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# **Software Requirements Specification**

**for**

## **BORG Calendar**

**Requirements for Version 1.7.5**

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# 1. Introduction

## 1.1 Purpose

This document is the **Software Requirements Specification** (SRS) for BORG Calendar, a program that combines a calendar and a task tracking system. The calendar provides day, week, month and year views, a very useful address book, to do list, memos, checklists and allows users to add single or repeating appointments containing any relevant information and enhanced with email and popup reminders. The task tracker can be used to keep track of more complex tasks that run through various states. The current version of this program is **1.7.5**.

## 1.2 Document Conventions

For the development of this document certain steps were followed:

- 1) **Collecting** all the available information about the program.
- 2) **Testing** the program thoroughly and performing a plethora of use cases in order to fully understand its functionalities.
- 3) **Writing** the final paper according to an official template, while paying extra attention to placing each piece of information in the corresponding section.
- 4) **Checking** the document for any mistakes and performing any last-minute changes.

This document is based upon v1.7.5 of BORG Calendar, so all requirements stated here are already satisfied in this specific version. However, it is important to update it with every future requirement and clarify its priority for consistency purposes so that this document can remain useful.

## 1.3 Intended Audience and Reading Suggestions

This document is intended for:

- **Users** in general, who wish to get informed on what the BORG Calendar application can do. Thus, they can decide whether it covers their needs before installing it or they can use it as a manual after they have installed the application.
- **Documentation writers**, as a source of information (i.e. a reference) or as an example of how an SRS should be written.
- **Developers**, who want to get informed about the program's functionalities in detail in order to come up with ways to enhance them and improve/extend the application.
- **Software testers**, who can use it as a guide in order to perform their tests in a more organized and methodical way by checking if all features are implemented correctly and maybe reporting potential bugs.

- **Project managers/marketing staff**, who want to get informed about the program in general, as their main job duty is to be aware at any time of what kind of programs are out in the market or the open source software community.

The rest of the document is divided into the following chapters:

- ❖ In **chapter 2** an overall description of the BORG Calendar application is provided. At first, the product perspective is presented as well as a high level summary of its major features. Then, following are the various user classes and their characteristics, the operating environments that the program supports, as well as any design and implementation constraints. Finally, the existing user documentation is provided and any relevant assumptions and dependencies are mentioned.
- ❖ In **chapter 3** the major system features are presented and the associated functional requirements are described in detail.
- ❖ In **chapter 4** all the external interface requirements and specifically the user, hardware, software and communications interfaces are described.
- ❖ In **chapter 5** other nonfunctional requirements such as performance, safety and security requirements as well as software quality attributes are presented.

The sequence in which the chapters are written is the most appropriate for each group of audience mentioned above and should be followed by everyone who wants to obtain a deeper knowledge of the BORG Calendar application. However, users and project managers/marketing staff may want to focus on chapters 2, 3 and 4 whereas developers and software testers may be more interested in chapters 3, 4 and 5.

## 1.4 Project Scope

In today's hectic and stressful society it is becoming more and more common for people to have busy schedules and a lot of things to remember every day. Thus, the need for a mean to organize all this information is bigger than ever. BORG Calendar provides the system to achieve that with a highly versatile calendar which appears in every possible view (i.e. day, week, month and year views), equipped with features such as an appointment editor that enables users to add single or repeating appointments with the ability to incorporate any relevant information and enhanced with email and popup reminders, an address book that can store any kind of information (from names and addresses to phone numbers and birthdays), a to do list, memos and checklists as well as a powerful task tracking system which enables users to keep track of more complex tasks that run through various states. So it becomes quite obvious that BORG Calendar is the ideal application for anyone who wants to organize their everyday schedule in a more sufficient way.

Some screenshots of the program are available here:

[http://mbcsoft.com/index.php?option=com\\_content&task=view&id=28&Itemid=50](http://mbcsoft.com/index.php?option=com_content&task=view&id=28&Itemid=50).

Additionally, more screenshots are provided in a more detailed and organized way in section 4.1.

## 1.5 References

More information on the BORG Calendar application can be found at:

- <http://sourceforge.net/projects/borg-calendar/>

This is the program's development and distribution website. It contains a short description of the program as well as user reviews and opinions. Also, users can download the latest or earlier versions of the program from here and communicate with the developer through the "Open Discussion" or the "Help" forum and those who are interested in contributing to the development of the program can contact the developer through the "Developers" forum. Finally, users can get informed on all the bugs that have been reported or the new feature requests that have been made from the corresponding tracker.

- <http://borg.mbcsoft.com>

This is the official website of the program. It contains a lot of information on BORG Calendar, including a brief description, a list of its main features, history of previous versions, screenshots, information about its author and, of course, links to the website mentioned above.

- The online help that can be accessed (after having installed and run the application) by hitting F1 or using the Help menu.

## 2. Overall Description

### 2.1 Product Perspective

BORG Calendar belongs to the wide categories of PIMs (Personal Information Managers), calendars, scheduling and project/task management applications. Other projects similar to this are qOrganizer, Simple PHP Agenda, osmo, XNotesNG, NRedNotebook, todayu etc.

BORG Calendar needs only Java to run (specifically Java Runtime Environment v6), which now comes pre-installed on most systems. However, if someone doesn't have it installed, he/she can download it from <http://java.com/en/download/index.jsp>.

### 2.2 Product Features

BORG Calendar provides the user with the following features:

- **Day, Week, Month and Year Views** of the calendar in the form of tabs (docked windows) or undocked windows (except for the month view which –being the main view– is always docked).
- **Appointment Editor** which supports a plethora of options and capabilities.
- **Email Reminders** that can be sent each day containing the next day's appointments.
- **Popup Reminders** that can appear in the form of a single popup window (as a list) or in a separate popup window for each reminder.
- **Address Book** that can store any kind of information.
- **To Do List** which interacts directly with the calendar.

- **Memos**
- **CheckLists**
- **Task/Project Tracking System** which keeps track of more complex tasks that run through various states.
- **Search** using a variety of filters and criteria.
- **Print** in any of the four different views of the calendar. The printout created has ample room to jot new appointments and can be used as a daily planner.
- **Edit, Export/Import Preferences** from the Options tab. The various preferences can be exported into a single file and imported directly into BORG Calendar. Thus, the user can have a backup of his personal preferences or even have several groups of preferences (several files) that can import and apply at once according to his/her occasional needs.
- **Categories** created by the user as a way to maintain “virtual calendars” within a single database. For example, the user can create a number of different categories, then assign his appointments or tasks to each of them and finally choose which category/categories is/are going to be displayed.
- **Import/Export from/to XML** as a way for the user to backup his/her data in human readable and editable form.
- **Encryption** of appointments and memos.
- **Several types of links and attachments** that can be added to appointments, addresses, projects and tasks.
- **Support of four types of databases (HSQLDB, H2, MySQL, Generic JDBC)** with the first being the default one, as it is created and set up automatically and requires no special actions from the user.

All of the above features are described in detail in chapter 3.

## 2.3 User Classes and Characteristics

BORG Calendar is basically intended for four user classes:

- **End users/Desktop** who only need to have some basic knowledge in the use of computers and are most likely to use the basic features of the application, without getting involved with the more complex ones (e.g. the task/project tracking system), and the default database which requires no special setup. Of course, the program might be more useful to users with a busy daily schedule or those working on a computer quite often.
- **Advanced users** who have a better knowledge in the use of computers and are probably interested in exploring all of the program’s capabilities and maybe wish to set up a different type of database.
- **Developers** who have a deeper knowledge of programming in Java and wish to improve/extend the application.

- **Others** who wish to contribute to the project in other ways such as getting involved with the program's documentation or translations. (this user class could be merged with the previous one)

## 2.4 Operating Environment

Due to the fact that BORG Calendar is written in the Java programming language, it runs through the use of a Java Virtual Machine and not directly on the operating system. Thus, it can generally run on all operating systems that support the Java platform/software. More specifically, it can run on the following OSes:

- all 32-bit Microsoft Windows (95/98/NT/2000/XP)
- 64-bit Microsoft Windows
- Microsoft Windows 7
- all POSIX (Linux/BSD/UNIX-like OSes)
- Linux
- Mac OS X
- HP-UX
- OpenVMS
- OS Independent (Written in an interpreted language)

The only prerequisite for the program to be installed and run correctly is the Java platform and specifically, Java Standard Runtime Environment v6. Nowadays, it comes pre-installed on most systems; however if someone doesn't have it installed he/she can download it from <http://java.com/en/download/index.jsp>.

## 2.5 Design and Implementation Constraints

BORG Calendar is an open source program so there aren't any major constraints regarding its design and implementation. It is licensed under the GNU General Public License version 2 or later, a copy of which is included in the installation files and can be accessed either directly (in the program's installation folder) or from within the program itself (using the Help menu option).

However, there are some constraints regarding the different databases that can be used. Apart from the HSQLDB database that is created and set up automatically, all the others (H2, MySQL, Generic JDBC) require the respective drivers to be downloaded and/or setup to be made.

Finally, there are some limitations regarding the languages. Naturally, the program is not translated in every existing language. The existing translations are in English, French, Spanish, German, Italian, Dutch, Polish, Brazilian Portuguese, Russian, Chinese (Simplified) and Ukrainian.

## 2.6 User Documentation

Included in the installation files is a user manual (which is not complete, nevertheless very useful) that can be accessed from within the program by hitting F1 or using the Help menu. Additional information can be found on its official website and its development and distribution website (refer to section 1.5).

## 2.7 Assumptions and Dependencies

Apart from the fact that BORG Calendar needs Java to run (which now comes pre-installed on most systems and most certainly this will continue to happen) there aren't any other third-party or commercial components that could affect its development or functions and consequently the requirements stated in this document.

# 3. System Features

In this chapter the major system features are described in detail. At some points certain screenshots would be useful. However, for consistency reasons these are provided in section 4.1 but in order to facilitate the reading of this document the appropriate linking has been implemented.

## 3.1 System Feature 1

*Day, Week, Month and Year Views of the calendar*

### 3.1.1 Description

The program's main screen has four different views of the calendar. Each one can appear as a docked window (with its corresponding tab) or as a separate, undocked window. Thus, any or all of them can be open at the same time.

### 3.1.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select "Action" → "[Month View](#)" / "[Week View](#)" / "[Day View](#)" / "[Year View](#)".
3. Alternatively, click on the corresponding button at the icons' bar.
4. Alternatively, when in month view, place the mouse over a day's number (a red bar will appear) and click. The day view of the specific day will appear.
5. Alternatively, when in month view, place the mouse over a week's number (a red bar will appear) and click. The week view of the specific week will appear.
6. Alternatively, when in year view, place the mouse over a day's number (a red bar will appear) and click. The day view of the specific day will appear.



7. Alternatively, when in year view, place the mouse over a month's name (a red bar will appear) and click. The month view of the specific month will appear.
8. To undock a view click on the square icon in its tab.
9. To dock a view select from the associated window "Action" → "Dock".

### 3.1.3 Functional Requirements

REQ-1: Only the month view (being the main view) cannot be undocked.

REQ-2: All windows' docking state is remembered when the program restarts.

## 3.2 System Feature 2

### *Appointment Editor*

#### 3.2.1 Description

The main feature of the program is that it enables the user to add, edit and delete appointments which can contain any relevant information and are equipped with a wide variety of options and capabilities.

