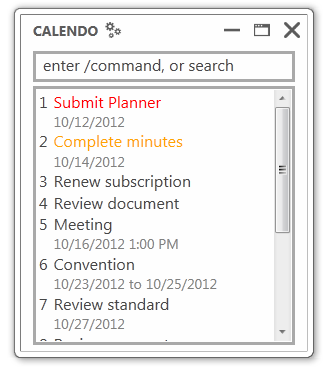
Calendo is compatible with Windows XP, Windows Vista, Windows 7 and Windows 8.   
Some features such as Google Calendar Integration may require Internet access and a Google account.

1. **Features**

**2.1. User Interface**

Calendo’s user interface is designed to be easy to use. All commands can be performed by entering them into the command or search box. A command is of the form **/command** [parameters].

Tasks are displayed in the task list panel, and are sorted by importance. The importance of the task is determined by its time and date.



Command Bar

Settings Button

Task Panel

Figure 2.1: User Interface

**2.2. Task Notification**

There are 3 types of tasks: Floating, Deadline, and Timed. Calendo treats each task differently.

**2.2.1. Floating Tasks**

Floating tasks are tasks without any due date or time interval specified. Calendo will not provide any special notifications for floating tasks.

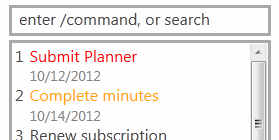


Figure 2.2: Floating Task

**2.2.2. Deadline Tasks**

Deadline tasks are tasks that have a specific due date or time.

Deadline tasks would be notified 24 hours before it is due. When this occurs, the task is highlighted in orange in the task list. When the task is overdue, the task would be highlighted in red, and Calendo would display a prompt to the user.



Overdue Task

Active Task

Figure 2.3: Task notification for Deadline Tasks

**2.2.3. Timed Tasks**

Timed tasks are tasks spanning over a period of time.

Timed tasks are similar to deadline tasks in that Calendo will provide a notification 24 hours before the timed task begins. When the time interval of the timed task has lapsed, the task will be marked as overdue.



Figure 2.4: Timed Task

**2.3. Google Calendar Integration**

Google Calendar integration allows you to modify tasks online via Google Calendar, and have them synchronized with Calendo so that you can access the tasks from within the application.

**2.4. Auto-Suggest**

The Auto-Suggest feature is designed to give immediate feedback as to what each command does. Typing a “/” immediately activates the feature, displaying a list of available commands along with their description.

1. **Quick start**

**3.1. Setting up Calendo**

1. Launch the application.
2. If you have a Google account, you can specify your account settings. You may skip this step and perform it later; however certain features such as Google Calendar Integration will be disabled.
3. Calendo is now ready for use.

**3.2. Adding tasks**

Tasks can be added by entering **/add** command into the search box, followed by the description of the task. Tasks can be assigned a date and time to the task using the **/date** and **/time** parameters respectively.   
**/add** [Description] **/date** [Day/Month/Year] **/time** [Hour:Minutes]

The date and time parameters are optional.

|  |
| --- |
| **Example**: To create a floating task  **/add** Prepare chicken  This adds “Prepare chicken” to the list of tasks. As no date and time is specified, it is treated as a floating task and would remain on the list of tasks until it is removed. |

|  |
| --- |
| **Example**: To create a deadline task at a certain date **/add** Meeting **/date** 18/10  This adds “Meeting” to the list of tasks, and will notify the user of the task nearing the 18th of October. For more information on task notifications, refer to 2.2 Task Notification.  The date is in the form of Day/Month/Year. Specifying the year is optional, and if it is omitted Calendo will assume that the event occurs on the closest matching date in the future. |
| **Example**: To create a deadline task at a certain time **/add** Meeting **/time** 11:00 AM  Calendo will notify the user of the task at 11:00 AM on the same day. If the current time is past 11:00 AM, Calendo will assume it is for the following day.  If AM/PM is not specified, it is assumed that the time follows the 24-hour clock. |

|  |
| --- |
| **Example**: To create a deadline task on a certain date and time **/add** Meeting **/date** 18/9 **/time** 11:00 AM  Calendo will notify the user of the task on 18th September at 11:00 AM. |

|  |
| --- |
| **Example**: To create a timed task on a certain time range **/add** Exhibition **/date** 19/9-21/9  Calendo will notify the user of the task near the 19th to 21st of September. |

