

Requirements Specification for an Electronic Calendar Tool

**Version 0.2
7 October 2015**

Editorial Note: This milestone example, and the others to follow, provide concrete examples of roughly what 307 class milestones should look like. Throughout the examples, there are editorial notes interjected, to explain important points. The notes are set off from the rest of the text in indented italics, to indicate that they should not be considered part of the document itself.

This first example illustrates roughly what your Milestone 1 should look. The numbered sections in the document are based on the sections outlined in the requirements specification document outline distributed in the first week of class.

This milestone has the results of Milestone 1 unchanged, with an added initial rough draft of Section 2. Things can be expected to change a good deal by the time the final project report is completed. However, the basic sections of the report provide a working framework for organizing initial ideas.

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1. Introduction

This document defines requirements for an electronic Calendar Tool. The tool provides functions to manage calendars for individual users as well as for groups of users. Individuals use the Calendar Tool to schedule appointments and to view calendar information in a variety of useful ways. Administrative users run a Calendar Tool Administration program to manage Calendar Tool databases and perform other administrative functions.

In addition to providing useful functionality, the Calendar Tool serves as a pedagogical example of software engineering concepts and principles. The software development artifacts for the Calendar tool are considered part of the overall Calendar Tool package.

1.1. Problem Statement

The general problems to be addressed by the Calendar Tool project are the following:

- a. to provide a reliable and easy to use software tool that manages an individual user's calendar
- b. to provide a secure group environment that manages a collection of individual calendars for the purposes of group scheduling and information sharing

While these problems have been solved by a number of commercially available and public domain products, the Calendar Tool provides a solution with certain functional improvements over existing tools. Specific problem areas are the following:

- a. scheduling multi-user meetings
- b. dealing effectively with overlapping events
- c. providing a wide range of calendar viewing options

The Calendar Tool project addresses the requirements of a particular customer. This customer needs a tool with a collection of features not available in any single existing tool. This aspect of the problem is one of combining a set of existing features in a way that the features have yet to be combined in another product.

In addition, the development of functioning software, the Calendar Tool project focuses on two additional problems not addressed in commercial tools:

- a. to provide a pedagogical example for use in the instruction of software engineering, including an example of the practical application of formal methods
- b. to provide fully documented, public domain source code for use by others

1.2. System Personnel

The personnel involved in the Calendar Tool project are organized into the following groups and sub-groups:

- a. end users
 - i. registered users
 - ii. user group leaders
 - iii. master system administrators
 - iv. unregistered individual users
- b. customers
- c. system developers
- d. software engineering students

e. outside parties

End users are those who use the Calendar Tool for its intended purpose. Registered end users have calendars that are stored in a Calendar Tool multi-user database, which is used for group scheduling purposes. Group leaders are designated registered users who may perform group scheduling operations which affect other users' calendars. Master system administrators perform overall system administration functions, including user and group leader registration. Finally, anyone can use the Calendar Tool as an unregistered user for the management of a strictly individual calendar.

The primary customer is Gene Fisher. He is customer representative for his faculty and staff colleagues in the Computer Science department at the California Polytechnic State University, San Luis Obispo. In this representative capacity, Fisher will consult with other potential customers to gather requirements from them, and integrate their requirements with his own.

The primary system developer is also Gene Fisher. His development activities are all those of the software development process, from requirements analysis through product implementation and deployment. He will also conduct the ongoing process activities of testing, configuration, documentation, and project management.

Fisher's development efforts are based on the work of a number of software engineering students who have used the Calendar Tool as a class project in software engineering courses. Students whose work has been particularly helpful are Larry Bolef, Brent Smolinski, Rick Myers, Brandon Wallace, and Oliver Wallace.

As noted above, the Calendar Tool is intended to serve as an example for use in software engineering courses. The students who use the Calendar Tool for this purpose focus on the artifacts of its development rather than its use as a functioning tool.

The Calendar Tool is available as public domain software for use by outside parties. The project directory is located at <http://www.csc.calpoly.edu/~gfisher/projects/calendar>.

1.3. Operational Setting

There are two operational settings for the Calendar Tool: (1) normal use as a functioning software system; (2) use as an example in software engineering courses.

The Calendar Tool is intended to be general public domain software. As such, there is no specific operational setting in which it must be installed. The setting for which it is appropriately suited is an office or organizational environment of some form, where users maintain their own calendars and need to schedule meetings with other users on a regular basis.

As noted in the preceding section on system personnel, there is a single primary customer for the Calendar Tool, and he is representative of customers in a particular university department. As such, the tool's requirements reflect the point of view of the customer base, including their work setting. Given the intent to develop a general-purpose product, the customer has made a conscience effort to exclude setting-specific features from the Calendar Tool requirements.

For use as a pedagogical example, the Calendar Tool has been designed to fit the curriculum used by Gene Fisher in undergraduate and graduate software engineering courses at Cal Poly University. These courses are two-quarter sequences that cover standard aspects of software engineering, with emphasis on the practical application of formal methods. For the most part, the concepts covered in these courses, and hence the concepts embodied in the Calendar Tool, are mainstream software engineering. Other

instructors may therefore find the Calendar Tool and its development artifacts useful as course examples.

1.4. Impacts

The positive potential impacts of the Calendar Tool as a functioning system are increased convenience and efficiency in managing individual and group calendars. The positive impacts of the Calendar Tool as a course example are

- a. the presentation of a non-trivial software system that students can use as a guide for their own software development work;
- b. an illustration of how formal methods of can be put to practical use.

Potential negative impacts include those common to any user-oriented software system. Viz., if the system is poorly designed and implemented, it can be inconvenient to use and decrease rather than increase user productivity. More specific negative impacts relate to issues of privacy, reliability, and data integrity. If the system implementation is flawed, it may reveal private information that users do not wish to be revealed. If an organization of users relies on a flawed implementation of the system to schedule critical events, and such events are improperly or incompletely scheduled, the organization may suffer significant disruption of its operations. Significant disruption may also occur if the system loses or corrupts important calendar data.