#### 3.2.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. To add a new appointment:
  - 2.1. When in month view, double-click inside a day's box to bring up the [appointment editor](#).
  - 2.2. Alternatively, right-click inside a day's box and select "Add New" to bring up the appointment editor.
  - 2.3. Alternatively, right-click inside a day's box and select "Quick Todo". A window pops up that prompts you to add some appointment text. Do so and select OK. Thus a new appointment has been added that contains only the subject text and the "To Do" attribute (will be explained later).
  - 2.4. Alternatively, right-click inside a day's box and select "Quick Note". A window pops up that prompts you to add some appointment text. Do so and select OK. Thus a new appointment has been added that contains only the subject text.
  - 2.5. When in week view, double-click inside a day's column to bring up the appointment editor.
  - 2.6. Alternatively, right-click inside a day's column and select "Add New" to bring up the appointment editor.
  - 2.7. Alternatively, right-click inside a day's column and select "Quick Todo". A window pops up that prompts you to add some appointment text. Do so and

select OK. Thus a new appointment has been added that contains only the subject text and the “To Do” attribute (will be explained later).

- 2.8. Alternatively, right-click inside a day’s column and select “Quick Note”. A window pops up that prompts you to add some appointment text. Do so and select OK. Thus a new appointment has been added that contains only the subject text.
- 2.9. Alternatively, click and drag the mouse inside the timed section of a day’s column. A green box will appear. Then, double-click inside that box. A window pops up that prompts you to add some appointment text. Do so and select OK. Thus a new appointment has been added that contains the subject text and the selected time range.
- 2.10. Alternatively, click and drag the mouse inside the timed section of a day’s column. A green box will appear. Then, right-click inside that box and select “Add New”. A window pops up that prompts you to add some appointment text. Do so and select OK. Thus a new appointment has been added that contains the subject text and the selected time range.
- 2.11. When in day view, the actions required are the same as in week view.
- 2.12. Once the appointment editor is open the user is presented with a variety of options:
  - Appointment Text: Firstly, the subject of the appointment has to be added. Additionally, the user can add a larger description of it or any other relevant information.
  - Appointment Time: The user can either check the checkbox “No Specific Time” and thus the appointment will be considered a “non-scheduled appointment” or “note”, or uncheck it and define the start time and duration of the appointment.
  - Properties: There is a number of attributes that can be assigned to the appointment:
    - If the “To Do” checkbox is marked the appointment is going to be a “To Do” and appear automatically in the to do list as well (further information on the to do list will be supplied later in the respective section).
    - The “Vacation”, “Half Day” and “Holiday” checkboxes are simply used to mark the day that contains the appointment in a different color so that it stands out. Also, a count of the number of vacation days taken for the year (including the current one) is shown for each vacation day.
    - If the “Private” checkbox is selected the appointment is going to be private and it will not appear in the calendar or the print output unless the “Show Private Appointments” option in the Options window is selected.
    - The “Color” and “Priority” attributes are self-explanatory and the “Category” field will be explained later in the respective section.

- Popup Reminders: This feature will be explained later in the respective section.
- Recurrence: There is a “Frequency” dropdown menu which includes every possible way an appointment could repeat. All choices are self-explanatory except for the monthly ones. The “monthly (date)” option means that the appointment will repeat on the same date each month (e.g. the 8<sup>th</sup> of each month), whereas the “monthly (day)” option means that the appointment will repeat on the same day and relative week each month (e.g. the second Tuesday of each month). The other fields in this section vary according to the option selected in the “Frequency” dropdown menu and are all self-explanatory.
- Links: This feature will be explained later in the respective section.
- Once the user has defined the preferred options he/she can press the “Save” button to save the appointment and remain in the same window or the “Save & Close” button to save the appointment and return to the calendar. The “Save Defaults” button makes the current settings the default ones.
- The options related to the encryption will be explained later in the respective section.
- At the right side of the appointment editor there is an Appointment List which contains all the appointments that exist for the selected date. By pressing the button next to the date a tiny calendar emerges and the date can be altered.

### 3. To edit an existing appointment:

- 3.1. When in month view, double-click on an appointment’s subject text to bring up the appointment editor for this specific appointment.
- 3.2. Alternatively, right-click on an appointment’s subject text and select “Edit” to bring up the appointment editor for this specific appointment.
- 3.3. To move an appointment (i.e. edit its date) directly from within the calendar, grab its subject text and drag & drop it into another date.
- 3.4. When in week view, the actions required are the same as in month view.
- 3.5. Additionally, when in week view, an appointment’s start time can be edited by moving its subject text (if it is a non-scheduled appointment) or box (if it is a scheduled one), as well as its duration by resizing its box (grabbing the upper or lower side and dragging it).
- 3.6. When in day view, the actions required are the same as in week view.
- 3.7. Once the appointment editor is open for the specific appointment the user can alter its settings or choose another one from the appointment list and edit that. Further options for editing provided in the appointment editor are:
  - If the “Edit New” button is pressed all the fields are restored into their default state for a new appointment to be added.

- If an appointment is selected from the appointment list and the “Copy Appointment” button is pressed a window pops up from which the user can select the date into which he/she wants the appointment to be copied.
- The “Send Reminder Email” option will be explained later in the respective section.

#### 4. To delete an appointment:

- 4.1. If it is a non-repeating appointment, right-click on its subject text and select “Delete” to completely remove it from the calendar.
- 4.2. If it is a repeating appointment, right-click on its subject text and select “Delete” to remove all of its occurrences or select “Delete One Only” to remove only the specific occurrence of the series.
- 4.3. If it is a to do appointment, apart from the “Delete” option that completely removes it from the calendar, there are two more options: the “Done (Delete)” and the “Done (No Delete)” which will be explained later in the section on the To Do List.
- 4.4. Alternatively, double-click on its subject text to bring up the appointment editor for this specific appointment and press the “Delete” or “Delete One Only” button according to one’s needs.

### 3.2.3 Functional Requirements

REQ-3: There is no way to add, edit or delete an appointment when in year view. The user has to switch to another view to do so.

REQ-4: When inside the appointment editor in order for an appointment to be saved at least the subject has to be filled. Otherwise, on save a window pops up which prompts the user to enter a subject.

REQ-5: When the “monthly (day)” recurrence option is set, if no such day exists for a given month, the appointment is skipped for that month, but the repeat count is still decremented.

REQ-6: Regarding the repeating appointments, repeats are only shown on the calendar for 2 years from the present date.

REQ-7: The user cannot move (alter the date) of any occurrence of a series of repeating appointments. If he/she tries to do so, a window will pop up informing him/her that only the first occurrence of the series can be moved. By doing that the whole series will be moved as one.

### 3.3 System Feature 3

#### *Email Reminders*

##### 3.3.1 Description

BORG Calendar can be set to send an email reminder each day for the next day's appointments. Additionally, the user can send extra email reminders for a specific day's appointments.

##### 3.3.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select "Options" → "Edit Preferences".
3. Click on the ["Email Parameters"](#) tab.
4. Check the "Enable Email" checkbox.
5. In the "SMTP Server" text field insert the name of the outgoing mail server.
6. In the "SMTP Port" text field leave the default value (25). If the default port is blocked for some reason, there are certain alternative values which can be entered depending on the mail service that is used.
7. In the "SMTP User (Optional)" text field insert the username of your email account.
8. In the "SMTP Password (Optional)" text field insert the password of your email account (these two fields are optional because depending on the email service that you use authentication may or may not be required).
9. In the "Your Email Address" text field insert the email address where you want the reminder email to be sent. More than one addresses can be entered separated by a comma.
10. In the "Reminder Email Time" field select the time on which the reminder email will be sent.
11. Check the "Enable TLS" checkbox as most mail service providers nowadays use TLS or SSL (the predecessor of TLS) cryptographic protocols to provide communication security over the Internet.
12. Press the "Apply" button to save the settings and the "Dismiss" button to exit the window.
13. To send an extra reminder email for a specific day's appointments, open the appointment editor for that day and press the "Send Reminder Email" button in the lower right corner of the window.

### 3.3.3 Functional Requirements

REQ-8: For the “Email Reminders” feature to function, all the parameters have to be entered correctly. A great resource on emails, which will help users achieve that, lies here: <http://www.emailaddressmanager.com/tips/email.html>. It includes articles on email addresses, protocols, incoming and outgoing mail servers and ports, mail server settings for the most famous mail service providers etc.

REQ-9: Specifically, in the “Reminder Email Time” field the 24-hour system is used. If an invalid value is entered no error message pops up and the entered value is switched automatically to a random valid value.

## 3.4 System Feature 4

### *Popup Reminders*

#### 3.4.1 Description

The user can set popup reminders to appear for each appointment. The reminders can appear in a single window as a list or in a separate popup window for each reminder.

#### 3.4.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Open the appointment editor to add a new appointment or edit an existing one and press the “Change” button in the “Popup Reminders” section.
3. A window appears which contains the default [popup times](#) that are available. Check the preferred ones for this specific appointment and press the “Save” button.
4. Alternatively, press the “Clear All” button to uncheck all the choices, the “Select All” button to select them or the “Dismiss” button to exit the window without saving any changes.
5. Press the “Save” or “Save & Close” button to save the appointment.
6. As the default implementation is the [single window](#) which contains a list of the reminders, when any item in the list hits a popup time the window pops up and a sound is played.
7. To suppress further reminders of a specific appointment, check it and press the “Hide” button. The “Done (Delete)” and “Done (No Delete)” buttons apply only to appointments that are marked as to do’s and will be explained later in the section on the To Do List. Finally, the “Unhide All” button restores all the hidden appointments.

8. To select the alternative implementation (i.e. the separate popup window for each reminder), to change the sound that is played when a reminder pops up, or to change the available popup times, select “Options” → “Edit Preferences” and click on the “[Popup Reminders](#)” tab.

### 3.4.3 Functional Requirements

REQ-10: Untimed appointments do not get popup reminders. However, untimed to do's for the current day get popup reminders every half hour as long as any popup times are selected. This time interval can be changed from the “Popup Reminders” tab in the “Options” window and if popup reminders are not wanted for untimed to do's they can be disabled by setting the time interval to 0.

## 3.5 System Feature 5

### *Address Book*

#### 3.5.1 Description

A simple, nevertheless very useful, feature of BORG Calendar is the address book which can be used as a database for the user's contacts and their personal information.

#### 3.5.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Action” → “[Address Book](#)”.
3. Alternatively, click on the corresponding button at the icons' bar.
4. Press the “Add New” button to add a new entry.
5. The available fields are divided into four tabs: “[Contact Information](#)”, “Address”, “Notes” and “Links” and are all self-explanatory except for the “Links” tab which will be explained later in the respective section. The “Birthday” field is equipped with a small calendar to facilitate the insertion of the date. Moreover, if a date is inserted the person's birthday will appear on the calendar on the appropriate day each year followed by his/her age.
6. Alternatively, click on an entry and press the “Edit” button or double-click on an entry to edit the specific entry.
7. Alternatively, click on an entry to select it or select multiple entries by clicking on one and dragging the mouse or by clicking on them while holding down the Ctrl key or select all of them by pressing Ctrl + A and then press the “Delete” button to delete it/them.
8. Alternatively, press the “Find” button and in the “Input” window that appears insert a string to search for the entry/entries which include the specific string. The program searches for the given string in any of the entries' fields.

