Human Computer Interaction

Design Report

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Design Report

THE TASK

We have been asked to design a regular meeting scheduler which might be used by a club or society to inform it’s members of up and coming events and allow them to specify whether they will be attending that event or not. The system is then required to log this information and use it to decide whether the meeting is quorate and will go ahead or not. We have also been asked to consider additional functions such as reminders.

Design Framework

As a starting point for our design specification we came up with a set of constraints which would form the design framework focusing in the four key areas of user, system, task, environment (although environment has only a small impact on this problem). Following our first meeting we had developed the following design space.

User	*Task*
2 Users 1. Co-ordinator 1.1. Trained 1.2. Flexible 1.3. Computer literate 1.4. Long-term organisation 2. Club Member 2.1. Untrained 2.2. Unknown computer literacy 2.3. Short term organisation	**Co-ordinator** 1. Select club member to send to 1.1. Add/Remove member 1.2. Change member e-mail 1.3. Multiple e-mails for single user 2. Setup meetings 2.1. Change details 2.2. View replies so far 3. Archive of past meetings 4. Cancel meeting **Club Members** 1. Select Yes/No 2. Change selection 3. View replies so far?
System	***Environment***
1. Send confirmation 2. Send reminders 3. Cancel Meetings if not quorum 4. - Error Checking (Dates match and are in future etc.)	**Co-ordinator** Always same PC (probably) **Club Member** Anywhere

Design Specification

From our design framework it was quickly apparent that the vast majority of the work was at the co-ordinators end, since we do not know how computer literate the club member is. We decided that all the club member would want to do is select whether or not they could attend the specified event, however we also thought that the possibility of more complex member functions could be included through a linked web interface, this will be covered in more detail later.

We outlined the co-ordinator's main stages of user activity as defined below:

Goal

Co-ordinate and manage his club in a fast and efficient manner.

Sub-Goal

Send out information about events.
Edit database of members.
View replies to previously sent e-mails.

Tasks

Setup a meeting.
Send out e-mails.
Add new members.
Edit old member profiles.

This is the very basic user model that we will be working with. Our system should allow the co-ordinator to perform these basic tasks intuitively and provide extra functionality to facilitate his job without creating annoyance should he want to perform the simple tasks quickly.

At this stage we felt that we had a good enough outline to try and decide which design environment to use as different programming languages will provide a different set of constraints on the design. Our options were fairly limited and it fell to a choice between:

- A highly graphical interface such as Delphi which would require some additional coding to create interaction between the system and the user using e-mail and would be a fixed location hard drive based application.
- A more restrictive language such as HTML, PHP and MySQL which limit your design in terms of the interfaces which can be produced, creating custom I/O methods would be complex, but which is ideally suited to the task with specific database and internet based data transfer functions built in. This method also has the advantage of allowing the co-ordinator to use the system from any work station, so long as a secure login was provided.

We felt that the second option was the best choice as the MySQL functions seemed ideal suited to the task. Also using HTML it would be extremely easy to implement a member's website displaying information past and future meetings and who will be attending the next meeting (special care would have to be taken not to breach the data protection act).

Hierarchical Task Analysis

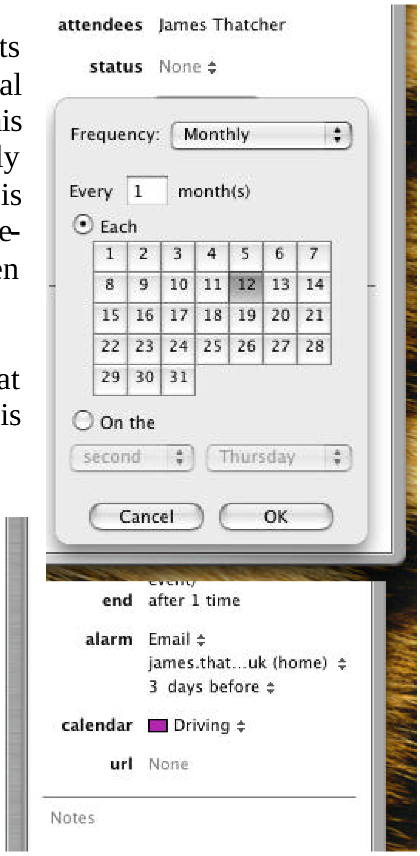
The very last stage of defining our design specification was to create a task analysis for the user model defined on the previous page. This is represented on the next page for the tasks of adding a meeting and adding a member. This is an outline of the exact tasks our system must perform to meet the users expectations, we then went on to use this in developing our design ideas.

IDEA GENERATION

We all developed a series of ideas for different parts of the interface independently then we brought them together in one meeting and decided which bits of what design we liked from each persons ideas. We also found that the idea of a diary/e-mail application crops up in many different places and we had a look at all of these to gain ideas, both positive and negative. The three main applications we looked at were:

- Hotmail – this online e-mail application has provisions for managing many contacts, interesting features we noticed were the ability to easily add multiple contacts to an e-mail and assigning nicknames as memory aides.
- Microsoft outlook – an organiser application although primarily used to send/receive e-mails we liked the ability to sort contacts into groups. However we did not like the method used for sorting or displaying previously entered contacts.
- Apple iCal – a Macintosh application that acts as a traditional diary. We found that iCal actually allows you to do everything in this project with all the required information clearly displayed, the only negative being that it is extremely difficult to add custom text to your e-mail message. We have included some screen shots from iCal.