As a course example, the use of the Calendar Tool has no significant negative impacts, unless its development methodology is considered weak or unrelated to the concepts being taught in a particular course. Such negative impacts can be easily avoided if instructors carefully examine the example before using it in a particular software engineering curriculum.

1.5. Related Systems

Widely used commercial systems that provide functionality comparable to the Calendar Tool include

- Microsoft Outlook,
- Apple iCal,
- Google Calendar,
- Now Software Now-Up-to-Date,
- Claris Organizer (no web site available)

Each of these systems provides a wide variety of calendar and scheduling functionality. In terms of such functionality, the goal for the Calendar Tool is to provide the important core features found in these tools, not the full range of features found in all of them. The Calendar Tool does provide modest functional improvements in three areas, when compared to most commercially available tools. These improvements are:

- a. more flexibility in viewing and selecting from lists of possible meeting times that are generated by the automatic scheduler;
- b. more flexibility in specifying recurring events;
- c. more extensive forms of view filtering.

The goals for the Calendar Tool relating to public domain source code and sound pedagogical development are not met by any of the above commercial systems.

A detailed review of each related tool follows in these subsections:

- Outlook review
- iCal review
- Google Calendar review
- Now-Up-to-Date review
- Claris Organizer review

Following these reviews, a summary of the features is provided in a feature comparison matrix.

Editorial Remark: For Milestone 1, each team member will produce a detailed review of one related system, and provide one column in the feature comparison matrix. For brevity, these details are not provided in the paper version of the Milestone 1 example, but are available in the online version of the example.

1.5.1. Microsoft Outlook

... Details omitted in paper version of the example.

1.5.2. Apple iCal

... Details omitted in paper version of the example.

1.5.3. Google Calendar

... Details omitted in paper version of the example.

1.5.4. Now Software Now-Up-to-Date

... Details omitted in paper version of the example.

1.5.5. Claris Organizer

Claris Organizer has been in use for a long time on Apple machines. It has a good set of basic features for calendaring. Given its age, there are a number of significant missing features, in particular there is no support for any kind of calendar sharing among multiple users. This means there is no support scheduling meetings for user groups.

Despite its age, Organizer provides fundamental calendaring functionality as well as any of the newer tools. Its features for color-coded categories and filter-based search are in fact exemplary. Organizer does not provide multi-platform operation, since it is an Apple-only product.

Good Features:

- covers the basics fine
- provides good printing functionality
- allows overlapping items and does a pretty good job of displaying them
- provides pretty good functionality for recurring items, but monthly recurring items cannot be specified that well; for example a recurring schedule on several specific days of the month cannot be done easily
- provides good functionality for item categories, allowing naming and color coding
- provides good functionality for filtering, allowing user-defined views that can include or not include

particular properties of scheduled items; for example a custom view can be defined to show only items of a particular category with titles containing a certain text pattern

- overall it's nice and simple, without a lot of superfluous features

Bad Features:

- allows only one view of one calendar to be open at a time; this is a significant problem
- has only one level of undo/redo
- the only kind of lists are for tasks
- provides a calendar "navigator" in the form of a small monthly view that is not very useful
- provides a "special date" type of scheduled item that is not useful given that is not significantly different than the "event" type of item
- provides a "contact list" feature that is not integrated with any external address book tool, making the feature not very useful
- provides a "notes" feature that is not well integrated with the calendar; specifically, notes can have a date stamp, but are not specifically associated with scheduled items

Missing Features

- no import of other calendar formats, including no import of plain text
- no place to put the location of a scheduled item; it must be squeezed into the title
- no details or notes field for scheduled items
- no yearly view
- no multi-user features at all, including no meeting items on calendar, and necessarily no user or group administration functionality

1.5.6. Feature Comparison Matrix

... Details omitted in paper version of the example.

2. Functional Requirements

The primary functionality the Calendar system is for scheduling and viewing events. Calendar operations are performed by individual users on their personal calendars, as well as by administrative users, who may schedule events for groups of users. The Calendar system also provides functionality for system administration and setting a variety of calendar options.

Following an overview of the Calendar user interface, details of system use are presented in the following scenarios:

- an individual user scheduling an appointment
- an individual user browsing calendars in a variety of ways
- an individual user scheduling other types of items
- a group leader scheduling a meeting with several attendees
- a system administrator updating the calendar databases
- an individual user setting system options
- details of file and edit commands

These scenarios cover all functional requirements for the system.

2.1. User Interface Overview

When the user initially invokes the Calendar tool, the screen appears as shown in Figure 1. The initial display consists of two windows: a standard form of pulldown command menu and a display of the current monthly calendar. The calendar entry for the current date is highlighted with a widened border. The monthly display is the standard default view. The user may change this and other default settings using the option commands discussed later.

Figure 2 shows an expansion of the command menus.

Editorial Remark: Some 308 tools may have more than one primary initial UI, for different categories of user. E.g., there may be one initial UI for student users and another for instructors. If more than one top-level UIs is particularly important, sketch out each for Milestone 2. In later milestones, all top-level UIs will be fully explained.

The File menu contains typical commands for manipulating data files and performing other system-level functions. 'File New' opens a new calendar in a new display window. 'File Open' opens an existing calendar from a previously saved file, displaying in the current display window or a new window as selected by the user. 'File Close' closes the currently active calendar, offering to save if it has been modified since opening. (The currently active calendar is the one on which the user has most recently performed a command.) 'File Close All' closes all open calendars, offering to save any

Calendar Tool □ ☒						
File	Edit	Schedule	View	Admin	Options	Help
April 2015 □ ☒						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
28	27	29	30			

Figure 1: Initial screen.