9. The user can drag and drop any column to rearrange the order in which they appear and also sort the various entries in alphabetical ascending/descending order by any attribute just by clicking on it one/two times respectively.

### 3.5.3 Functional Requirements

REQ-11: In order for an entry to be added the First and Last Name have to be inserted. Otherwise, a window pops up informing the user about this. All the other fields are optional.

REQ-12: In order for the “Edit” and “Delete” buttons to function at least one entry has to be selected.

REQ-13: If the user tries to insert a birthday by typing it, at first the characters are red indicating that the input is invalid. If the “Save” button is pressed the entry will be saved but the birthday field will remain empty. When on insertion the input reaches a valid form the string will turn green and then by clicking the “Save” button it will be saved correctly.

## 3.6 System Feature 6

### *To Do List*

#### 3.6.1 Description

Another handy feature of BORG Calendar is the To Do List. It interacts directly with the calendar as it contains all appointments marked as to do's that have not been marked as done.

#### 3.6.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Action” → “To Do”.
3. Alternatively, click on the corresponding button at the icons' bar.
4. The [To Do List](#) appears which includes all the appointments that have been inserted from the calendar and are marked as to do's.
5. To edit an item of the list double-click on it or right-click on it and select “Edit”. The appointment editor for the specific appointment will open. The user can also move an appointment to the following day or even move it to an entirely different date by right-clicking on it and choosing the corresponding option. Any changes made from within the To Do List will be reflected directly into the calendar (in any view of it).
6. To delete an item from the To Do List there are two options:
  - The “Done (No Delete)” option removes the appointment from the To Do List but leaves it on the calendar (as a strike-through item).



- The “Done (Delete)” option removes the appointment from the To Do List and from the calendar as well.

These options are available from within the To Do List as well as the calendar.

7. From within the To Do List the user can also add a Quick To Do by entering its text and date –and optionally its color, category (which will be explained later in the respective section) and priority– and pressing the “Add” button.

### 3.6.3 Functional Requirements

REQ-14: In order for the “Done (No Delete)” and “Done (Delete)” buttons to function at least one item has to be selected.

REQ-15: In order for the Quick To Do to be added both the text and the date fields have to be completed. Otherwise, a window pops up informing the user about this. Moreover, when the “Add” button is pressed the Quick To Do is added but the text and date fields are not cleared. The user can change this from the [“Todo Options”](#) tab in the “Options” window.

REQ-16: A special case worth mentioning is the case of repeating to do’s. Like any other appointment, repeating to do’s will appear multiple times on the month view. However, they will only appear once on the To Do List, starting with occurrence number one. If a repeating to do is marked as done on the To Do List, the next occurrence of the to do will then be placed on the To Do List and this is done until the last occurrence has been marked as done.

## 3.7 System Feature 7

### Memos

#### 3.7.1 Description

Memos are plain text notes that can be created and saved by the user and are equipped with the ability to be encrypted as well as exported to files that can be opened and edited by almost any word processing application.

#### 3.7.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Action” → [“Memos”](#).
3. Alternatively, click on the corresponding button at the icons’ bar.
4. The memos’ names appear on the left in alphabetical order and by clicking on any of them the corresponding text appears on the right.
5. The “New Memo”, “Save Memo”, “Delete Memo” and “Export” buttons are self-explanatory.

6. The “Decrypt” button as well as the “Encrypt On Save” option will be explained later in the respective section.

7. The memos’ text can be searched by pressing Ctrl + F.

### 3.7.3 Functional Requirements

REQ-17: The “Save Memo” button is activated only after the user has added text to a newly created memo or edited the text of an existing memo.

REQ-18: Every memo must have its own unique name. If the user tries to create a memo with a name identical to an existing one, a window pops up informing him/her about this.

REQ-19: A memo with no name can be created and is treated like all the others (i.e. the empty name is treated as a unique one and no other memos without a name can be created).

REQ-20: In order for the “Delete Memo” button to function a memo has to be selected.

## 3.8 System Feature 8

### CheckLists

#### 3.8.1 Description

CheckLists are probably the simplest feature of BORG Calendar and are provided as an alternative to the To Do List for simpler, unscheduled and untimed tasks.

#### 3.8.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Action” → [“CheckLists”](#).
3. Alternatively, click on the corresponding button at the icons’ bar.
4. The checklists’ names appear on the left in alphabetical order and by clicking on any of them the corresponding checklist appears on the right.
5. The “New CheckList”, “Save CheckList”, “Delete CheckList” and “Copy CheckList” buttons are self-explanatory.
6. The “Uncheck All” button unchecks all the checked items from the selected checklist.
7. To add a new item to a checklist enter its text to the empty field next to the checkbox and press “Enter”.
8. To insert a new item to a specific position right-click on an existing item and select “Insert Above” or “Insert Below” according to your will.

9. To delete an item from a checklist right-click on it and select "Remove".

### 3.8.3 Functional Requirements

REQ-21: Every checklist must have its own unique name. If the user tries to create a checklist with a name identical to an existing one, a window pops up informing him/her about this.

REQ-22: A checklist with no name can be created and is treated like all the others (i.e. the empty name is treated as a unique one and no other checklists without a name can be created).

REQ-23: In order for the "Save CheckList", "Delete CheckList", "Copy CheckList" and "Uncheck All" buttons to function a checklist has to be selected.

## 3.9 System Feature 9

### *Task/Project Tracking System*

#### 3.9.1 Description

One of the most powerful features of BORG Calendar is the Task/Project Tracking System. It is used to keep track of more complex tasks with defined start and end dates, different statuses, descriptions and resolutions. General information about the use of the Task Tracker, the objects managed by it as well as its structure can be found in the online help (refer to section 1.5). To avoid duplicating this information only the necessary pieces are included in this document.

#### 3.9.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select "Action" → "Tasks".
3. Alternatively, click on the corresponding button at the icons' bar.
4. The Task Tracker includes three tabs: the "Project Tree", the "Projects" and the "Tasks" tab.
  - 4.1. In the "[Project Tree](#)" tab the project tree appears on the left and consists of projects which are displayed as folders and tasks which are displayed as leaves. By clicking on any of them the corresponding Project/Task Information appears on the right where they can be edited and new tasks as well as subtasks can be added. Moreover, new projects and tasks can be added directly from the project tree by right-clicking on the parent project and selecting "Add Task" or "Add Project". Once a project or task has been selected from the project tree, the interface on the right is identical to the one that appears when adding a new project or task, thus it will be explained later in the respective section.

4.2. In the “[Projects](#)” tab a list of all, only the open or only the closed projects appear, according to the selection in the “Status” drop-down menu. Press the “Add” button to [add a new project](#). The Project Information consists of the following fields:

- Item #: The project’s serial number. This field is filled automatically.
- Status: The project’s status. Can be either open or closed. When creating a new project it is open by default.
- Due Date: The project’s due date, meaning the date on which it has to be completed.
- Description: This field is self-explanatory.
- Parent: The parent project, meaning the project in which the current project will be included. The user can choose a parent project or leave this field empty.
- Category: Will be explained later in the respective section.
- Start Date: This field is self-explanatory.
- Days Left: The days remaining until the due date. This field is filled automatically.
- Total Tasks: The number of tasks that this project includes. Filled automatically.
- Open Tasks: The number of open tasks that this project includes. Filled automatically.

Once all the necessary information has been entered press the “Save” button to save the project. The “Links” section will be explained later in the respective section. In the “Tasks” section a list of the open tasks included in the current project is displayed and the options provided are the same as in the “Tasks” tab which will be explained later on.

The “Change”, “Delete”, “Close” and “Clone” buttons in the “Projects” tab are all self-explanatory.

4.3. In the “[Tasks](#)” tab the user can determine which tasks will be displayed through a number of filters. Specifically, the user can decide to show all the tasks of a certain status, all the tasks included in a certain project or all the tasks that include a certain string in their description. Also, there is an option to show the subtasks as well. To [add a new task](#) press the “Add” button. The Task Information consists of the following fields:

- Item #: The task’s serial number. This field is filled automatically.
- Status: The task’s status. When creating a new task it is open by default and then it progresses through a user configurable tree of states to reach an end state (which is the closed state by default). BORG Calendar comes with a

set of default task types and states which is adequate for most people, nevertheless can be edited according to the user's needs.

- **Type:** The task's type. The options available in this field are user configurable, as mentioned above, and the choice made in this field determines the options that will be available in the previous one.
- **Start Date:** This field is self-explanatory.
- **Due Date:** The task's due date, meaning the date on which it has to be completed.
- **Project:** The parent project, meaning the project in which the current task will be included. As tasks that are not part of any project can also be created, the user can choose a parent project or leave this field empty.
- **Category:** Will be explained later in the respective section.
- **Pri:** The task's priority. The smaller the number the higher the task's priority.
- **PA:** The PA (person assigned) field doesn't really do anything except hold data. It is up to the user to decide its use.
- **Close Date:** The date on which the task is closed. This field is filled automatically.
- **Days Left:** The days remaining until the due date. Filled automatically.
- **Description:** This field is self-explanatory.
- **Resolution:** This field is self-explanatory.
- **History:** This field is a log of the major changes made in the current task, such as its creation, any changes in its status, the creation of any subtasks etc. Filled automatically.
- **Links:** Will be explained later in the respective section.

In the "SubTasks" section the user can add subtasks to the current task. Subtasks are single units of work that do not progress through a set of states. They are either completed or not-completed. To add a subtask double-click in the "Description" field, input some text and press "Enter". Optionally, a due date can also be selected. Once all the necessary information has been entered press the "Save" button to save the task.

The "Change", "Delete", "Close" and "Clone" buttons in the "Tasks" tab are all self-explanatory.

5. To edit the default task types and states select "Options" → "Task State Options" → ["Edit Task Types and States"](#). By clicking on a type the corresponding states appear; by clicking on a state the corresponding next states appear and so on. To add, rename or delete any of them right-click on it and select the respective option. Press the "Save" button to save any changes. Press the "Dismiss" button to exit the window without saving

any changes.

6. To reset the task types and states to their default values select “Options” → “Task State Options” → “Reset Task States to Default”.

### 3.9.3 Functional Requirements

REQ-24: In order for the “Change”, “Delete”, “Close” and “Clone” buttons to function a project/task has to be selected.

REQ-25: In order for a project/task/subtask to be created at least the description has to be completed.

REQ-26: All child projects/tasks of a project must have due dates on or before the project’s due date. If the user tries to create a project/task with a due date later than the parent project’s due date, a window pops up informing him/her about this.

REQ-27: Respectively, all subtasks of a task must have due dates on or before the task’s due date. If the user tries to create a subtask with a due date later than the parent task’s due date, a window pops up informing him/her about this.

REQ-28: A project cannot be closed unless all of its child tasks are closed. If the user tries to close a project that has at least one not-closed child task a window pops up informing him/her about this.

REQ-29: Respectively, a task cannot be closed unless all of its subtasks are closed. If the user tries to close a task that has at least one open subtask a window pops up informing him/her about this.

## 3.10 System Feature 10

### *Search function*

#### 3.10.1 Description

Another useful feature of BORG Calendar is the Search function. It contains a wide variety of filters and can be used to perform bulk deletes (thus cleaning up old appointments that are no longer needed) as well as change the category of multiple appointments at once (the “categories” feature will be explained later in the respective section).