Left we see how an event can be set to repeat at regular and below shows how all the information is displayed once it has been entered.


attendees James Thatcher

status None

Frequency: Monthly

Every 1 month(s)

● Each

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	27	28
29	30	31				

○ On the second Thursday

end after 1 time

alarm Email
james.that...uk (home)
3 days before

calendar Driving

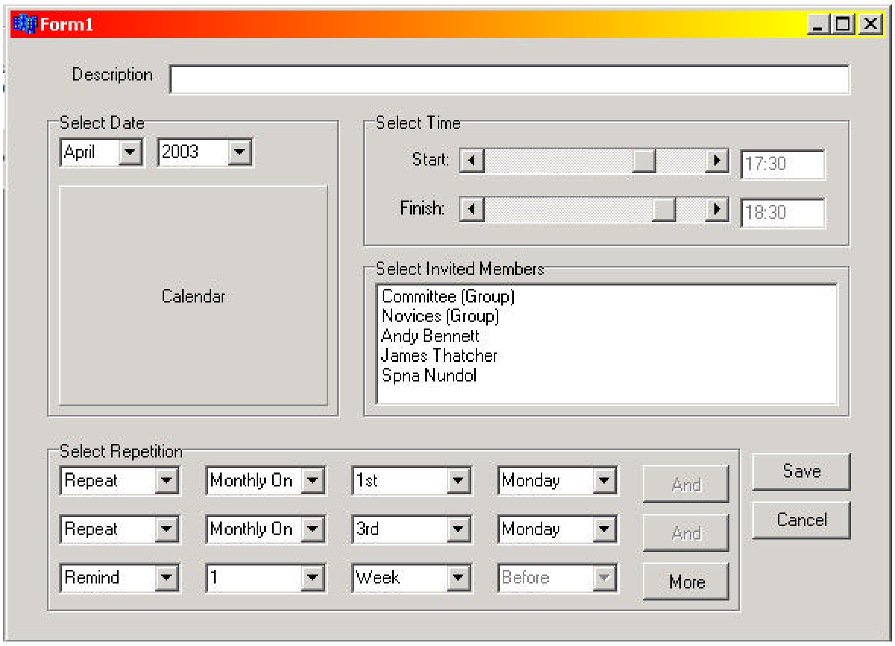
url None

Notes

IDEAS

Presented over the next two pages are some of our initial ideas for the design some of which we implemented simply, without any functionality to try and better visualise the interface. There are also a few concept ideas which we did not take any further.

The first one shows a possible idea for an add a new meeting screen. The start and end times use scroll bars which allow control down to the nearest 5 minutes but do not require the mouse. The repetition box allows you to add up to five special events including multiple repetitions and multiple reminders.



Description:

Select Date

April 2003

Select Time

Start: 17:30

Finish: 18:30

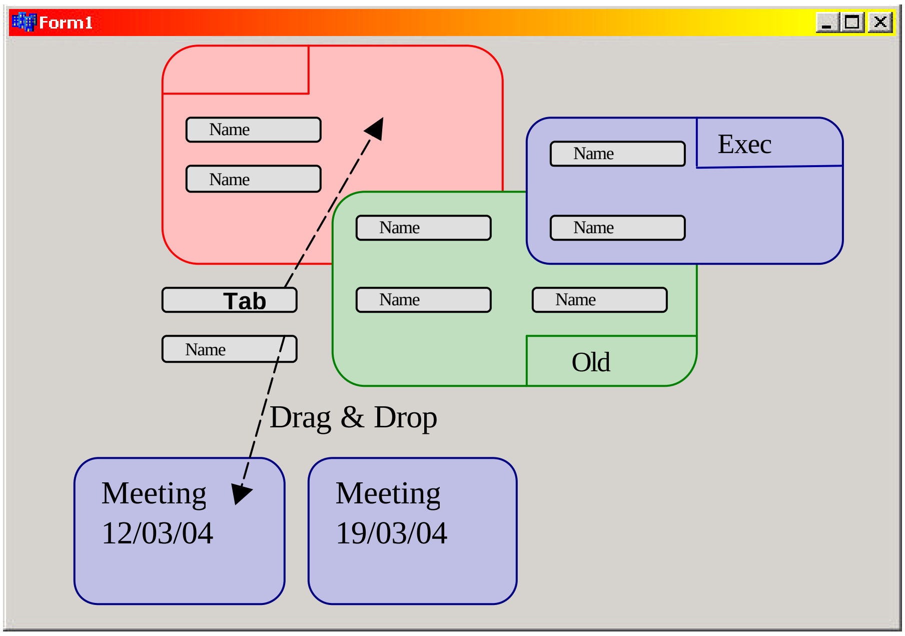
Select Invited Members

Committee (Group)
Novices (Group)
Andy Bennett
James Thatcher
Spna Nundol

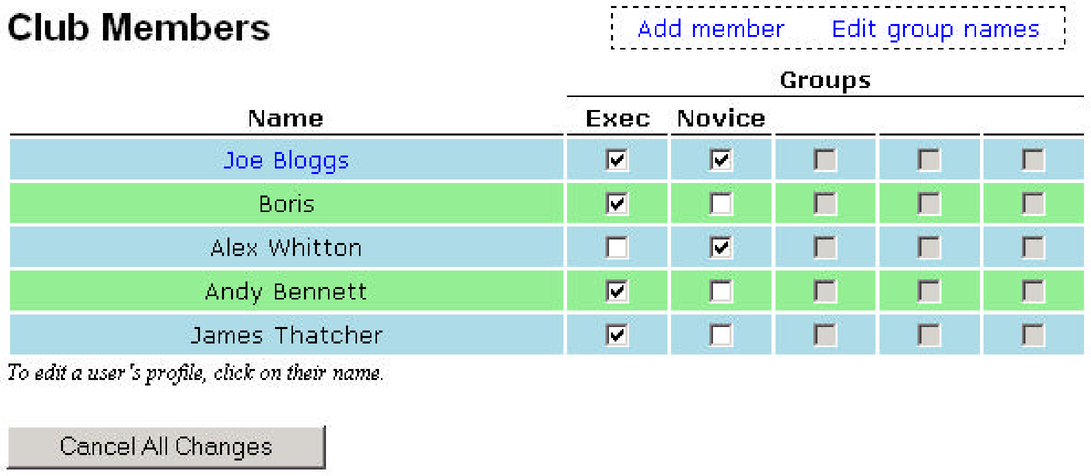
Select Repetition

Repeat	Monthly On	1st	Monday	And
Repeat	Monthly On	3rd	Monday	And
Remind	1	Week	Before	More

The second mock up shows a concept for how members profiles could be sorted and added to meetings using a visual “Drag and drop” interface. We felt that this was in important aspect as not all the members of a club will necessarily be invited to every event. The members are displayed in their groups in a sort of Venn diagram. Groups or Individual members can then me dragged into the relevant meeting. This is a very visual and simple interface which keeps all the information on one page, however it get could get immensely crowded and it would be difficult to have one member in more than 4 groups.



An alternative way of arranging club members in a clear and easily editable way is displayed below. This uses a common everyday model of a logic grid to sort members into groups. You would be able to sort by member name and by each group. Again the number of groups would be limited but we felt that 5 or 6 groups would be sufficient to accommodate all the members of the club. When the user clicks on ‘Add member’ or ‘Edit groups’ blank text boxes appear in a new row or column allowing the required information to be entered.



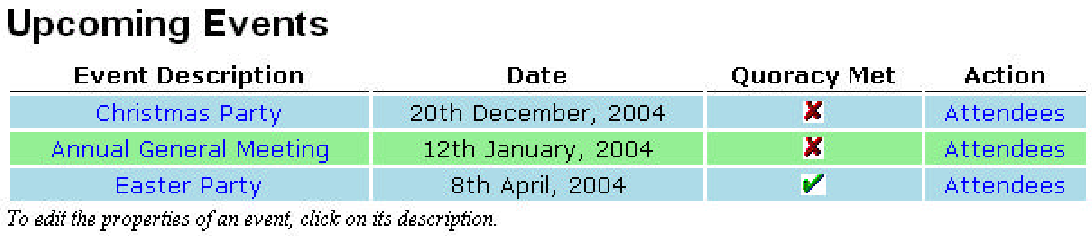
Club Members

Add member   Edit group names

	Groups				
Name	Exec	Novice			
Joe Bloggs	☑	☑	□	□	□
Boris	☑	□	□	□	□
Alex Whitton	□	☑	□	□	□
Andy Bennett	☑	□	□	□	□
James Thatcher	☑	□	□	□	□

To edit a user's profile, click on their name.

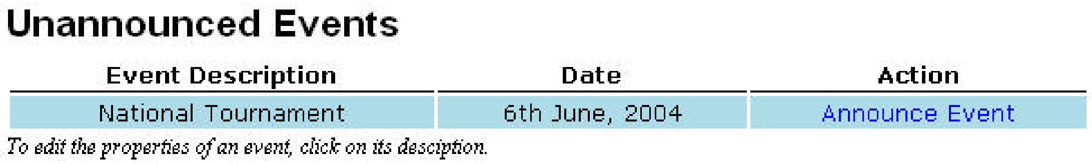
Using a similar template we created a sample main page which would be used to display all the basic information about any scheduled meetings.



Upcoming Events

Event Description	Date	Quoracy Met	Action
Christmas Party	20th December, 2004	✗	Attendees
Annual General Meeting	12th January, 2004	✗	Attendees
Easter Party	8th April, 2004	✓	Attendees

To edit the properties of an event, click on its description.



Unannounced Events

Event Description	Date	Action
National Tournament	6th June, 2004	Announce Event

To edit the properties of an event, click on its desciption.

A page similar to this could be displayed on the web for general access by all the members to give them information about all the up and coming meetings and who will be attending each one. It could also be used to display past events and view the minutes of that meeting.