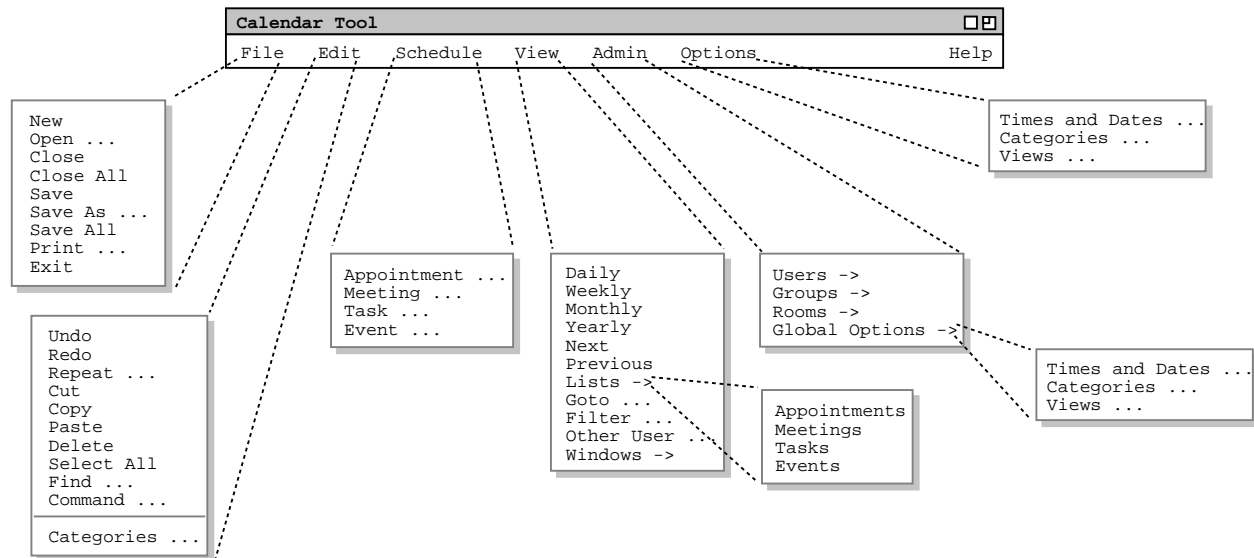


Figure 2: Expanded command menus.

that have been modified. 'File Save' saves the currently active calendar on the file from which it was opened, or on a new file if it was created from a new display. 'File Save As' allows the current calendar to be saved on a different file from which it was opened or most recently saved upon. 'File Save All' saves all currently open calendars. 'File Print' prints the contents of the currently active display window in a form suitable for output to a printing device capable of displaying text and graphics. 'File Exit' exits the Calendar tool.

The Edit menu contains commands for manipulating calendar data during editing. 'Edit Undo' undoes the most recently completed editing commands. Repeated successive invocations of 'Undo' will undo successively earlier commands. 'Edit Redo' redoes the most recently undone commands. Repeated successive invocations of 'Redo' will redo the series of undone commands in reverse order. 'Edit Repeat' displays a dialog that allows the most recently invoked command to be repeated one or more times. 'Edit Cut' removes and copies the currently selected datum in the current display. 'Edit Copy' copies the currently selected datum without removing it. 'Edit Paste' inserts the most recently cut or copied datum at the currently selected edit point in the current display. 'Edit Delete' removes the currently selected datum without copying it. 'Edit Select All' selects all editable data in the current display. 'Edit Find' performs a search for a given text string. The search is performed in all open calendars; successive invocations of search with an unchanged search string searches for further occurrences of the string until all occurrences are found. 'Edit Command' allows the user to enter any Calendar tool command in textual form, including sequences of commands to form scripts.

Editorial Remark: The preceding descriptions of File and Edit operations are typical for the kinds of tools we are working on in 308. Your requirements for these operations will likely be very similar to these. Summary descriptions need to be added for all of the other items on each of the remaining menus. The descriptions are organized into one paragraph per menu or menu section, where a menu section is a set of items delineated by horizontal rules in the menu. These descriptions will be expanded and refined in near-term future milestones. The top-level command structure should be pretty well stabilized by around Milestone 5, though minor updates can continue

throughout the quarter.

2.2. Scheduling an Individual Appointment

Editorial Remark: This scenario illustrates a reasonably detailed level of analysis, but some pictures and text are still missing. For your Milestone 2, you should have a few scenarios like this, where some of the details have been worked out. As the quarter progresses, all of the scenarios will be done to a complete level of detail.

This introductory scenario shows an individual user scheduling two simple appointments. Appointment scheduling is one of the most commonly performed operations with the Calendar system. In this scenario, we assume that the user has just been registered in the calendar system and so has a brand new calendar with no entries, and only the normal default settings for all options. Details of user registration and default calendar creation are covered in Section 2.6

To schedule an appointment, the user selects the Appointment item in the Schedule menu, whereupon the system displays the dialog shown in Figure 3. The title field is a one-line string that describes the appointment briefly. The date is the date on which the appointment is to occur. The end date applies only to recurring appointments, as discussed below. The start time and duration fields specify when the appointment will occur and how long it will last.

Schedule an Appointment

Title:

Start Date: Start Time:

End Date: Duration:

Recurring? Interval: S M T W Th F S

Type: Security:

Location: Priority:

Remind? When: How:

Details:

Figure 3: Appointment Scheduling Dialog.

The information in the fourth row of the dialog is used to specify whether, and if so how often an appointment recurs. Immediately to the right of the 'Recurring?' label is a check box. If it is checked on, then information pertinent to a recurring appointment changes from greyed-out to black. This information is the end date, the recurring interval, and the seven daily check boxes to the right of the interval box.