#### 3.10.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Action” → “[Search](#)”.
3. Alternatively, click on the corresponding button at the icons’ bar.

4. The user can adjust the filters according to his/her will and press the “Search” button. In the “Search Results” section a list of all the items that match the defined criteria will appear. The available filters are:
  - Search String: By entering a string in this field only the items whose name/description includes that string will appear in the search results.
  - Case Sensitive: By checking this option the search for the entered string will be case-sensitive, meaning that the case of the letters must also match.
  - Whole Word: By checking this option the entered string must be a whole word in the items’ name/description in order for them to appear in the search results.
  - Category: Will be explained later in the respective section.
  - Start Date: By entering a date in this field only the items with a date on or after the entered one will appear in the search results.
  - End Date: By entering a date in this field only the items with a date before the entered one will appear in the search results.
  - Appointment/Address/Task/Project/Memo: By checking any of these options (types of items) the respective items appear in the search results.
  - To Do/Repeating/Vacation/Holiday: By checking any of these options only the appointments are filtered (only the ones with the selected attributes appear in the search results). The other types of items are not affected.
  - Has Links: By checking this option only the items that contain any links (as well as all the memos) appear in the search results. (The Links feature will be explained later in the respective section.)
5. The user can drag and drop any column to rearrange the order in which they appear and also sort the various search result items in alphabetical ascending/descending order by any attribute just by clicking on it one/two times respectively.
6. To view the details of an item and/or edit it, double-click on it.
7. To select a search result item just click on it. To select multiple items click on them while holding down the Ctrl key or click on one of them and drag the mouse or click on one of them and, holding down the Shift key, click on another to select these two and all that are between them. To select all the items press Ctrl + A.
8. To delete the selected item/items press the “Delete Selected” button and to change their category press the “Change Category” button.

### 3.10.3 Functional Requirements

REQ-30: In order for the “Delete Selected” and “Change Category” buttons to function at least one item has to be selected.

REQ-31: The “Delete Selected” button deletes only appointments and addresses. It has no effect on the other types of items.

## 3.11 System Feature 11

### *Print function*

#### 3.11.1 Description

Whilst, at first glance, it may seem a trivial feature, for some users that cannot always be close to a computer the print function may be one of the most important features of BORG Calendar as they can print the next few months and use the printout as a daily planner until they can get back to BORG to update it online. If new appointments come up there is always ample room on the printout to jot them down. Of course, apart from the calendar views, the print function can be performed for any other screen of the program.

#### 3.11.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Being on any of the program's screens, select "Action" → "Print".
3. Alternatively, click on the corresponding button at the icons' bar.
4. When in month view, a window pops up asking how many months to print. Choose a number and press the "OK" button.
5. Another window appears in which the printer and the preferred [printing properties](#) are defined.
6. When in any other calendar view or screen of the program the first window is omitted.

#### 3.11.3 Functional Requirements

REQ-32: In order for the print function to be performed a printer has to be connected to the computer. However, if a printer does not exist the user can select to print to a file (from the second window) thus creating a .prn file that can be converted to a .pdf file which will have the same look as the actual printout.

## 3.12 System Feature 12

### *Edit, Export/Import Preferences*

#### 3.12.1 Description

Many functions and screens of BORG Calendar are user configurable. The various preferences can be defined from the "Options" window and additionally exported into a single file and imported directly into BORG Calendar. Thus, the user can have a backup of his personal preferences or even have several groups of preferences (several files) that can import and apply at once according to his/her occasional needs.



### 3.12.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.

2. To define the preferred options:

2.1. Select “Options” → “Edit Preferences”.

2.2. The “Options” window appears which includes the following tabs:

- [Appearance](#): Most options in this tab are self-explanatory except for:
  - The “Look and Feel” field whose options in the drop-down menu are the look and feels installed in the user’s JRE. Some of the look and feels from Java are not so appealing with BORG Calendar. The PlasticXP look and feel is distributed with BORG to make sure that the user is provided with at least one good looking one. If the look and feel is changed, the program has to be restarted in order for the new one to be applied.
  - The “Truncate Appointments in Month View” option which causes only the subject of the appointment text to show in the month view. If this option is unchecked the rest of the appointment text will show in the month view as well.
  - The “Day Start Hour” and “Day End Hour” fields that define the range of times shown on both the Day and Week Views.
  - The “Locale” field which includes the regional settings for most of the countries in the world. The regional settings mainly include the date formats, month names and weekday names.
- [Fonts](#): The options in this tab are self-explanatory.
- Email Parameters: The options in this tab are explained above (refer to section 3.3 on the Email Reminders feature).
- Popup Reminders: The options in this tab are explained above (refer to section 3.4 on the Popup Reminders feature).
- [Miscellaneous](#): Most options in this tab are self-explanatory except for:
  - The “Show Stack Trace Option on Error Dialogs” which is disabled by default and need not be enabled unless debugging is being done. If it is enabled every time an error occurs next to the “OK” button in the error window a “Show Stack Trace” button will appear that generates a stack trace which can be sent to the developers to help debug the error.
  - The “Socket Port” field which should be left as it is (with the default 2929 value) because thus the program can detect when another copy is running. If the user starts a second copy of BORG Calendar when one is

already running, and the socket port is set, the second copy will just open the running copy and exit.

- The “Backup Folder” and “On Shutdown” fields which will be explained later in the section on the “Import/Export from/to XML” function.
- The “Enable the dynamic loading of plugins and JARs from the lib folder” option which should always be enabled so that the Help window as well as other .jar files and plugins can be loaded.
- [User Color Scheme](#): The options in this tab are self-explanatory.
- [Task Options](#): Most options in this tab are self-explanatory except for:
  - The “Show Task Numbers on Calendar” option which is deselected by default but if enabled certain codes appear before the projects’ / tasks’ / subtasks’ descriptions on the calendar. For example, the “PR6” code represents project number 6, whereas the “BT2” code represents task number 2 and the “BT4/ST5” code represents subtask number 5 of task number 4.
- Todo Options: The options in this tab are explained above (refer to section 3.6 on the To Do List feature and specifically to REQ-15).
- Encryption: The options in this tab will be explained later in the respective section.
- Database Information: The options in this tab will be explained later in the respective section.

2.3. Once the preferred options have been defined press the “Apply” button for the changes to take effect and then the “Dismiss” button to close the window.

2.4. Press the “Dismiss” button to exit the window without saving any changes.

3. To export the current preferences:

3.1. Select “Options” → “Export Preferences”.

3.2. In the window that appears give a name to the file and choose where it will be created.

4. To import a preferences file:

4.1. Select “Options” → “Import Preferences”.

4.2. In the window that appears browse and select the file.

### 3.12.3 Functional Requirements

No functional requirements exist for the current feature.

### 3.13 System Feature 13

#### Categories

##### 3.13.1 Description

BORG Calendar enables the user to create a number of different categories, then assign the appointments or tasks to each of them and choose which category/-ies is/are going to be displayed. Appointments and tasks that are in a category that is being shown behave normally and appear in the calendar, task manager, printouts etc. Appointments and tasks that are in a category that is hidden, will remain in the database, but will not appear anywhere on any screen. Thus, the user is provided with a way to maintain multiple “virtual calendars” within a single database.

##### 3.13.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. To create a new category:
  - 2.1. Select “Categories” → “Add New Category”.
  - 2.2. In the window that appears enter a name for the category and press the “OK” button.
3. To assign an appointment or a task (or a group of tasks, i.e. a project) to a category select the desired category from the drop-down menu in the respective fields.
4. To choose which category/-ies is/are going to be displayed:
  - 4.1. Select “Categories” → [“Choose Categories to Display”](#).
  - 4.2. The window that appears includes all the categories that have been created and also a “<No Category>” option which includes all the appointments and tasks that have not been assigned to any category. Select the one/ones that you want to be displayed and press the “Apply” button for the changes to take effect and then the “Dismiss” button to close the window.
  - 4.3. Press the “Dismiss” button to exit the window without saving any changes.
  - 4.4. The “Select All” and “Clear All” buttons are self-explanatory.
5. To delete a category:
  - 5.1. Select “Categories” → “Delete Category”.
  - 5.2. In the window that appears choose which category you want to be deleted and press the “OK” button.

5.3. Another window appears which warns the user that deleting the category will automatically delete all the appointments and tasks associated with it. By pressing the “OK” button the deletion is completed.

6. To delete all the categories which have no items assigned to them, select “Categories” → “Remove Unused Categories”.

### 3.13.3 Functional Requirements

REQ-33: Every category must have its own unique name. If the user tries to create a category with a name identical to an existing one or a category with no name, no error message pops up; however on pressing the “OK” button nothing happens (the window closes without any category having been created).

REQ-34: In order for the “Delete Category” button to function there must be at least one category in the list (apart, of course, from the “<No Category>” option).

## 3.14 System Feature 14

### *Import/Export from/to XML*

#### 3.14.1 Description

Another very important feature of BORG Calendar is that it enables the user to export the entire database to a time-stamped zip file which contains a number of xml files. Thus, the backup data are in a human readable and editable form and can be accessed outside of BORG Calendar or imported right back into the program. The exportation can be performed manually at any time or can be set to happen automatically every time the program shuts down.

#### 3.14.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.

2. To export the current data:

2.1. Select “Import / Export” → “[Export XML...](#)”.

2.2. In the window that appears choose where the time-stamped zip file will be created and press the “Select Export Directory” button. The name of the file will contain the exact date and time of the creation. For example, the name “borg20110824202136” means that the file was created on August 24, 2011 at 20:21:36.

3. To import the entire backup zip file:

3.1. Select “Import / Export” → “Import Entire Backup Zipfile”.

3.2. In the window that appears browse and select the zip file.

4. To import a single xml file:
  - 4.1. Select “Import / Export” → “Import XML...”.
  - 4.2. In the window that appears browse and select the xml file.
  - 4.3. Another window appears informing the user about the type of data that will be imported. Press the “OK” button to complete the importation.
5. To define a backup action which will occur every time the program shuts down:
  - 5.1. Select “Options” → “Edit Preferences”.
  - 5.2. Select the “Miscellaneous” tab of the “Options” window.
  - 5.3. In the “Backup Folder” field enter the path of the folder where you want the zip file to be created and in the “On Shutdown” field select the action to be performed every time the program shuts down.
  - 5.4. Press the “Apply” button to save the settings and the “Dismiss” button to exit the window.

### 3.14.3 Functional Requirements

REQ-35: If the user tries to import a zip file (or single xml files) which contains data that already exist in the program's database, the identical data are not overwritten. The appointments and addresses are imported (and thus, the already existing ones duplicated), the already existing memos and checklists are not imported as there cannot be memos or checklists with identical names (however, no error message pops up) and the already existing tasks are not imported as there cannot be tasks with the same serial number (a window pops up containing a description of the error).

## 3.15 System Feature 15

### *Encryption*

#### 3.15.1 Description

BORG Calendar supports the optional encryption of appointments and memos. If this feature is enabled, AES symmetric encryption is used to encrypt and decrypt text before storing in the database. General information about the use of the encryption feature and how it works can be found in the online help (refer to section 1.5). To avoid duplicating this information only the necessary pieces are included in this document.