We liked the above template for layout and colour and decided to take it forward to implementation with a few minor changes (i.e. change the green cell colour as green has associated mental connections.) and influences from the other ideas discussed.

DIALOGUE STYLES

Direct Manipulation

We have focused on direct manipulation as our main method of data entry and navigation. This involves rapid, incremental and reversible actions. Typing is replaced by pointing and selecting, and the results of actions are visible immediately. The benefits of using this style of interaction are:

1. control and display compatibility
2. less syntax, resulting in reduced error rates
3. more preventable errors
4. faster learning and higher retention
5. encouraged exploration

This determines that the main input device is the mouse. This is expected to improve fluidity in usage of the interface. The keyboard is necessary only in the following 2 cases, both of which with a relatively low frequency of usage, as compared to that of the mouse: on the 'add-an-event' page, a textbox is available should the user wish to include a message in the email to the members of the club, and the club members list where names and members' details are to be entered.

Layout

The interface has been designed to provide a 'direct manipulation' style of interaction, with features such as drop-down menus, calendars and check boxes.

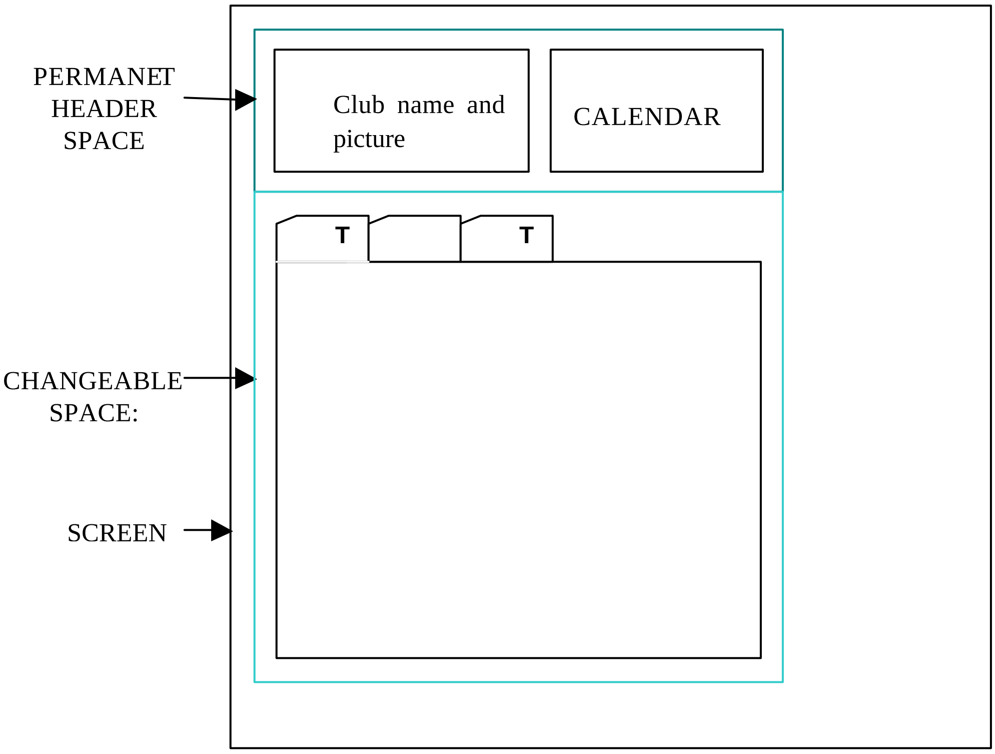


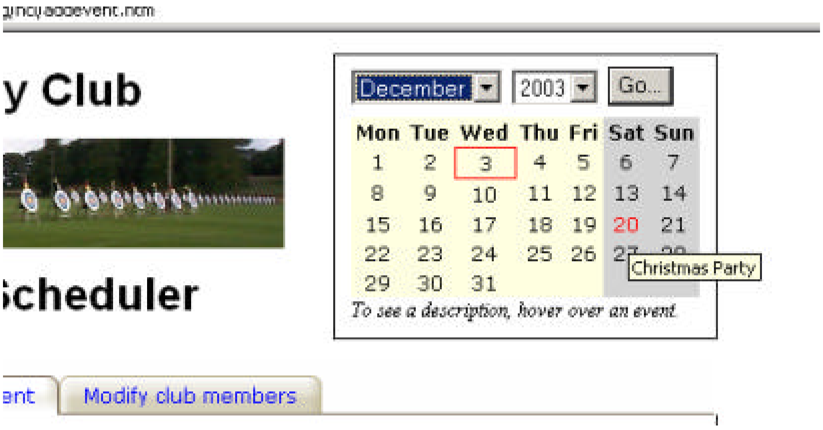
Fig.1. *Interface layout*

The display area allocated to the interface is separated into 2 main sections, namely a non-changing permanent header space and a changing task area. ***(fig.1)***

The Header Space

In this layout, the header space, as an unchanging space providing a sense of continuity from one page to the next.