Below the recurring information are additional data entry boxes. The category entry is a color-coded text string that categorizes the appointment for listing and filtering purposes. Appointment security is one of four levels: public, title only, confidential, and private. Details of these security levels are discussed shortly. The appointment location specifies where it will be held.

The priority indicates whether an appointment is a must or optional. The priority can be used to indicate the general importance of an appointment to the user. The more specific use of appointment priority is in group meeting scheduling, where optional appointments can be automatically rescheduled if necessary. Meeting scheduling is discussed further in Section 2.5

The data entry row starting with 'Remind?' is used to enable the sending of a reminder prior to the start of the appointment. When the remind check box is on, the other reminder information changes from greyed-out to black. The two data entries immediately to the right of the check box indicate how soon before the meeting the reminder is sent. The small box is a numeric value, and the other box is one of the three alternatives 'minutes before', 'hours before, or 'days before'. To right of the time-before entry is a box for selecting how the reminder should be sent. The three choices are 'on screen', 'beep only', or 'email'.

The bottommost data entry area in the appointment dialog is for entering a detailed description of the appointment. Any amount of free-form textual information can be entered.

After the dialog appears on the screen, the user enters information by a combination of typing and selecting from pre-defined choices. Figure 4 shows the result of the user having filled in information for a new appointment titled "Dentist". It has a date, start time and duration, but no end date since it is non-recurring. Since this is the first time on the Calendar system for this user, the category of 'outside appt' has to be created. In a new calendar, the only pre-defined appointment category is "holiday". When the user initially selects the down arrow next to the 'Category' display box, the menu shown in Figure 4 appears. Since the user wants to create a new category, she selects the 'Edit ...' item at the bottom of the menu, whereupon the system displays the dialog shown in Figure 5. The user then selects the 'Add' button, which brings up the dialog in Figure 6. To create the new 'outside appt' category, the user types into the 'Text :' box, selects 'Blue' from the color selection menu, and presses the 'OK' button. To complete the edit, the user presses the 'Done' button in the still pending edit-categories dialog.

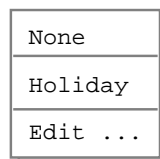


Figure 4: Initial categories menu.

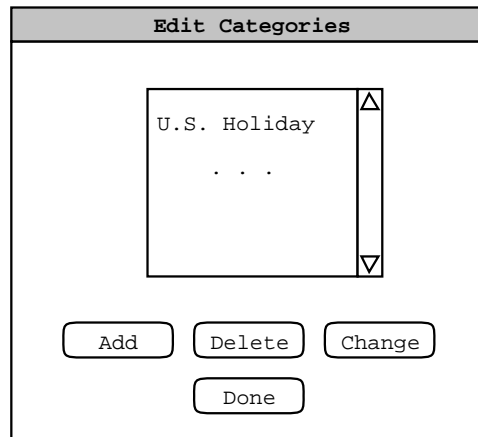


Figure 5: Edit categories dialog; *Editorial Note: This is a rough sketch.*

Text :

Color :

OK

Cancel

Figure 6: Add category dialog; *Editorial Note: This is a very rough sketch.*

To confirm the scheduling of the dentist appointment, the user presses the 'OK' button in the main schedule-appointment dialog. At this point, the appointment is added to the user's personal calendar.

The user now proceeds to create another appointment following the same procedure as above. The resulting filled-in appointment dialog is shown in Figure 7. In this case, the appointment is recurring, scheduled for each Tuesday and Thursday between the specified start and end dates. Note that when the recurring check box is selected, the 'Date' field label is changed to 'Start Date' to clarify the display.

The user has set the priority for this new appointment to 'optional' instead of 'must', as was the case for the dentist appointment. The operative effect of selecting an 'optional' priority relates to scheduling group meetings, which is discussed further in Section 2.5 Aside from group scheduling, the meaning of 'must' versus 'optional' is purely informational, i.e., it indicates the relative importance of the appointment.

-- On paper -- need to draw electronic version. --

Figure 7: Scheduling a Second Appointment.

After scheduling and confirming an appointment, the appointment data are entered in an online working copy of the user's calendar. In order for the appointments to be permanently saved in the calendar file, the user must invoke the 'File Save' command. The default name of the calendar file for new users is chosen by the system administrator, as described in Section 2.? However, the filename chosen by the system administrator is the only name known to the Calendar Tool for group scheduling purposes. Further details of file operations are discussed in Section 2.?

2.3. Browsing an Individual Calendar

Editorial Remark: this and the remaining sections are just skeletons of what is to come. The basic ideas of what the system will do have been laid out, but much detail remains to be filled in.

The scenarios in this section show a user browsing her personal calendar in a variety of ways, including

- structural viewing by day, week, month, and year
- viewing lists of scheduled items
- going to a particular date
- filtered viewing
- viewing recently displayed windows

There is also a scenario showing how a user can view the public portions of another user's calendar, including a group's "virtual" calendar. The section concludes with a scenario showing how reminders are received and viewed.

2.3.1. Viewing by Day, Week, Month, and Year

To view the daily details for today's date, the user chooses the 'View Day' menu command. In response, the system displays a window of the form shown in Figure 8. The arrows on both sides of the date allow the user to navigate to the previous and next day.

Sketches of views for the week and year are in Figures 9 and 10.

2.3.2. Viewing Lists of Scheduled Items

The calendar views described in the previous section are organized in standard calendar units of days, weeks, etc. The user may also view scheduled items in the alternate form of ordered lists. To view a list of scheduled items the user chooses the 'View Lists' menu command. In response, the system displays the submenu shown in Figure 11. The first four commands in the 'View Lists' submenu are the four types of scheduled item. The last command provides functionality to sort the lists in different useful orders.