**3.3. Removing tasks**

To remove the task, use the **/remove** command and specify the task number that appears to the left of the task. Calendo does not automatically remove tasks; users should remove them when they are completed.  
**/remove** [Task number]

|  |
| --- |
| **Example**: To remove the first task **/remove** 1 |

**3.4. Modifying tasks**

To modify a task, use the **/change** command and specify the task number. Immediately following the command, type the new description, the time and date and press enter.   
**/change** [Task Number] [Description] **/date** [Day/Month/Year] **/time** [Hour:Minutes]

The description, date, and time parameters are optional. If a parameter is omitted, it will remain unchanged.

|  |
| --- |
| **Example**: To change the description of the first task on the list **/change** 1 Flight to Hong Kong |

|  |
| --- |
| **Example**: To change the time of the first task on the list **/change** 1 **/time** 11:00 AM  If the task is originally a floating task, it would be converted to a deadline task. |

|  |
| --- |
| **Example**: To convert a task from a deadline task to a floating task **/change** 1 **/date /time**  The date and time parameter is provided but their parameter values are omitted. |

|  |
| --- |
| **Example**: To change the date of the first task **/change** 1 **/date** 19/11 |

|  |
| --- |
| **Example**: To change multiple parameters **/change** 1 Flight to Hong Kong **/date** 19/11 **/time** 11:00 AM |

**3.5. Searching for tasks**

To search for a particular task, simply type the search query into the Command Bar. The results should appear immediately. Tasks can be searched either by description or by due date.

Search queries must not begin with a “/”. In the event you wish to search with the “/” included, add a space to the front of the query.

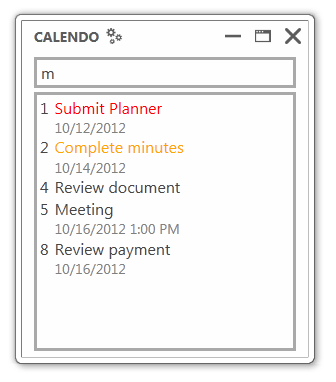


Figure 3.1: Searching for tasks

**3.6. Undo an operation**

To undo an operation performed by a command, use the **/undo** command. To undo an operation performed by the undo command, use the **/redo** command. Both commands do not have any parameters.

|  |
| --- |
| **Example**: To undo an operation **/undo** |

|  |
| --- |
| **Example**: To undo the undo operation **/redo** |

**3.7. Synchronize with Google Calendar**

Ensure that Calendo has the correct Google Account settings specified. You can manage account settings by clicking on the Settings Button.

To synchronize with the Google Calendar, use the **/sync** command to synchronize changes done in Calendo to Google Calendar and vice versa. The **/sync** command does not have any parameters.

|  |
| --- |
| **Example**: To synchronize with Google Calendar **/sync** |

**Developer Manual**

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**1. Introduction**

Calendo is a task management application designed to help users manage their tasks efficiently. This developer guide aims to introduce you to the inner workings of Calendo, and assumes you have experience working with C#. **User Interface** developers should also have some knowledge of XAML and the Windows Presentation Foundation.

**1.1. Component Overview**

Calendo is broken up into several components.

* **User Interface** (Section 2): The **User Interface** component consists of the Graphical User Interface (GUI) and handles user interaction. The component is simply referred to as “Calendo” in code.
* **Command Processing** (Section 3): The **Command Processing** component handles commands that the user provides through the **User Interface**. This component decides what actions are to be performed based on the supplied command.
* **Data** (Section 4): The **Data** component handles data storage. The component stores data and allows for the retrieval of information to be used at runtime.
* **Google Calendar** (Section 5): The **Google Calendar** component handles synchronization with the Google Calendar web service, including Authentication with the service.
* **Task Manager** (Section 6): The **Task Manager** component is the “logic” module of Calendo, with the bulk of actions being performed by this component. This component acts as a wrapper between **Command Processing** and other components such as **Google Calendar** and **Data**.

User Interface

Command Processing

Task Manager

Data Storage

Google Calendar

User

Figure 1.1: Component Overview

**2. User Interface**

The **User Interface** component is responsible for handling all user interactions, providing a means for users to input commands as well as displaying a list of all the tasks Calendo is handling. There is one main class in this component, MainWindow, as well as a corresponding XAML document containing the markup for the interface.

This component also contains several converter classes, found in the Calendo.Converters namespace. These classes are EntryToBrushConverter, EntryToDateTimeStringConverter, and EntryToDateTimeVisibilityConverter. Each of these converter classes implements the Convert(object value, Type targetType, object parameter, CultureInfo culture) method in the IValueConverter interface.