The header also includes a calendar which, to reduce memory recall is set by default to the current month with the current date highlighted. The dates for which meetings or events have already been scheduled are shown in red. By hovering on these red dates, the user is given a brief description of the event scheduled for that particular day (***fig.2***). This feature makes the interaction responsive, whereby an effect occurs within less than 0.1s of its cause. In this case, the need for the user to know approximately which dates a particular event has already been scheduled.



Mon	Tue	Wed	Thu	Fri	Sat	Sun
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	27	28
29	30	31				

To see a description, hover over an event

Fig 2. *The calendar*

Clicking on the red date takes the user to details of the event(s) scheduled for the date in question. The flexibility brought about by the rapid access of data through this 2-level structure contributes to *dynamic exploration*.

The Task Space

This space consists of 3 pages, namely the 'main page', the 'add an event interface' and the 'modify club members' page. The continuous representation of these changeable pages is ensured by the use of tabs. Evidently, the layout of these pages as being in a 3-compartment folder is in line with the implementation of a direct-manipulation design style.

The Main Page

The main page provides the user with a quick overview of the events, with the information displayed in tabular form. This allows the user to quickly scan all the most important information about each event. In particular an indication of whether quoracy has been met for a specific meeting, which is indicated by symbols: a green tick for an affirmative and a red cross for a negative.

Elements on this page are linked to other relevant pages, with all active links shown in blue, again contributing towards a more flexible dialogue between the user and the computer. In the case of the 'forthcoming events', clicking on the event name takes the user to details concerning the event and allows them to edit these properties.

The Add an Event Page

This interface is split into 3 main sections, namely:

1. Details for the event.

This includes the title or description of the meeting. Once all the details have been entered and the event has been saved the user is presented with a template e-mail including to all the data which he may then personalise.

The date is selected in 2 steps, first involving the use of a drop-down menu, to select the month and year, then clicking on the required date in the calendar. The drop-down month and year lists are ideal in this instance as drop-downs are very fast, reduce the need for user memorisation and reduce the likelihood of errors.

The calendar model provides a familiar means of visual display to the user which is extremely well known and highly intuitive.

2. Attendees.

Designed to allow the administrator to select which members are invited to a particular meeting. The list is a compacted version of the address book, with the members grouped into different categories as per requirements deemed convenient by the user (see next section). For instance, in this case, different groups include ‘novices’ and ‘board members’.

3. Repetition

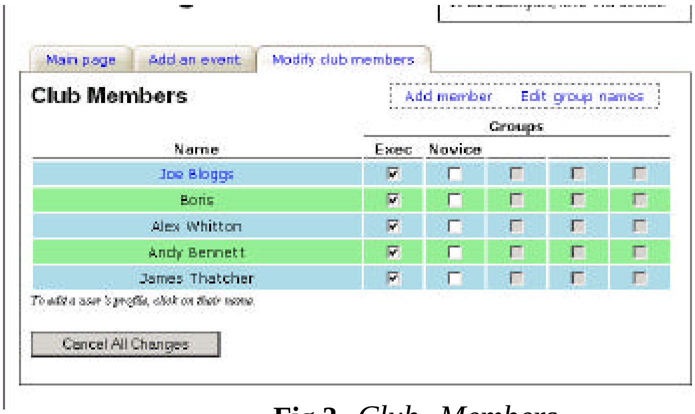
This is an optional feature, should the meeting be a regular event it can be set to repeat weekly, monthly by date, monthly by day or yearly. Also we have allowed the administrator to ask for reminders to be sent out on a certain date or a set number of days before the meeting(s). Obviously these options have different sub-options so we have implemented a tree structure where sub options are hidden until they are needed. The advantages of this include:

1. The internal classification of fields and the sequences of execution provide a structure for the user to follow. This reduces memory load and eases navigation.
2. Familiar terminology - Grouped items and labels are marked clearly and are easily comprehensible.
3. Non-overlapping items - The lower level items are naturally associated with a single higher level item. There is an obvious link between different stages and selections within the program. This reduces user confusion.

The Club Members page

The club members’ names are displayed in tabular form. For ease of reading, consecutive rows are of different colours.

Check boxes are used for this specific case to assign the members to different groups. This allows members to be part of more than one group at a time. In order to prevent accidental manipulation of the members' details, the information is displayed, by default, in a read-only format. If any changes are to be made, the user has to click on the 'Edit Group Names' button first. The 'cancel all changes' button, which provides the additional option of nullifying any modifications, is clearly visible at the bottom of this page. ***(fig.3)***



Club Members

Name	Groups				
	Exec	Novice			
Joe Bloggs	☑	□	□	□	□
Boris	☑	□	□	□	□
Alex Whitton	☑	□	□	□	□
Andy Bennett	☑	□	□	□	□
James Thatcher	☑	□	□	□	□

To edit a user's profile, click on their name.

Fig.3 *Club Members*

Consistency

Through out the design we have attempted to create consistency by using a cascading style sheet. Consistency in interface design is vitally important as it speeds up learning and prevents error. Consistency in colour makes commands more intuitive. Below is a list of the main aspects of the style sheet and why they have been set as such.