Figure 12 shows the response to the users selection of the 'View Lists Appointments' command. The figure shows a chronologically ordered list of the appointments created by the user in the preceding scenarios. The format of the list items is precisely the same as in the daily and weekly lists displays. *[Look at all of the options available for daily and week lists view and figure out which apply here.]*

Daily Agenda □ □	
◀ Wednesday, September 6, 2013 ▶	
8 AM	
9 AM	
10 AM	
11 AM	
12 PM	
1 PM	
2 PM	
3 PM	
4 PM	
5 PM	

Figure 8: Day view.

Weekly Agenda □ □							
◀ Week of September 3 - 9, 2013 ▶							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
8 AM							
9 AM							
10 AM							
11 AM							
12 PM							
1 PM							
2 PM							
3 PM							
4 PM							
5 PM							

Figure 9: Weekly View.

2006																							
January 2006								February 2006								March 2006							
Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa	
1	2	3	4	5	6	7					1	2	3	4				1	2	3	4		
8	9	10	11	12	13	14		5	6	7	8	9	10	11		5	6	7	8	9	10	11	
15	16	17	18	19	20	21		12	13	14	15	16	17	18		12	13	14	15	16	17	18	
22	23	24	25	26	27	28		19	20	21	22	23	24	25		19	20	21	22	23	24	25	
29	30	31						26	27	28						26	27	28	29	30	31		
April 2006								May 2006								June 2006							
Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa	
						1		1	2	3	4	5	6						1	2	3		
2	3	4	5	6	7	8		7	8	9	10	11	12	13		4	5	6	7	8	9	10	
9	10	11	12	13	14	15		14	15	16	17	18	19	20		11	12	13	14	15	16	17	
16	17	18	19	20	21	22		21	22	23	24	25	26	27		18	19	20	21	22	23	24	
23	24	25	26	27	28	29		28	29	30	31					25	26	27	28	29	30		
30																							
July 2006								August 2006								September 2006							
Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa	
						1				1	2	3	4	5							1	2	
2	3	4	5	6	7	8		6	7	8	9	10	11	12		3	4	5	6	7	8	9	
9	10	11	12	13	14	15		13	14	15	16	17	18	19		10	11	12	13	14	15	16	
16	17	18	19	20	21	22		20	21	22	23	24	25	26		17	18	19	20	21	22	23	
23	24	25	26	27	28	29		27	28	29	30	31				24	25	26	27	28	29	30	
30	31																						
October 2006								November 2006								December 2006							
Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa		Su	Mo	Tu	We	Th	Fr	Sa	
1	2	3	4	5	6	7					1	2	3	4							1	2	
8	9	10	11	12	13	14		5	6	7	8	9	10	11		3	4	5	6	7	8	9	
15	16	17	18	19	20	21		12	13	14	15	16	17	18		10	11	12	13	14	15	16	
22	23	24	25	26	27	28		19	20	21	22	23	24	25		17	18	19	20	21	22	23	
29	30	31						26	27	28	29	30				24	25	26	27	28	29	30	
																31							

Figure 10: Yearly View.

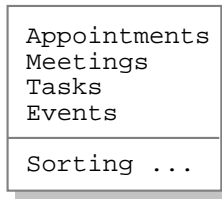


Figure 11: View lists dialog.

-- Here's a rough draft, with actual data to be filled in. --

Appointments								
Title	Date	Time	Duration	Recurs?	Category	Location	Security	Priority

Figure 12: Basic Appointments List.

By default, the list is sorted chronologically by appointment date and time. The list contains all the appointments in the six-week period starting one week prior to today's date. The default ordering and time-range of the list can be changed using the filtering commands described in Section ??? of the requirements.

When the user selects the 'View Lists Sort' command, the system displays the dialog shown in Figure 13. The sorting dialog allows the user to specify the primary, secondary, and tertiary sorting keys for each of the four types of scheduled item. By default, the sorting keys for all four types of schedule item are as follows:

-- To appear. --

Figure 13: List Sorting Dialog.

- a. start date/time is the primary key
- b. duration is the secondary key
- c. title is the tertiary key

The available sorting keys are derived from the information fields in each type of scheduled item. Figure 14 shows expanded sorting menus for each of the four types of scheduled item.

The precise sorting details for each of keys are as follows:

- a. Date/time sorting is in ascending chronological order of the starting date and time. Appointments and meetings have both a start date and a start time, the pair of which are used as the combined key. Tasks and events have only start date, which is used as the sorting key.
- b. Duration sorting is in ascending order from shortest to longest duration.
- c. Title sorting is based on the lexical order of title strings, where lexical ordering is defined as character-wise comparison based on the ASCII character collating sequence, ignoring differences in the case of letter characters (i.e., sorting is case *insensitive*).

The date/time key consists of both a date and time for appointments and meetings. For these

Lists of the other three types of scheduled items (meetings, tasks, and events) are very similar to appointment lists. Section ??? covers the scheduling as well as the listing formats for the three additional types of items.

2.3.3. Viewing a Specific Calendar Date

This is a simple command to goto a particular date. The command is context-specific, i.e., it goes to a selected date in whatever the current view is.

2.3.4. Filtered Viewing

Figure 15 is an initial sketch.

-- To appear. --

Figure 14: List sorting keys.