Each converter is used with a data-binding that passes it an Entry object.

**2.1. MainWindow**

This class contains methods used as event handlers for user interaction, as well as an instance of the **Command Processing** component, used to handle user input.

Unlike other components in Calendo, MainWindow has no publicy accessible properties or methods, and is not designed to be instantiated or used by other modules. This portion of the document hence assumes the reader will be extending or modifying its functionality.

**2.1.1. MainWindow Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| CommandProcessor: CommandProcessor | Command Processing module, used to execute user commands. |

**2.1.2. MainWindow Methods**

| **Method Name** | **Description** |
| --- | --- |
| MainWindow() | Constructor. Creates and initializes the component. |
| DefocusCommandBar() | Method used to set keyboard focus away from the Command Bar. |
| FilterListContents() | Method used to search the Task List. |
| UpdateItemsList() | Updates the Task List with entries retrieved from CommandProcessor. |
| BtnSettingsClick(object sender, RoutedEventArgs e) | Event handler triggered when the Settings button is clicked. |
| CloseWindow(object sender, RoutedEventArgs e) | Event handlers triggered when the Close, Minimise, or Maximise buttons are clicked. |
| MinimiseWindow(object sender, RoutedEventArgs e) |
| MaximiseWindow(object sender, RoutedEventArgs e) |
| GridMouseDown(object sender, MouseButtonEventArgs e) | Event handler triggered when a mouse click occurs in the main Grid control. Used to set keyboard focus away from the Command Bar. |
| TbxCommandBarLostFocus(object sender, RoutedEventArgs e) | Event handlers triggered when the Command Bar has lost or gained focus, used to show or hide the “Enter Command” prompt appropriately. |
| TbxCommandBarGotFocus(object sender, RoutedEventArgs e) |
| TbxCommandBarKeyUp(object sender, KeyEventArgs e) | Event handler triggered after a keystroke has been detected in the Command Bar. Used to send user input to CommandProcessor as well as filter the task list. |
| UndoHandler(object sender, ExecutedRoutedEventArgs e) | Event handlers triggered when the key combinations Ctrl+Z or Ctrl+Y are pressed, used to Undo or Redo the last action. |
| RedoHandler(object sender, ExecutedRoutedEventArgs e) |
| ItemsListDoubleClick (object sender, SelectionChangedEventArgs e) | Event handler triggered when an item in the Task List has been double-clicked. Used to automatically fill a “change” command into the Command Bar. |
| WindowStateChanged(object sender, EventArgs e) | Event handler triggered when the window shifts between states (maximized, normal, or minimized). Used to prevent a quirk in WPF’s handling of the window border. |

**2.2. EntryToBrushConverter**

This class is used in the MainWindow.xaml control to colour tasks in the task list according to their current status (ongoing, overdue, or normal).

**2.2.1. EntryToBrushConverter Properties**

This class has no properties.

**2.2.2. EntryToBrushConverter Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| Convert(object value, Type targetType, object parameter, CultureInfo culture) | Takes in an Entry, processes it, and returns a Brush with a colour appropriate for the entry’s status. |
| IsTaskOverdue(Entry currentEntry) | Takes in an Entry, returns true if it is overdue, false otherwise. |
| IsTaskOngoing(Entry currentEntry) | Takes in an Entry, returns true if it is ongoing, false otherwise. |
| ConvertBack(object value, Type targetType, object parameter, CultureInfo culture) | Unimplemented Interface member. Will throw a NotImplementedException if called. |

**2.3. EntryToDateTimeStringConverter**

This class is used in the MainWindow.xaml control to format and display the start and end dates of tasks in a human-readable format.

The data-binding used with this class must also pass it a string parameter of either “StartDate” or “EndDate” depending on which date is to be used.

**2.3.1. EntryToDateTimeStringConverter Properties**

This class has no properties.

**2.3.2. EntryToDateTimeStringConverter Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| Convert(object value, Type targetType, object parameter, CultureInfo culture) | Takes in an Entry and a string parameter, returns a string of the specified date (start/end) in a human-readable format. |
| ConvertBack(object value, Type targetType, object parameter, CultureInfo culture) | Unimplemented Interface member. Will throw a NotImplementedException if called. |

**2.4. EntryToDateTimeVisibilityConverter**

This class is used in the MainWindow.xaml control to properly display tasks with or without start/end dates. If a task has no start or end date, it is displayed as a single-line entry consisting of only its description; if it does, the start (and end date, if applicable) are displayed underneath the description text. This converter is used to determine if the second line should be hidden or displayed, and if so, whether or not separator text is needed between start and end date.