#### 3.15.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. Select “Options” → “Edit Preferences”.

3. Select the "[Encryption](#)" tab of the "Options" window.
4. If this feature is enabled for the first time, a new Key Store file has to be created. In the "KeyStore" field press the "Browse" button and in the window that appears give a name to the file, choose where it will be created and press the "Open" button.
5. Another window appears in which a password has to be entered in order for the file to be created. Enter the password twice for confirmation and press the "OK" button.
6. The Key Store file, which contains a random encryption key and is protected by the given password, is created in the selected location.
7. If a Key Store file already exists, however it is not set in the "KeyStore" field, press the "Browse" button and in the window that appears browse and select it.
8. In the "Password Expiration" field select a time in seconds to define how long the program will remember an entered password. The default value is 5 minutes. This means that once a valid password is entered, it will not have to be re-entered for further encryption/decryption operations for 5 minutes. This time length can be set to any value between 0 seconds and 1 year (31.536.000 seconds). A value of 0 would cause the program to prompt for the password for every encryption / decryption operation.
9. Press the "Apply" button to save the settings and the "Dismiss" button to exit the window.
10. To encrypt an appointment:
  - 10.1. When inside the appointment editor for the specific appointment, check the "Encrypt On Save" option and press the "Save" or "Save & Close" button.
  - 10.2. In the window that appears enter the encryption password and press the "OK" button. The appointment text is now encrypted and is not displayed properly in any view.
11. To encrypt a memo:
  - 11.1. When inside the "Memos" tab and having selected the memo, check the "Encrypt On Save" option, enter some memo text (so that the memo is altered and thus, the "Save Memo" button activated) and press the "Save Memo" button.
  - 11.2. In the window that appears enter the encryption password and press the "OK" button. The memo text is now encrypted and is not displayed properly in any view.
12. To decrypt an appointment or a memo press the corresponding "Decrypt" button and in the window that appears enter the encryption password and press the "OK" button.

### 3.15.3 Functional Requirements

REQ-36: Encryption cannot be used unless a Key Store file is set in the “Encryption” tab of the “Options” window. If the user tries to encrypt/decrypt an appointment or a memo without having set a Key Store file, a window pops up informing him/her about this.

REQ-37: In the window which prompts for a password in order for the Key Store file to be created, the passwords entered in both fields have to match exactly. Otherwise, a window pops up informing the user about this.

REQ-38: If in the “Password Expiration” field an invalid value is entered, no error message pops up and the entered value is switched automatically to the most recently entered valid value.

REQ-39: In order for an appointment or memo to be encrypted/decrypted the password entered must be the correct one. If the user enters an incorrect password, a window pops up informing him/her about this.

REQ-40: If in the window which prompts for a password in order for the Key Store file to be created, the user presses the “OK” button without entering any password, no error message pops up. The Key Store file is created normally and the password protecting it is an empty one (i.e. in order for any encryption/decryption operation to be performed the “OK” button has to be pressed without entering any password).

## 3.16 System Feature 16

*Several types of links and attachments*

### 3.16.1 Description

There are four types of links and attachments that can be added to appointments, addresses, projects and tasks. These are:

- The File Link, which is a link to a file inside the user’s file system.
- The Attached File Link, which is a link to a file that BORG Calendar will copy into an attachment folder, located inside the user’s HSQLDB database folder. Thus, if the user moves the database folder between machines (i.e. on a thumb drive), his/her attachments will always be available. (This type of link is supported for the HSQLDB database only, which is the default one as will be explained later in the respective section.)
- The URL Link, which is a link to a URL .
- The BORG Object Link, which is a link to another appointment, address, memo, project or task.

### 3.16.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. To add a File Link to an appointment/address/project/task:
  - 2.1. Open the respective editor and in the “Links” section/tab press the “Link file” button.
  - 2.2. In the window that appears browse and select the file.
3. To add an Attached File Link to an appointment/address/project/task:
  - 3.1. Open the respective editor and in the “Links” section/tab press the “Attach File” button.
  - 3.2. In the window that appears browse and select the file.
  - 3.3. The link is added and the file is automatically copied into the attachments folder.
4. To add a URL Link to an appointment/address/project/task:
  - 4.1. Open the respective editor and in the “Links” section/tab press the “URL” button.
  - 4.2. In the window that appears enter the URL and press the “OK” button.
5. To add a BORG Object Link to an appointment/address/project/task:
  - 5.1. Open the respective editor and in the “Links” section/tab press the “BORG” button.
  - 5.2. In the window that appears select the type of the link’s target object and press the “OK” button.
  - 5.3. Another window appears which contains a list of the existing items of the selected type. Click on the one you want to link to and press the “Select” button.
6. To delete a link right-click on it from within the “Links” section/tab and select “Delete”.
7. To open a link from within the “Links” section/tab double-click on it or right-click on it and select “Open”. Files and URLs are opened according to the user’s operating system settings by launching the viewer specified. More specifically, URLs are opened in the default browser.
8. To preview the type of a link right-click on it from within the “Links” section/tab and select “Properties”.



### 3.16.3 Functional Requirements

REQ-41: In order for a link to be added to an item, it has to be saved first. If the user tries to add a link to an item that has not already been saved to the database, a window pops up informing him/her about this.

REQ-42: In order for a file link to be opened a viewer has to be specified for that file type in the user's operating system settings. If no viewer is specified, the file will not be opened and an error message will pop up.

## 3.17 System Feature 17

*Support of four types of databases*

### 3.17.1 Description

BORG Calendar supports the following types of databases: HSQLDB, H2, MySQL and Generic JDBC. As of version 1.6, HSQLDB is the default DB type, as it is created and set up automatically and requires no special actions from the user. General information about the available db types and the way they are set up as well as their prerequisites can be found in the online help (refer to section 1.5). To avoid duplicating this information only the necessary pieces are included in this document.

### 3.17.2 Stimulus/Response Sequences

The sequences of user actions and system responses that stimulate the described behavior are:

1. Run the application.
2. To alter the default database settings (not necessary – do this only if needed) select “Options” → “Edit Preferences”.
3. Select the “[Database Information](#)” tab of the “Options” window.
4. Select the preferred DB type and define the appropriate settings.
5. Press the “Apply DB Change” button and in the window that appears the “Yes” button to confirm the changes.
6. A window appears informing the user that the program must be restarted in order for the changes to take effect. Press the “OK” button and re-open the program.

### 3.17.3 Functional Requirements

REQ-43: In the “Action” menu choice there are two options: the “Sync with DB” and the “Run SQL” option. In order for these options to have a meaning, the MySQL database type has to be selected.

REQ-44: If the database directory is changed, the original data are not copied and the original database is not removed. Thus, if the user wants to copy or move the database to another location, he/she has to do this manually before changing the database directory from the “Options” window.

## 4. External Interface Requirements

### 4.1 User Interfaces

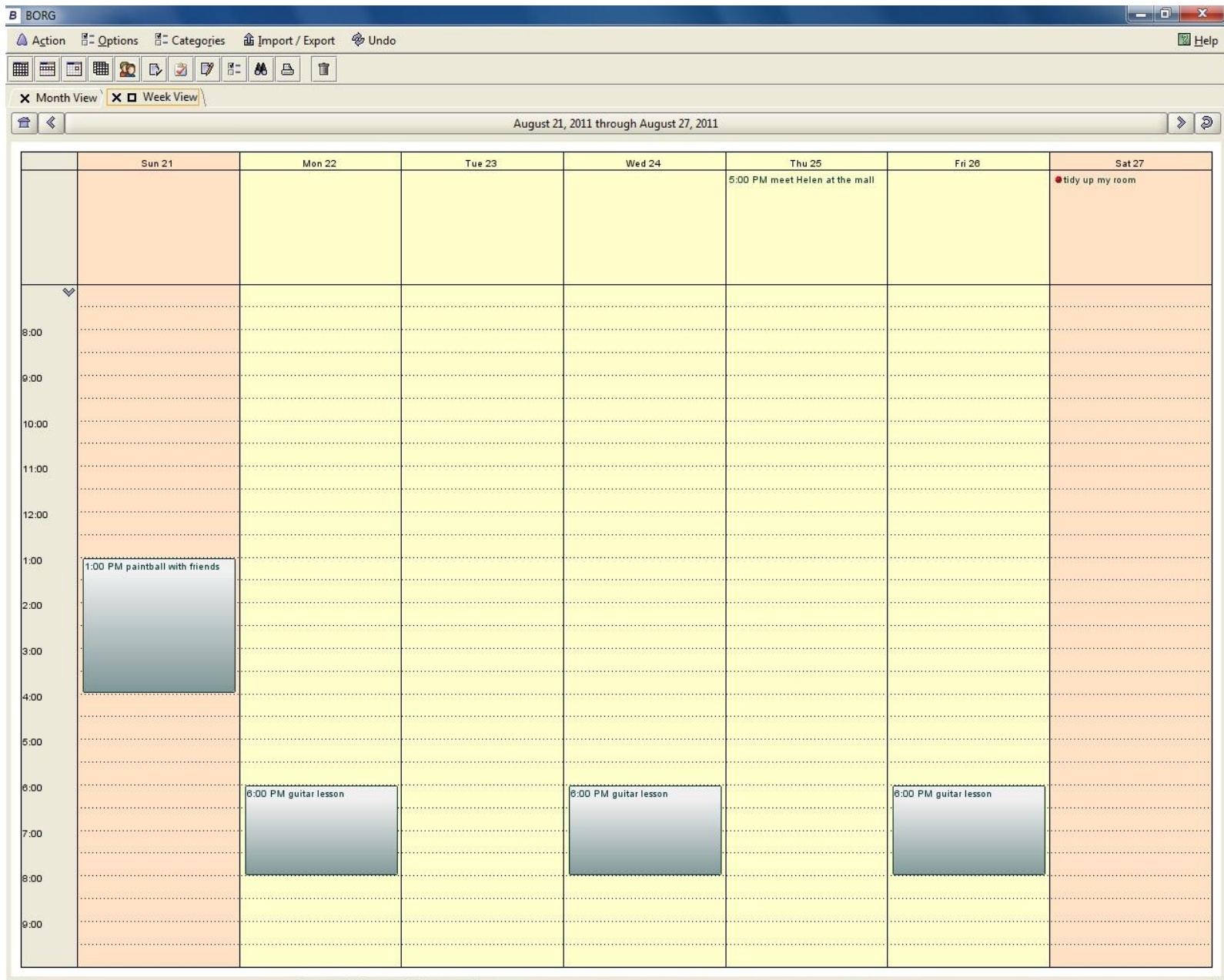
BORG Calendar interacts with the user through various interfaces. Since the program's user interfaces have already been described in chapter 3 (while presenting its main features), sample screenshots of these interfaces are provided below without any further analysis. (Any information that is included in the program and depicted in the screenshots is random and was added to the program with the sole purpose of portraying how actual data would be displayed.)

Additionally, as this program is not part of some product family, no certain GUI standards or other style guides are followed.