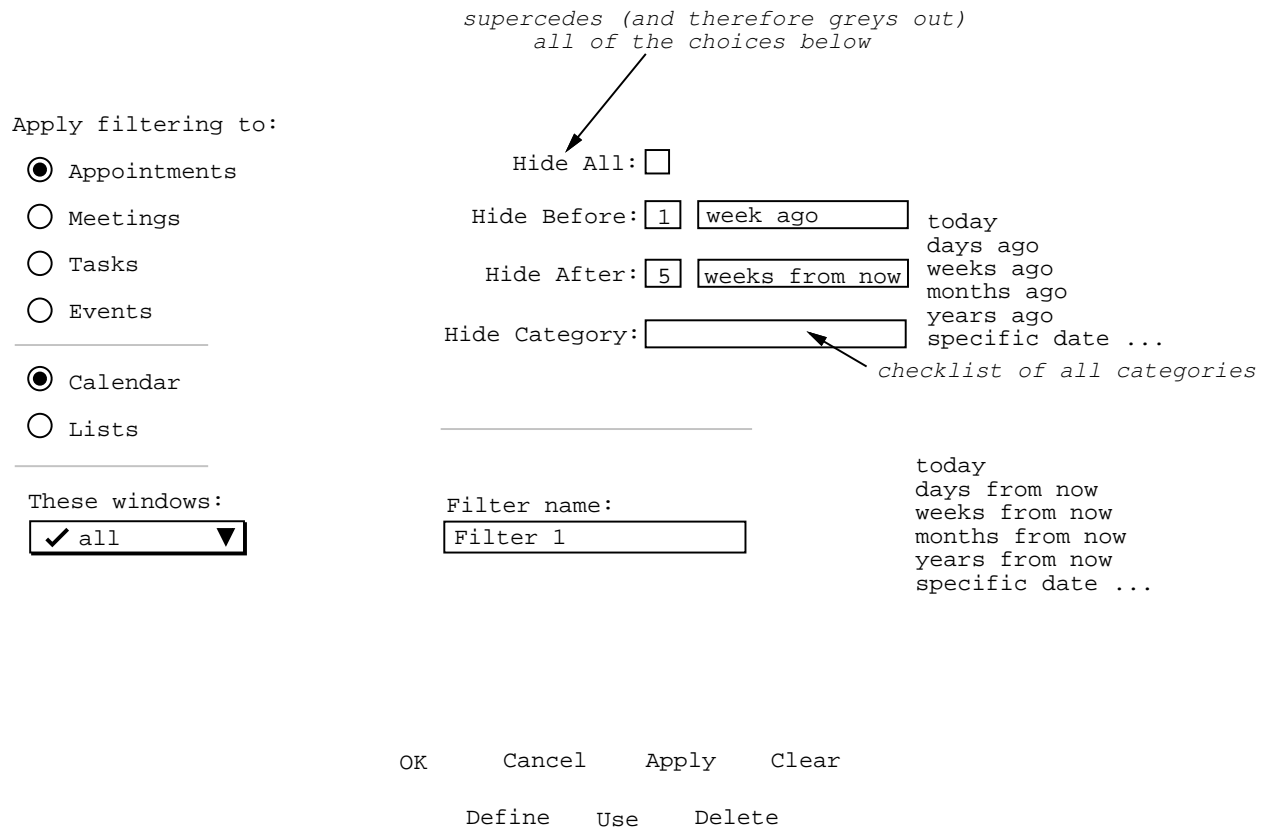


Figure 15: Filtering dialog initial sketch.

2.3.5. Viewing Recently Displayed Windows

2.3.6. Viewing Other Users' Calendars

2.3.7. Receiving Reminders

When scheduled items are entered with reminding turned on, the user receives the reminders as specified in the original scheduling dialog. It is important to note that the Calendar system itself need not be running in order for the user to receive reminders, though clearly the computer system on which the Calendar tool is installed must be running.

As described in the earlier scenarios, there are three types of reminders that the user can elect to receive: on-screen message, audible beep, or email message. For example, when it is time for the dentist appointment scheduled in Section 2.2 the user receives the reminder shown in Figure 16.

-- On paper -- need to draw electronic version. --

Figure 16: Dentist appointment reminder.

In section 2.7 the user scheduled an event with a 2-day advance email reminder. The reminder message sent by the system for this event is shown in Figure 17.

2.4. More Individual User Scheduling

The scenarios in this section show a user scheduling the three other types of scheduleable items: meetings, tasks and plain events. Following these three scenarios is a summary of the precise data formats that are allowed in all of the scheduling dialogs.

2.4.1. Scheduling an Individual Meeting

The scenario in this section illustrates an individual user scheduling a meeting with a few other users. More advanced forms of group scheduling are covered in Section 2.5.

When the user selects `Meeting` in the `Schedule` menu, the system displays the dialog shown in Figure 18.

Sketch of the remainder:

- The user selects possible dates, start times, recurring, location, and attendees.
- The other fields need not be filled in yet.
- When user presses 'OK', system responds with summary list of possible dates and times.
- The user responds with a selection from the list.
- The system then displays the confirmed meeting, as shown in Figure 19
- If some fields yet need to be filled, the user does so and presses 'OK'.

2.4.2. Scheduling Tasks

When the user selects `Task` in the `Schedule` menu, the system displays the dialog shown in Figure 20.

2.4.3. Scheduling an Event

When the user selects `Event` in the `Schedule` menu, the system displays the dialog shown in Figure 21.

2.4.4. Data Entry Details

The following data entry formats apply to each dialog where the indicated field appears

- The `Title` and `Location` fields are free-form, one-line strings. If the text is longer than will fit the provided data-entry area, then it will automatically scroll as the user types and can be repositioned using the normal text movement arrow keys.
- The `(Start) Date` and `End Date` are type-in fields, with checking for legal date syntax. The

-- On paper -- need to draw electronic version. --

Figure 17: Event email reminder.