The data-binding used with this class must also pass it a string parameter of either “StackPanel” or “RangeText”, depending on if the converter is being used to show/hide the second line as a whole, or the separator text alone.

**2.4.1. EntryToDateTimeVisibilityConverter Properties**

This class has no properties.

**2.4.2. EntryToDateTimeStringConverter Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| Convert(object value, Type targetType, object parameter, CultureInfo culture) | Takes in an Entry and a string parameter, returns Visibility.Visible or Visibility.Collapsed depending on whether the Entry has a start/end time. |
| ConvertBack(object value, Type targetType, object parameter, CultureInfo culture) | Unimplemented Interface member. Will throw a NotImplementedException if called. |

**3. Command Processing**

The **Command Processing** component is used to convert text input from the user into executable commands, execute them, and return the “result”. There is one class in this component: CommandProcessor.

**3.1. CommandProcessor**

An object of this class is constructed as a “module” to process and execute commands. The ExecuteCommand method is then called with a user-input string, interprets the input as an executable command, and finally executes it. TaskList is updated with the result of the command.

|  |
| --- |
| **Example**: Execution  CommandProcessor commandProcessor = new CommandProcessor();  string inputString = "/add Meeting for CS2103";  commandProcessor.ExecuteCommand(inputString); |

|  |
| --- |
| **Example**: Result extraction  CommandProcessor commandProcessor = new CommandProcessor();  List<Entry> result = CommandProcessor.TaskList; |

**3.1.1. CommandProcessor Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| TaskList: List<Entry> | Gets the list of tasks returned by the last executed command. |

**3.1.2. CommandProcessor Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| CommandProcessor() | Constructor. Creates a CommandProcessor “module”. |
| ExecuteCommand(string userInput) | Executes the command and stores the result in TaskList. |

**4. Data Storage**

The **Data Storage** component is used to store information used by Calendo for later retrieval. There are two main classes in this component, Storage and StateStorage. These classes are part of the Calendo.Data namespace. External classes such as SettingsManager and TaskManager depend on the Storage and StateStorage classes respectively.

Calendo.Data

Storage<T>

StateStorage<T>

TaskManager

SettingsManager

Data<T>

State<T>

Figure 4.1: Data Storage component overview

**4.1. Storage<T>**

The Storage class is used as a general purpose data storage system. As it is a generic class (hence the “<T>”), runtime objects can be saved as they are, and returned back to their original state upon retrieval. The Storage class saves the object into an XML file, in a human-readable format.

The Storage class saves to “data.txt” by default.

|  |
| --- |
| **Note**: Only *publicly accessible* properties that can be modified are saved. The class must also be publicly accessible in order to be supported by the Storage class. Interfaces are not supported by the Storage class. |

|  |
| --- |
| **Example**: Saving  Storage<Entry> myStorage = new Storage<Entry>();  myStorage.Entries = new Entry();  myStorage.Save(); |

|  |
| --- |
| **Example**: Loading  Storage<Entry> myStorage = new Storage<Entry>();  myStorage.Load();  Entry current = myStorage.Entries; |

**4.1.1. Storage<T> Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| Entries: T | Gets or sets the object stored by Storage. |

**4.1.2. Storage<T> Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| Storage() | Constructor. Use the default “data.txt” as file path. |
| Storage(string filePath) | Constructor. Sets the file path used by Storage class. |
| Load(): bool | Loads the current object from the file. Returns true on success, false if an error occurred. |
| Save(): bool | Saves the current object to the file. Returns true on success, false if an error occurred. |

**4.1.3. Storage<T> Dependencies**

The Storage class is dependent on the Data class. The Data class serves as a wrapper to for the data to be stored, and is mainly used for controlling the resulting XML format. The Storage class uses the XMLSerializer class (part of the .NET framework) to serialize and deserialize objects to and from XML.

Storage<T>

Data<T>

Figure 4.2: Storage<T> Dependencies

**4.2. StateStorage<T>**

The StateStorage class has almost the same functionality as the Storage class. Unlike the Storage class, StateStorage supports the undo and redo feature, allowing you to revert changes made to your object.