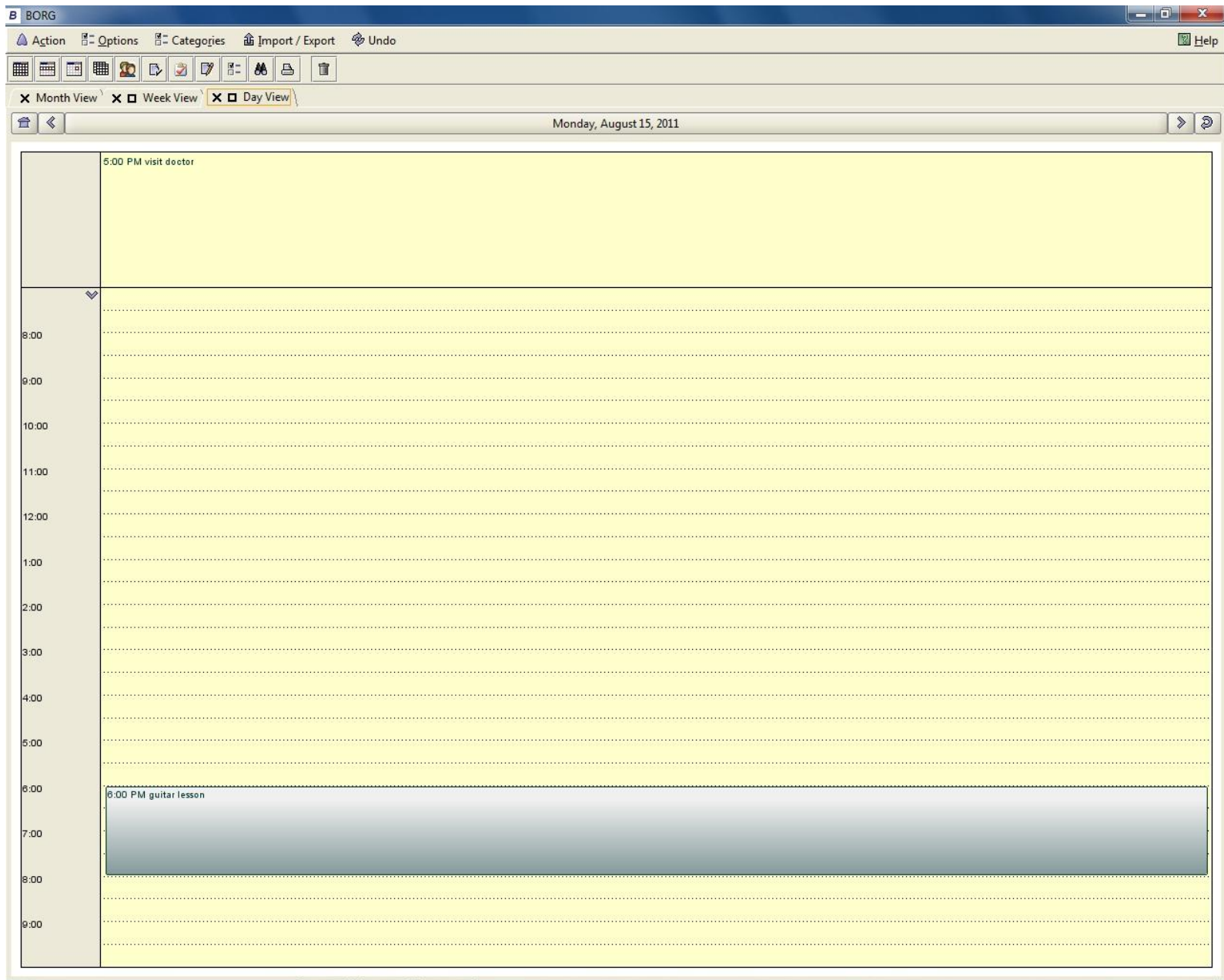
The keyboard shortcuts that enhance the program's usability are the standard "Ctrl + A" (i.e. select all) and "Ctrl + F" (i.e. search for text) that function in certain screens (refer to chapter 3). Moreover, there are many buttons and options that contain an underlined letter. These are selected by pressing "Alt + *the underlined letter*".

B BORG						
Action Options Categories Import / Export Undo Help						
X Month View						
August 2011						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1 wash the car	2 11:15 AM ship departure!	3	4	5	6
7	8	9	10	11 Birthday: Lucy Andrews(23)	12	13
14	15 5:00 PM visit doctor 6:00 PM guitar lesson	16	17 6:00 PM guitar lesson	18	19 6:00 PM guitar lesson	20
21 1:00 PM paintball with friends	22 6:00 PM guitar lesson	23	24 6:00 PM guitar lesson	25 5:00 PM meet Helen at the mall	26 6:00 PM guitar lesson	27 tidy up my room
28	29 1:30 PM turn off the oven! 6:00 PM guitar lesson	30 buy a birthday gift for Jack	31 6:00 PM guitar lesson	1 Birthday: Jack Rivers(26)	2 6:00 PM guitar lesson	3
4	5 6:00 PM guitar lesson	6	7 6:00 PM guitar lesson	8 "software engineering" project create a presentation of the whole send it to the developer to check write the SRS document	9 6:00 PM guitar lesson	10

the "Month View" of the calendar



the "Week View" of the calendar



*the “Day View” of the calendar*

the “Year View” of the calendar

BORG

Action Options Categories Import / Export Undo Help

Month View Appointment Editor for 8/15/11

### Appointment Text

Subject: visit doctor

address of the doctor's office: 17 Lawrence St.

### Appointment Time

Start Time: 5:00 PM ☐ No Specific Time

Duration: 0:00 ☐ Change Date New Date:

### Properties

☐ To Do ☐ Vacation ☐ Half Day ☐ Holiday ☐ Private

Color:  Category: <No Category> Priority: 5

### Popup Reminders

90, 120 minutes before the appointment

### Recurrence

Frequency: once

☒ Times: 1 ☐ Repeat Forever

☐ Until:  ☐ Show Repeat Number

### Links

☐ Encrypt On Save

### Appointment List

Aug 15, 2011

Text	Time
visit doctoradd...	5:00 PM
guitar lesson	6:00 PM

**the "Appointment Editor" tab**

The image shows a screenshot of a software window titled "Options". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a tabbed interface with the following tabs: "Task Options", "Todo Options", "Encryption", "Database Information", "Appearance", "Fonts", "Email Parameters" (which is the active tab and highlighted with a yellow border), "Popup Reminders", "Miscellaneous", and "User Color Scheme".

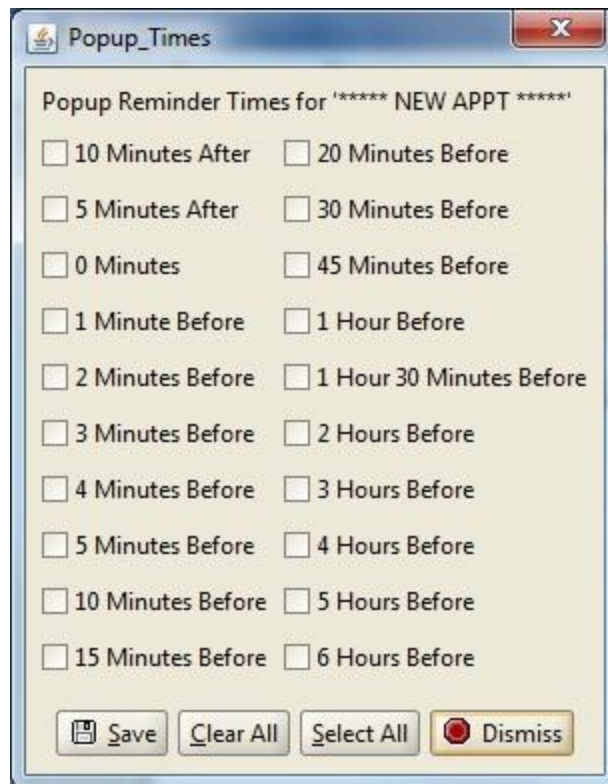
Inside the "Email Parameters" tab, there are several settings:

- An unchecked checkbox labeled "Enable Email".
- A text input field for "SMTP Server".
- A text input field for "SMTP Port" containing the value "25".
- A text input field for "SMTP User (Optional)".
- A text input field for "SMTP Password (Optional)".
- A text input field for "Your Email Address".
- A time selection field for "Reminder Email Time" showing "00:00" with up and down arrow buttons.
- An unchecked checkbox labeled "Enable TLS".

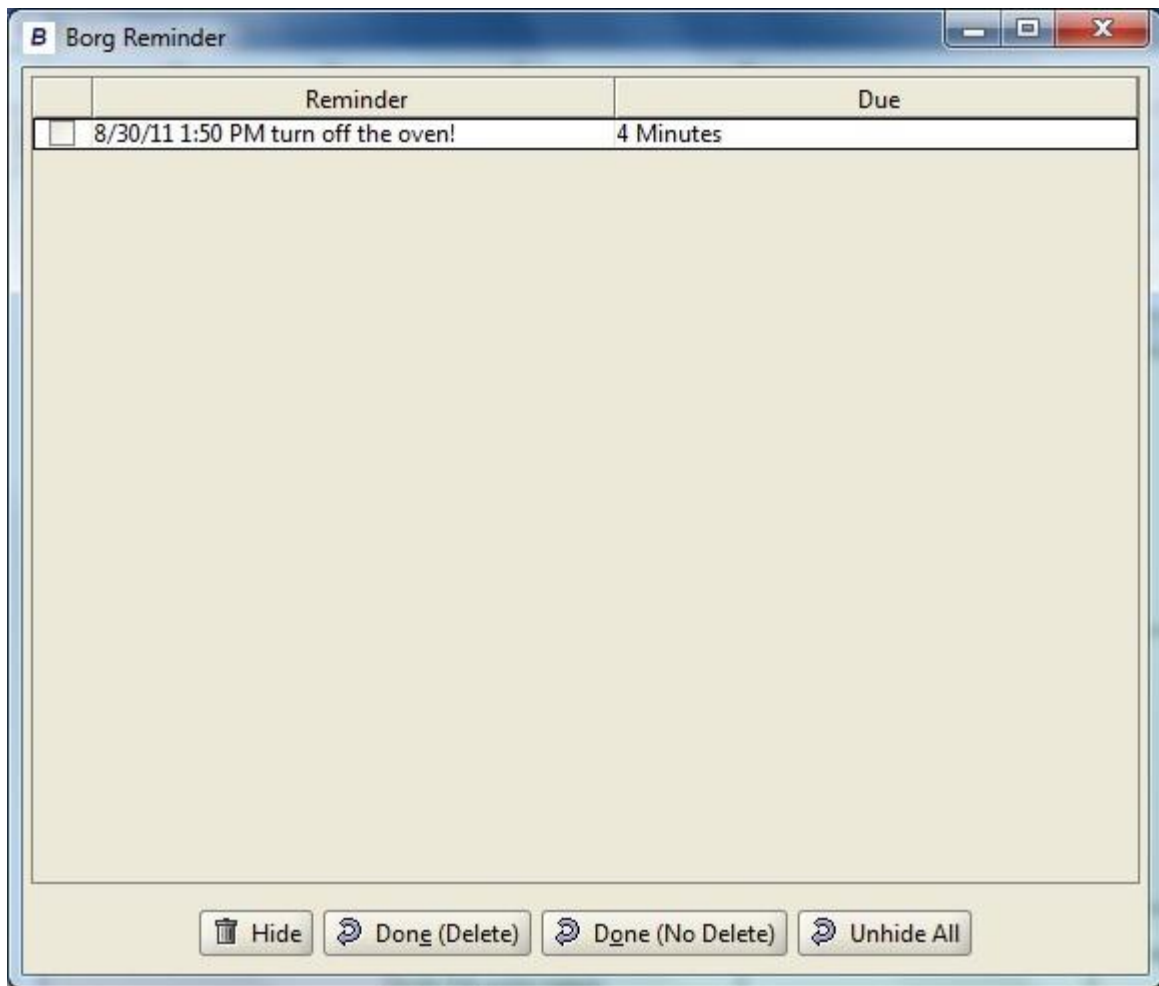
At the bottom of the window, there are two buttons: "Apply" (with a floppy disk icon) and "Dismiss" (with a red stop sign icon).