1. A continuous representation of certain objects by the use of tabs is present between changeable pages. The header space remains the same (club name, picture and calendar), providing a sense of continuity and familiarity between pages. The display area consists of 2 sections throughout the program which keeps general layout aspects consistent.
2. Tables used on each page are of similar formats and appear onscreen in standard positions.
3. Text fonts chosen are consistent with their representation and functionality. Titles and headers are shown in bold. Explanations of feature functionality and user instructions appear in italic hyperlinks are in blue.
4. Terminology is kept simplistic and familiar throughout.
5. Colour coding is used to clarify sections. Each calendar representation uses the same layout and colour coding (yellow/grey). Tables use a consistent colour scheme. The selected and currently viewed page will show a white tab, with the unseen pages brown.

HELP AND ERROR CHECKING

We will provide both a printed (paper-copy) user manual and an online user manual for our product. An online help facility, tutorial and demonstration will also be made available to aid user understanding.

User Manual

This will be divided into 2 main sections. The first section will introduce users to the basic workings of the system, acting as a good way for users to 'get-started'. A brief overview of the key features and the most commonly used functions will be described. By providing this initial introduction, users should be more aware of the system's basic functionality. It enables more eager users to try things out almost immediately, therefore reducing user learning time, which in turn hopefully increases user satisfaction.

The second section will be a more detailed description of all the features in the program. It is there to be used as a reference manual and will cover the entire system functionality. This will include step-by-step instructions and examples for common sequences of actions as well as 'trouble-shooting' explanations for possible errors or mistakes encountered by users.

A 'table of contents', 'index' and 'glossary' will be provided. The information will aim to be easy to understand, keeping to simple and common terminology. Sentences will be kept concise, instructions concrete and only relevant and correct information will be presented. A priority in designing the manual will be to make information easy to find. Entry points will be included and information will be arranged logically.

The reason for having the user manual in both printed and electronic form is that there are advantages and disadvantages associated with both. The printed format is more traditional. However, by offering the online manual the text may be more readily available to users since the user will be online if currently using the meeting scheduler and may not have the printed manual to hand. It is also easier for some users to store and access an electronic version of the manual than the printed copy.

On the other hand, reading from displays does have the potential to make information harder to read and absorb. The emitted light from displays may cause difficulty in reading as opposed to reflected light from paper since there may be a greater glare. Displays are fixed which may limit certain aspects associated with reading, for example the reading distance of the manual may be greater than for a paper copy, and the placement of the screen could be too high/low for comfortable reading. It is also often hard to display the information in help and the application at the same time if the help is on screen, where as this is very easy when using a paper manual. Reduced hand-body motion is linked to reading off displays. These limitations on movement and the encouragement of rigid postures can lead to fatigue.

Online Help

Here we have 2 options for online help that could be provided for the user. The first would be a simple alphabetical list of keywords which the user can select from a 'help' menu item. This would involve the clicking of the mouse cursor and a user selection of displayed command names, which would result in a short paragraph explanation of the selected command. However, this method may be confusing for new users since there can be confusion between command names leading to frustration and stress.

A second help method could be to have pop-up messages appearing onscreen once the cursor moves across certain parts of the display. This may irritate the knowledgeable user or those who do not need guidance. Therefore, an alternative would be to provide a ‘help’ key or button within each section of the program that could be pressed when needed. Each display page would have its respective ‘help’ button which would lead onto information relevant for that particular display page and the available features onscreen. The online help system will be made easy to access and easy to return from.

Online Tutorial/Demonstration

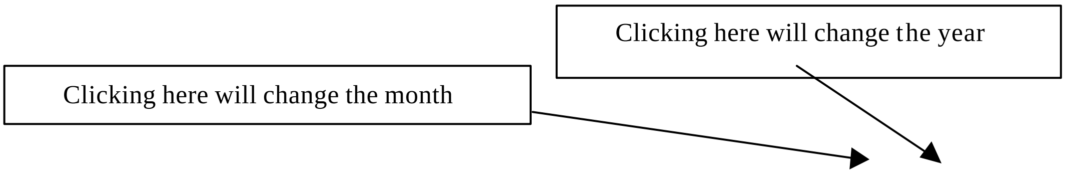
An online tutorial is used to teach the novice user the general functions of the program by showing simulations of the working system. The user can see sequences of actions take place but will also be able to direct the demonstration to different features of the product. This method is a good hands-on way to engage the user in interactive sessions and to increase familiarity with the system rapidly. Each section (add event, add member etc) will be shown in sequence with the potential use of animations to help direct and explain certain steps and options available. The user will have the option to interact with the tutorial or to simply watch a chosen series of actions as a demonstration of system functionality.

Advantages of the tutorial/demonstration system are that the attention of the user will not be constantly shifting between the terminal and the instructional material. The user can focus on ‘learning-by-seeing’. Therefore, the skills needed to operate the meeting scheduler will be acquired faster. The tutorial/demonstration can also be viewed by the individual user alone without the possibility of embarrassment of mistakes made before other club members.