The StateStorage class can be used in exactly the same way as the Storage class.

|  |
| --- |
| **Note**: The file produced by StateStorage is generally not compatible with Storage. However, the Storage class can be used to read files produced by StateStorage by using the State class to wrap the original class which was saved.  Storage<State<Entry>> compatibleStorage = new Storage<State<Entry>>(); |

|  |
| --- |
| **Note**: The class to be used with StateStorage must be *serializable*. In order to tag a class as serializable, add the [Serializable] tag to the beginning of the class.  [Serializable] public class Entry {  …  } |

**4.2.1. StateStorage<T> Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| Entries: T | Gets or sets the object stored by StateStorage. |
| HasRedo: bool | Returns true if there are available redo states, false otherwise. |
| HasUndo: bool | Returns true if there are available undo states, false otherwise. |

**4.2.2. StateStorage<T> Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| StateStorage() | Constructor. Use the default “data.txt” as file path. |
| StateStorage(string filePath) | Constructor. Sets the filePath used by StateStorage class. |
| Load(): bool | Loads the current object from the file. Returns true on success, false if an error occurred. |
| Redo(): bool | Reverses changes done by the Undo() method. Returns true if the current state has changed, false if no changes were made. |
| Save(): bool | Saves the current object to the file. Saving adds a state to the storage. Returns true on success, false if an error occurred. |
| Undo(): bool | Reverts the current state to the previous state. Returns true if the current state has changed, false if no changes were made. |

**4.2.3. StateStorage<T> Dependencies**

The StateStorage class is dependent on both the Storage and State class. The State class is used to maintain the current state of the object, and stores copies of past revisions of the object. The Storage class is used to save the State class into a file.

StateStorage<T>

Storage<State<T>>

State<T>

Figure 4.3: StateStorage<T> Dependencies

**4.3. Data<T>**

The Data class is a wrapper that is used by the Storage class. This class implements the ICloneable interface, and supports the Clone() method. Cloning of an object is done via binary serialization. The Data class is independent.

|  |
| --- |
| **Note**: The supplied type T must have the default constructor. |

|  |
| --- |
| **Note**: The clone() method requires the supplied type T to be serializable. Refer to 4.2. StateStorage<T> for an example of how to tag a class as serializable. |

**4.3.1. Data<T> Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| Value: T | Gets or sets the object represented by Data. Used for serialization. |

**4.3.2. Data<T> Methods**

|  |  |
| --- | --- |
| **Method Name** | **Description** |
| Data() | Constructor. Uses the default constructor for T. |
| Clone(): object | Returns a deep copy of the object. |

**4.4. State<T>**

The State class maintains the current and past states of an object. The AddState() method is used to add a state to the list of states. This class supports the Undo() and Redo() methods, which are used for going back and forward in the list of states respectively.

|  |
| --- |
| **Note**: The supplied type T must have the default constructor and must be serializable. Refer to 4.2. StateStorage<T> for an example of how to tag a class as serializable. |

**4.4.1. State<T> Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| Value: T | Gets or sets the object represented by the current state. |
| States: List<Data<T>> | Gets or sets the list of states. Used for serialization. |
| HasRedo: bool | Returns true if there are available redo states, false otherwise. |
| HasUndo: bool | Returns true if there are available undo states, false otherwise. |

**4.4.2. State<T> Methods**

| **Method Name** | **Description** |
| --- | --- |
| State() | Constructor. Creates an empty state. |
| AddState(): void | Adds a state. |
| Redo(): bool | Revert to a state in the redo stack.  Returns true if the current state has changed, false otherwise. |
| Undo(): bool | Revert to the state before the current state.  Returns true if the current state has changed, false otherwise. |

**4.4.3. State<T> Dependencies**

The State class is dependent on the Data class. The Data class is used to provide deep copying of the object, and acts as a wrapper to store the objects representing a state.

State<T>

Data<T>

Figure 4.4: State<T> Dependencies

**5. Google Calendar**

The **Google Calendar** component is responsible for synchronizing the user’s tasks with his/her Google Account. Instances of this component are created at runtime only when required.

Calendo.GoogleCalendar

GoogleCalendar

TaskManager

Google API

(External)

OAuth 2.0 API

(External)

Figure 5.1: Google Calendar Component Overview

**5.1. GoogleCalendar**

**5.1.1. GoogleCalendar Methods**

| **Method Name** | **Description** |
| --- | --- |
| Sync(List<Entry> entries): boolean | Gets list of tasks and adds it to Google Calendar |
| Authorize(): string | Authorises user’s Google Account |
| GetAuthentication(NativeApplicationClient provider): string | Returns access token for authentication |
| PostTasks(Entry entry,string access\_token): Boolean | Posts a task |
| Import(string access\_token): string | Imports tasks from Google Calendar |

**5.1.2. GoogleCalendar Dependencies**

The GoogleCalendar class is dependent on the TaskManager class, which is used to obtain entries to be added to Google Calendar (through the Sync() method). The TaskManager class also calls the Import() method of GoogleCalendar.