***the "Email Parameters" tab of the "Options" window***

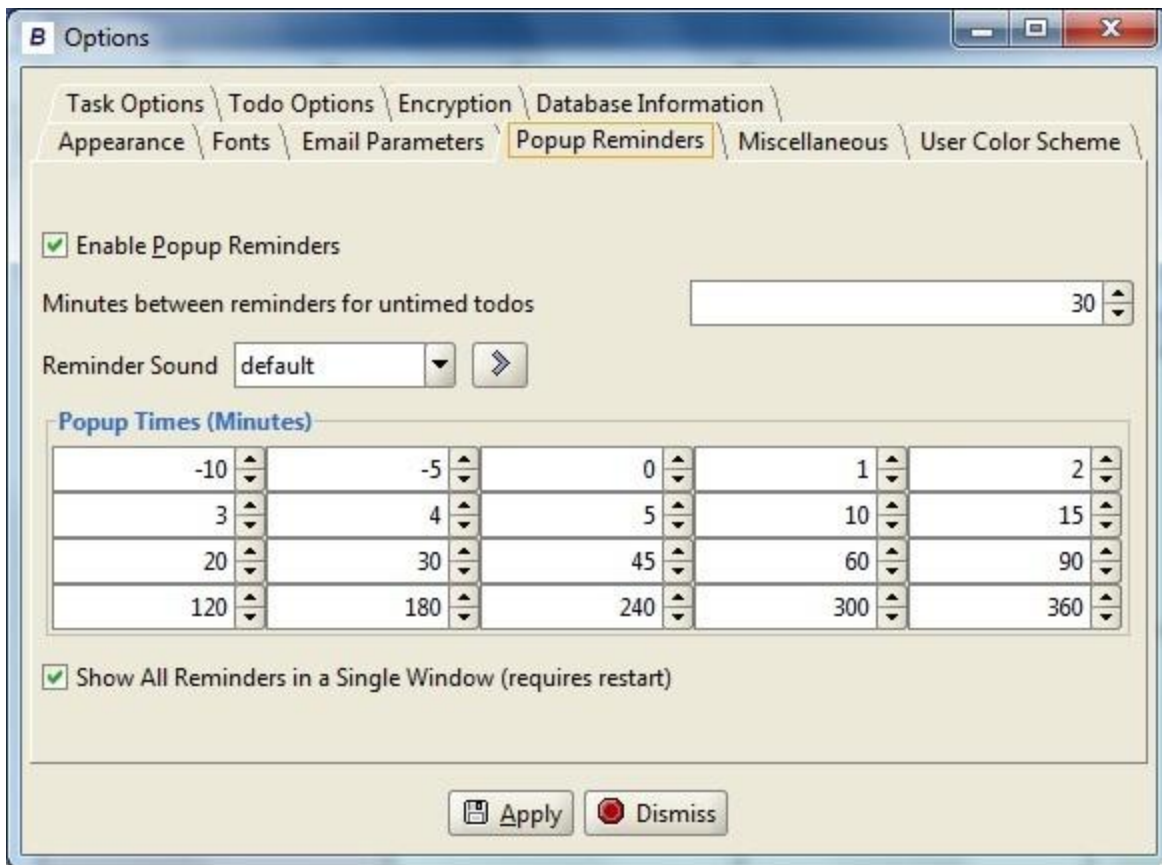




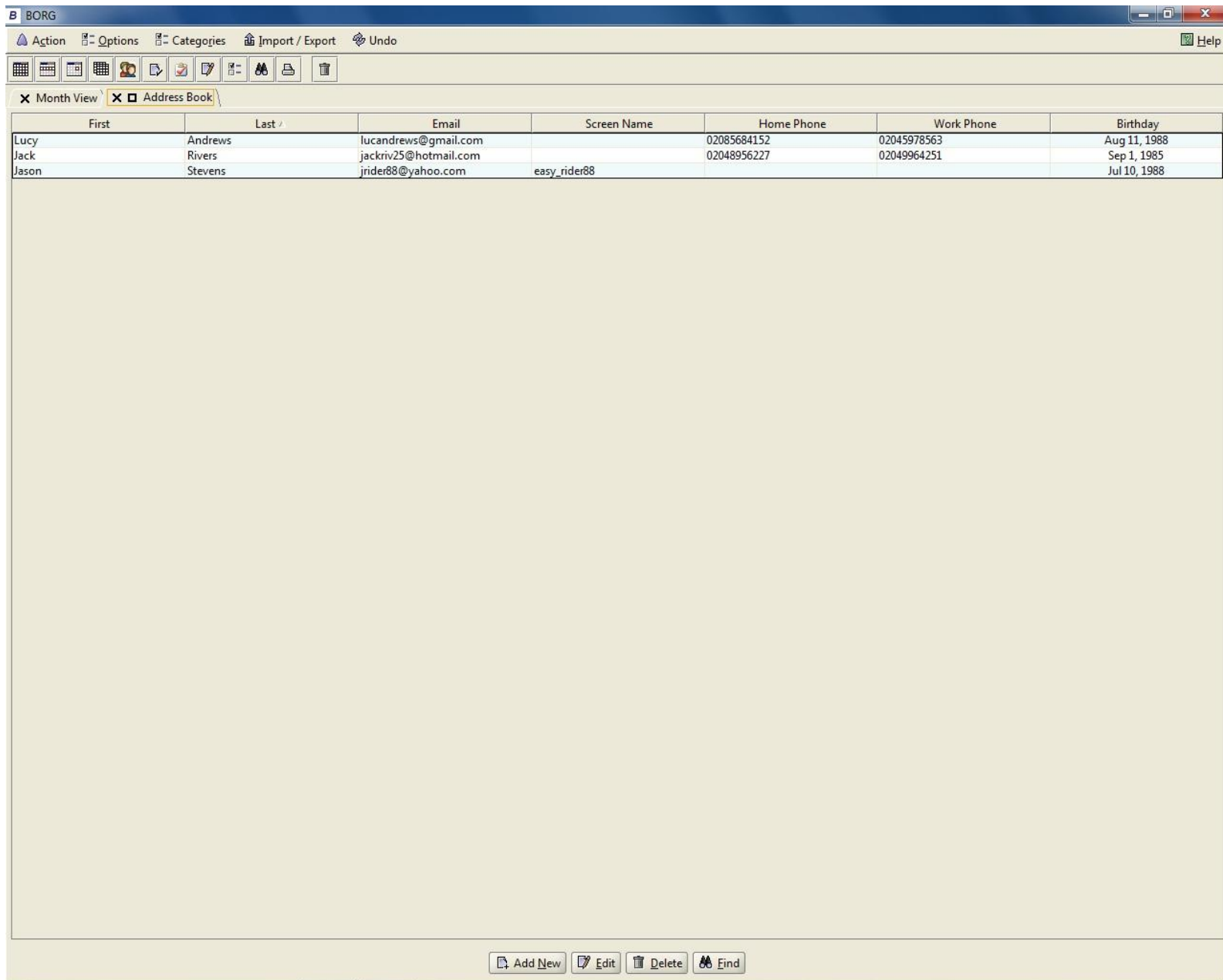
*the "Popup Times" window*



*the "Borg Reminder" window*



*the “Popup Reminders” tab of the “Options” window*



**the "Address Book" tab**

The screenshot displays the BORG software interface. The title bar reads "B BORG". The menu bar includes "Action", "Options", "Categories", "Import / Export", and "Undo". The toolbar contains icons for various functions. The tab bar shows "Month View", "Address Book", and "Address Book Entry" (selected). The "Address Book Entry" tab has a sub-tab bar with "Contact Information", "Address", "Notes", and "Links" (selected). The main area contains a form with the following fields:

- First Name:
- Last Name:
- Nickname:
- Screen Name:
- Home Phone:
- Work Phone:
- Pager:
- Fax:
- Email:
- Web Page:
- Company:
- Birthday:

A "Save" button is located at the bottom center of the form.

***the “Contact Information” tab of the “Address Book Entry” tab***

BORG

Action Options Categories Import / Export Undo Help

Month View To Do List

Date	To Do	Category	Priority
Aug 27, 2011	tidy up my room		5
Aug 30, 2011	buy a birthday gift for Jack		5
Aug 30, 2011	===== Today =====	Today is	
Sep 8, 2011	"software engineering" project		
Sep 8, 2011	write the SRS document		3
Sep 8, 2011	send it to the developer to check and upload it		3
Sep 8, 2011	create a presentation of the whole project and show it to the professor		3

2 items

Done (No Delete) Done (Delete)