Error Checking

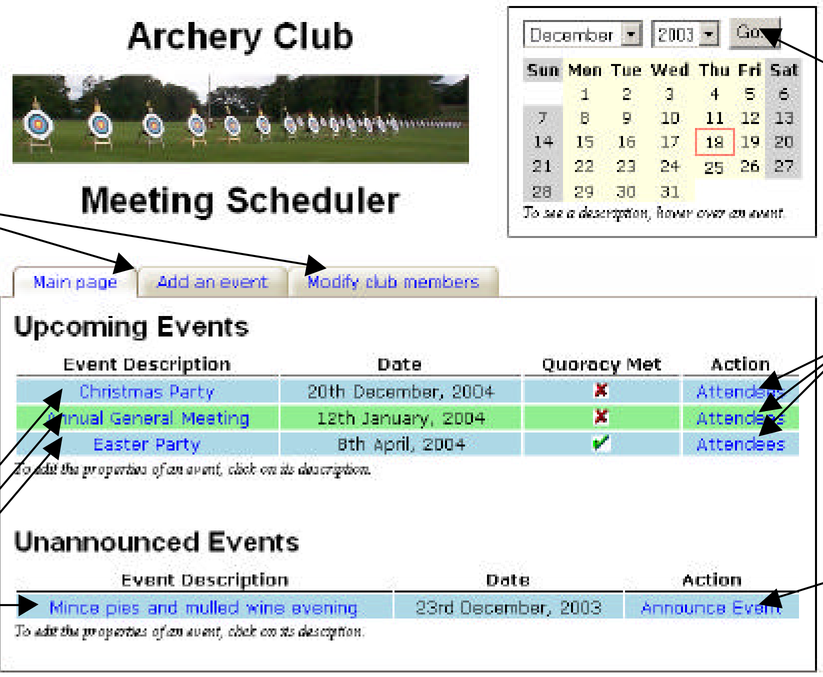
The system performs error checking to ensure that the user has not entered and data which contravenes the laws of the universe, such as, not scheduling meetings in the past etc.

Walk Through


Clicking here will change the year
Clicking here will change the month

Clicking here will take you to the add event and edit members sections

Clicking these will allow you to amend the event



Archery Club

Meeting Scheduler

December ▾ 2003 ▾ Go

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	27
28	29	30	31			

To see a description, hover over an event.

Main page | Add an event | Modify club members

Upcoming Events

Event Description	Date	Quoracy Met	Action
Christmas Party	20th December, 2004	✘	Attendees
Annual General Meeting	12th January, 2004	✘	Attendees
Easter Party	8th April, 2004	✓	Attendees

To edit the properties of an event, click on its description.

Unannounced Events

Event Description	Date	Action
Mince pies and mulled wine evening	23rd December, 2003	Announce Event

To edit the properties of an event, click on its description.

Clicking here confirms date

Clicking these will allow you to view the attendees

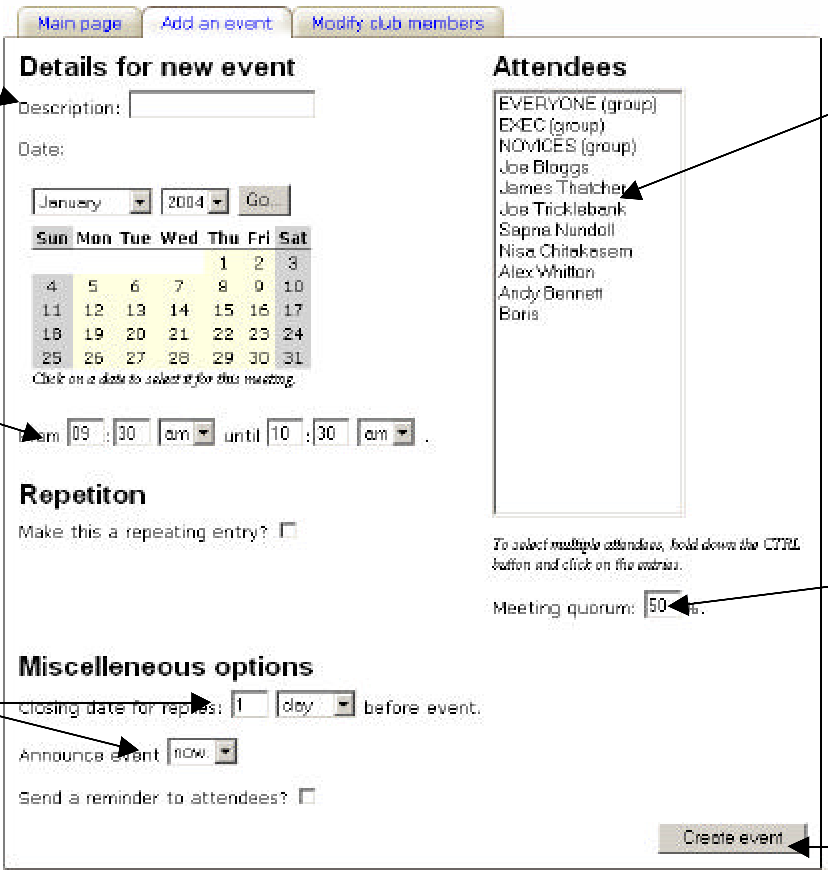
Clicking here will announce the event to the attendees via email

Allows description of meeting to be added

Can set the time for the meeting

Can set whether the meeting will be repeated

Sets miscellaneous options



Main page | Add an event | Modify club members

Details for new event

Description:

Date:

January ▾ 2004 ▾ Go

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	27	28	29	30	31

Click on a date to select it for this meeting.

from 09 : 30 am ▾ until 10 : 30 am ▾ .