Schedule a Meeting
□ □

Title:

Earliest Possible Date: Earliest Start Time:

Latest Possible Date: Latest Start Time:

Earliest End Date: Duration: hr min

Latest End Date:

Recurring? Interval: S M T W Th F S
□ □ □ □ □ □ □

Category: ▼ Security: ▼

Location: Priority: ▼

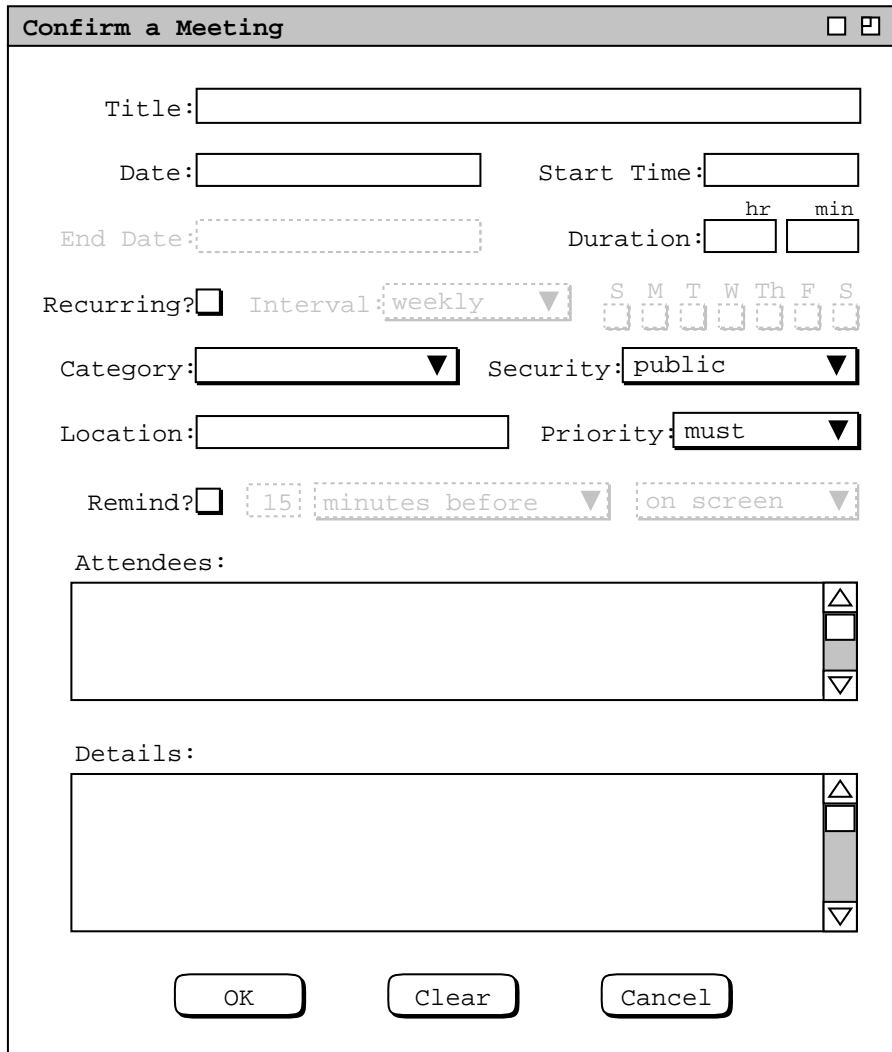
Remind? ▼ ▼

Attendees:

Id or Nickname	Attendance Required	Not Registered
	<input type="checkbox"/>	<input type="checkbox"/>

Details:

Figure 18: Meeting scheduling dialog.



The image shows a 'Confirm a Meeting' dialog box with the following fields and controls:

- Title:** A text input field.
- Date:** A date selection field.
- Start Time:** A time selection field.
- End Date:** A dashed text input field.
- Duration:** Two input fields labeled 'hr' and 'min'.
- Recurring?:** A checkbox.
- Interval:** A dropdown menu with 'weekly' selected.
- Days:** A row of seven checkboxes labeled S, M, T, W, Th, F, S.
- Category:** A dropdown menu.
- Security:** A dropdown menu with 'public' selected.
- Location:** A text input field.
- Priority:** A dropdown menu with 'must' selected.
- Remind?:** A checkbox.
- Reminder:** A dashed text input field with '15' and a dropdown menu with 'minutes before' selected.
- Reminder Location:** A dashed text input field with 'on screen' selected.
- Attendees:** A list box with a vertical scrollbar.
- Details:** A text area with a vertical scrollbar.
- Buttons:** 'OK', 'Clear', and 'Cancel' buttons at the bottom.

Figure 19: Meeting scheduling dialog.

Schedule a Task

Title:

Due Date:

End Date:

Recurring? Interval: weekly S M T W Th F S

Category: Security: public

Priority: must

Remind? 15 minutes before on screen

Details:

OK Clear Cancel

Figure 20: Task scheduling dialog.

Schedule an Event

Title:

Start Date: End Date:

Category: Location:

OK Clear Cancel

Figure 21: Event scheduling dialog.

following are legal forms of date entry: ...

2.5. Scheduling Group Meetings

Editorial Remark: the rough notes below show how a working version of the requirements can have very rough ideas that will be refined as the process goes along.

HERE ARE SOME ROUGH NOTES:

Make sure the following stuff gets included: the scheduling system automatically figures out if the current user is the leader of one or more of the groups (??or individuals??) listed in the attendees list, and if so prompts with a confirmation that asks if the meeting should be penciled in on those users' calendars.

I'm thinking that we may want to keep it simple here and only allow pencil-in when meetings are scheduled for registered groups. So here's a plausible rule: in the confirmation dialog, the following information/questions are included: (1) You are a leader of the following group(s) whose attendance you've requested; do you want to pencil-in for them? (2) You do not have pencil-in authority over the following user/group calendars: ... ; do you want to send email notices announcing the meeting to these users? (3) the following individually listed attendees are also in one or more of the listed groups: ... ; the pencil-in or email notice will be done only once for these users.

The dialog for scheduling a meeting is quite similar to scheduling an appointment. In particular, the following fields are exactly the same in both dialogs: Title, Recurring, Category, Priority, Location,

2.6. Administrative Functions

Scenarios in this section illustrate functions available to the system administrator. These functions allow an administrator to update the user, group, room, and global option databases.

2.6.1. User Database

When the user selects the 'Users . . .' item in the privileged 'Admin' menu, the system responds with the dialog shown in Figure 22. *Need to explain all of the functionality.*

2.6.1.1. Adding a User

When the user selects the 'Users->Add' item from the 'Admin' menu, the system displays the dialog shown in Figure 23.