The GoogleCalendar component uses several libraries from the Google Calendar API [1]. Authentication is performed using the OAuth 2.0 authorization protocol [2]. Google’s API libraries are part of the Google.Apis namespace, while the OAuth 2.0 library is part of the DotNetOpenAuth namespace; both namespaces belong to external libraries.

Additionally, the **Google Calendar** component is indirectly dependent on the JSON parsers from the Json.Net library [3], which is used by the Google API libraries to serialize runtime objects into a format suitable for web requests or responses.

**6. Task Manager**

The **Task Manager** component acts as a layer between the **Command Processing** and **Data** components. This component is part of the main Calendo namespace.

Calendo (Task Manager)

TaskManager

SettingsManager

CommandProcessor

Data Storage

Google Calendar

Figure 6.1: Task Manager Component Overview

**6.1. TaskManager**

The TaskManager class performs the actions requested by the **Command Processing** component. Some of these actions are passed directly to other components (i.e. a pass-through), such as the Sync() method to the **Google Calendar** component.

**6.1.1. TaskManager Properties**

|  |  |
| --- | --- |
| **Property Name** | **Description** |
| Entries: List<Entry> | Gets the list of entries. |

**6.1.2. TaskManager Methods**

| **Method Name** | **Description** |
| --- | --- |
| TaskManager() | Constructor. Load entries from archive file. |
| Add(string description): void | Adds a floating task. |
| Add(string description, string date, string time): void | Adds a deadline task. |
| Add(string description, string startDate, string startTime, string endDate, string endTime): void | Adds a timed task. |
| Change(int id, string description, string startDate, string startTime, string endDate, string endTime): void | Change parameters of a task. Parameters that are empty would be ignored. |
| Get(int id): Entry | Get the task by ID. |
| Redo(): void | Undo changes performed by undo |
| Remove(int id): void | Remove a task by ID. |
| Sync(): void | Synchronize tasks with Google Calendar (pass-through to Google Calendar component) |
| Undo(): void | Undo the last operation (excluding itself) |

**6.1.3. TaskManager Dependencies**

The TaskManager class is dependent on StateStorage (from Calendo.Data). The StateStorage class is used for storing entries into a file for later retrieval. The TaskManager class also depends on the TaskTime class, but only as a temporary data representation for date and time. The TaskTime class is not intended to be used by other classes.

TaskManager

StateStorage<List<Entry>>

TaskTime

Calendo.Data

Figure 6.2: TaskManager Dependencies

**6.2. SettingsManager**

The SettingsManager class provides a means to access and modify settings. This class is intended for the **Google Calendar** component, although it can be used to store any other setting. All settings are in string format. Objects can be converted into string format using serialization formats such as XML or JSON.

**6.2.1. SettingsManager Properties**

There are no properties for SettingsManager. Settings are retrieved and modified via methods.

**6.2.2. SettingsManager Methods**

| **Method Name** | **Description** |
| --- | --- |
| SettingsManager() | Constructor. Load settings from settings file. |
| GetSetting(string settingName): string | Retrieves the value of the setting for the specified setting. |
| SetSetting(string settingName, string settingValue): void | Sets the value of the setting for the specified setting. If the setting exists, its value would be overridden. |

**6.2.3. SettingsManager Dependencies**

The SettingsManager class is dependent on the Storage (from Calendo.Data) and KeyPair classes. The Storage class is used for storing settings into a file for later retrieval. The KeyPair class is a serializable class used for storing Key-Value pairs.

SettingsManager

Storage

KeyPair<string, string>

Calendo.Data

Figure 6.3: SettingsManager Dependencies

**7. References**

[1] Google. (2012 Sep). *Google Apps Calendar API: Downloads.* Retrieved 12 October, 2012 from the World Wide Web: <https://developers.google.com/google-apps/calendar/downloads>

[2] Internet Engineering Task Force. (2012 March). *The OAuth 2.0 Authorization Protocol.* Retrieved 13 October, 2012 from the World Wide Web: <http://tools.ietf.org/html/draft-ietf-oauth-v2-22>/

[3] Codeplex. (2012 Oct). Json.NET. Retrieved 13 October, 2012 from the World Wide Web: <http://json.codeplex.com/>