Repetiton

Make this a repeating entry? □

Miscelleneous options

Closing date for replies: 1 day ▾ before event.

Announce event now ▾

Send a reminder to attendees? □

Create event

Attendees

EVERYONE (group)
EXEC (group)
NOVICES (group)
Joe Bloggs
James Thatcher
Joe Ticklebank
Sapna Nundoll
Nisa Chitakasem
Alex Whitton
Andy Bennett
Boris

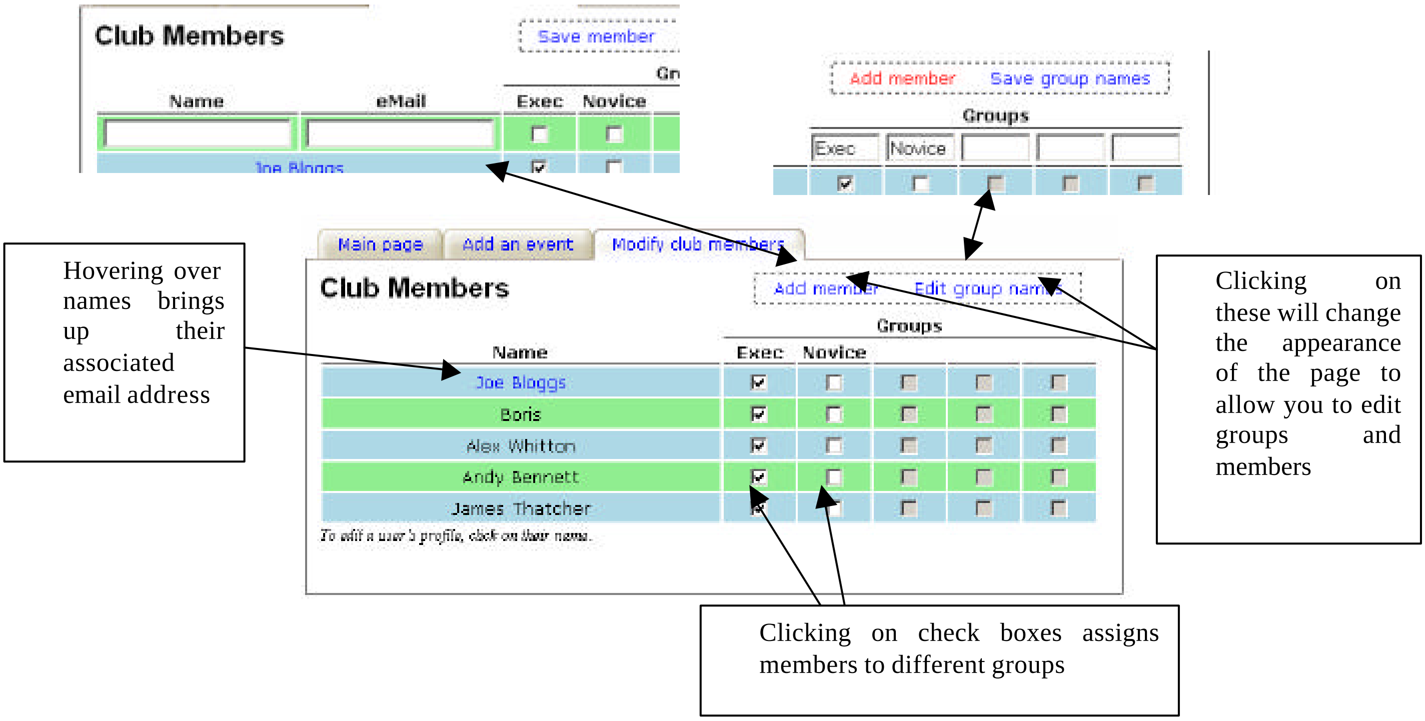
To select multiple attendees, hold down the CTRL button and click on the entries.

Meeting quorum: 50 %.

Highlighting people selects them to be attendees

Changing this will set the % of attendees needed to make the meeting viable

Affirms choices and sends out email to attendees



Club Members

Save member

Name	eMail	Exec	Novice
		□	□
Joe Bloggs		☑	□

Add member Save group names

Groups

Exec	Novice			
☑	□	□	□	□

Main page | Add an event | Modify club members

Club Members

Add member Edit group names

Name	Exec	Novice			
	Groups				
Joe Bloggs	☑	□	□	□	□
Boris	☑	□	□	□	□
Alex Whitton	☑	□	□	□	□
Andy Bennett	☑	□	□	□	□
James Thatcher	☑	□	□	□	□

To edit a user's profile, click on their name.

Hovering over names brings up their associated email address

Clicking on these will change the appearance of the page to allow you to edit groups and members

Clicking on check boxes assigns members to different groups