2.6.1.2. Deleting a User

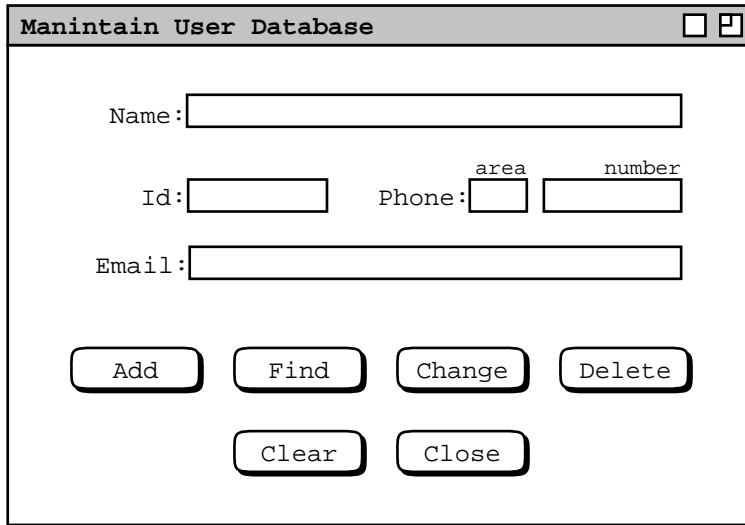
2.6.1.3. Changing a User

2.6.1.4. Finding a User

2.6.2. Group Database

The group database dialog is similar to the user database dialog, as shown in Figure 24.

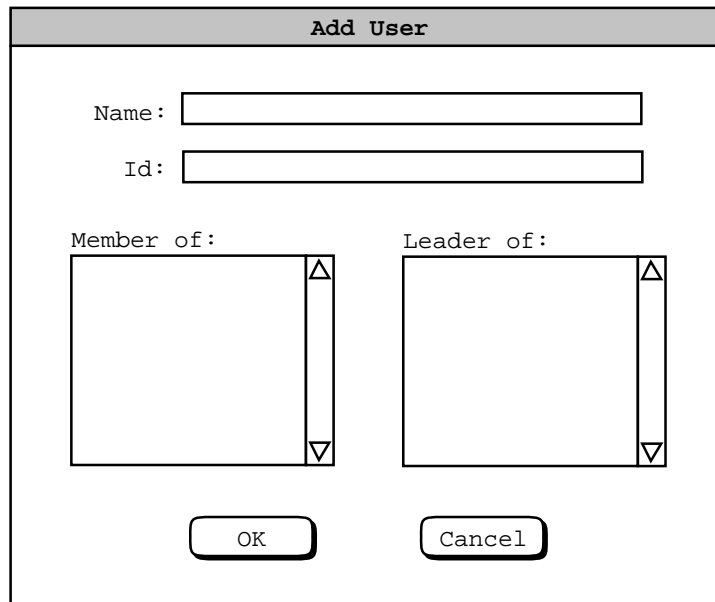
NOTE: Include a field that allows the existence of the group and/or its membership to be kept private.



The dialog box titled "Manintain User Database" contains the following fields and controls:

- Name:
- Id:
- Phone: area number
- Email:
- Buttons: Add, Find, Change, Delete, Clear, Close

Figure 22: User database dialog.



The dialog box titled "Add User" contains the following fields and controls:

- Name:
- Id:
- Member of:
- Leader of:
- Buttons: OK, Cancel

Figure 23: Add-user dialog.

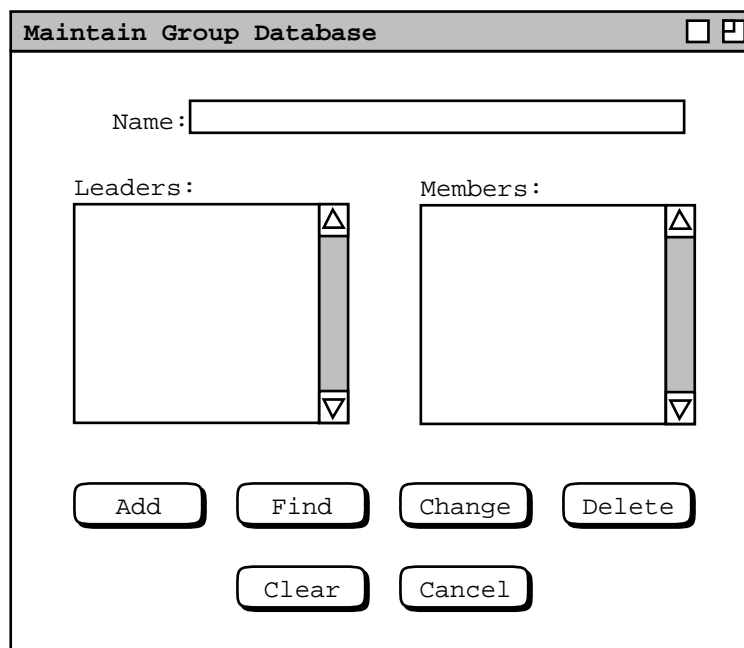


Figure 24: Group database dialog.

2.6.2.1. Room Database

2.6.2.2. Global Options

2.7. Individual User Options

NOTES: Among the other options, there should be some for little things. Here's the beginnings of a list:

- (yes/no) remind on File Save As -- turn on/off the reminder about only the default calendar name being used for group scheduling purpose.

2.8. Details of File and Edit Operations

NOTE: The file and edit operations are pretty much normal, except for 'Repeat' and 'Command'. 'Repeat' allows the user to repeat the most recently executed operation a number of times. 'Command' allows any operation to be executed by typing it in textual form. This forms the basis for writing command scripts, details of which need to be worked out.