Quick Todo

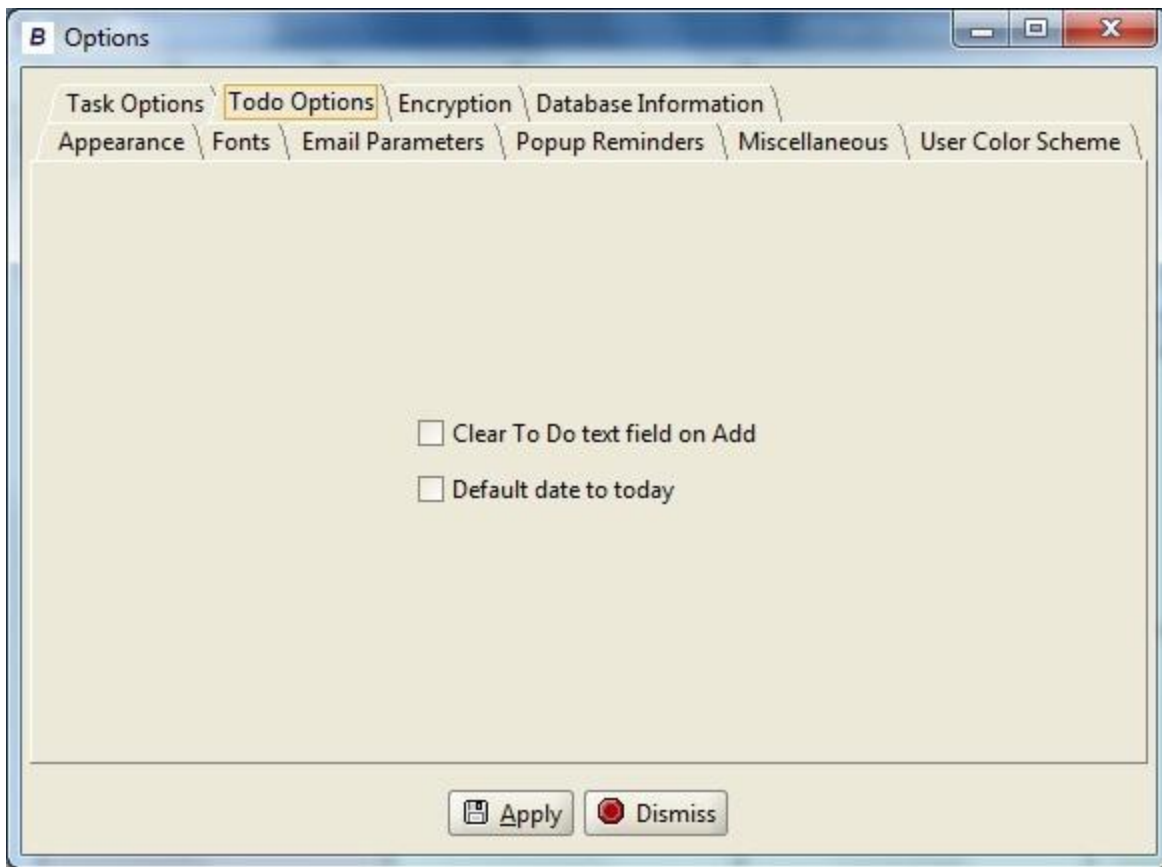
To Do

Date

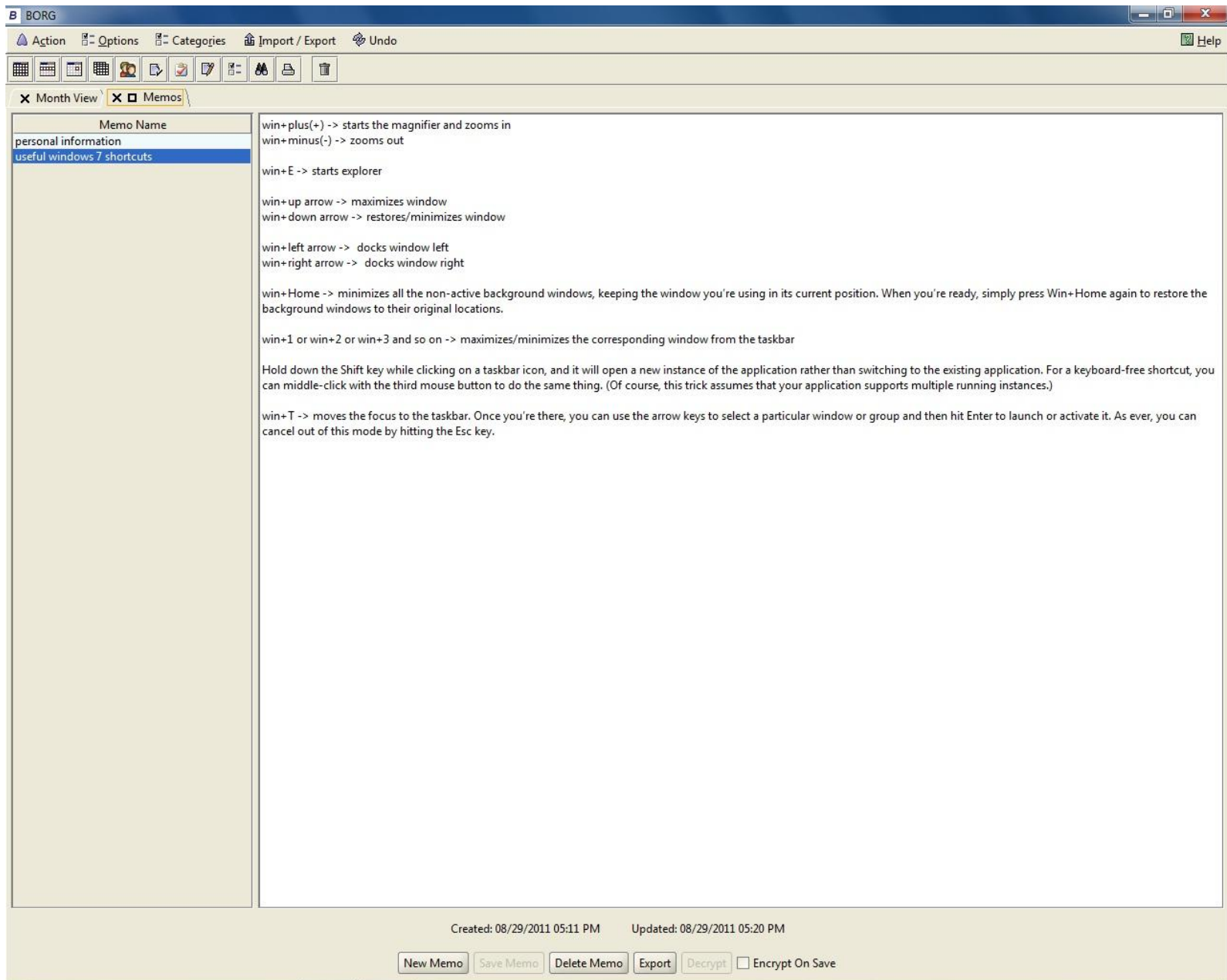
Add

Category <No Category> Priority 5

the "To Do List" tab

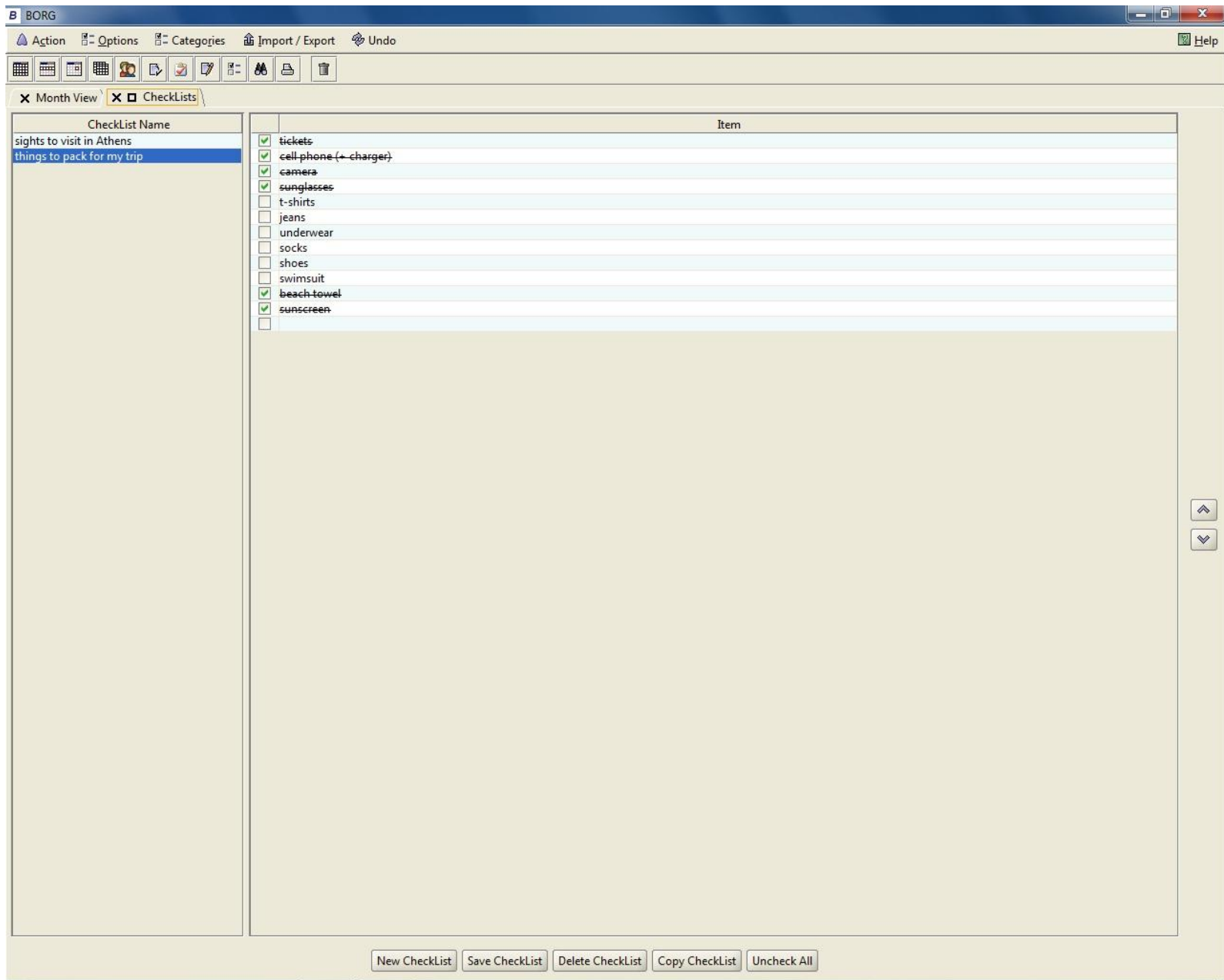


*the "Todo Options" tab of the "Options" window*



**the “Memos” tab**





*the "CheckLists" tab*

B BORG

Action Options Categories Import / Export Undo Help

Month View Tasks

Project Tree Projects Tasks

Projects

- basement renovation
  - plan and create a layout of the finished basement
  - take care of the plumbing, the wiring, and the electrical
  - clean the entire basement space
  - add the flooring and any toilets or showers
  - furnish the basement
- "software engineering" project
  - search for a suitable open source program
  - contact the program's developer and ask for his permission to write the SRS document
  - write the SRS document
  - send it to the developer to check and upload it
  - create a presentation of the whole project

**Project Information**

Item # 2 Category <No Category>

Status OPEN Start Date Jun 10, 2011

Due Date Sep 8, 2011 Days Left 9

Description "software engineering" project Total Tasks 5

Parent Open Tasks 3

Save

**Links**

Link file Attach File URL B BORG

**Tasks**

Item #	Status	Type	Pri	Days Left	Description	Start Date	Due Date
1	CLOSED	TASK	3	9	search for a suitable open source program	Jun 10, 2011	Sep 8, 2011
--	CLOSED	TASK	3	--	create accounts at sourceforge.net and tigris.org	Jun 10, 2011	Sep 8, 2011
2	CLOSED	TASK	3	9	contact the program's developer and ask for his permission to write the S...	Jun 10, 2011	Sep 8, 2011
3	IN_PRG	DOC	3	9	write the SRS document	Jun 10, 2011	Sep 8, 2011
4	OPEN	TASK	3	9	send it to the developer to check and upload it	Jun 10, 2011	Sep 8, 2011
5	OPEN	TASK	3	9	create a presentation of the whole project and show it to the professor	Jun 10, 2011	Sep 8, 2011

5 items

Add Change Delete Close Clone Show Subtasks Show Closed Tasks

Show Closed Projects Show Closed Tasks

the "Project Tree" tab of the "Task Tracker"

B BORG

Action Options Categories Import / Export Undo Help

Month View Tasks

Project Tree Projects Tasks

Status: All

Item #	Category	Status	Start Date	Due Date	Total Tasks	Open Tasks	Days Left	Description
1		CLOSED	Aug 9, 2011	Aug 23, 2011	5	0	0	basement renovation
2		OPEN	Jun 10, 2011	Sep 8, 2011	5	3	9	"software engineering" project

Add Change Delete Close Clone

*the “Projects” tab of the “Task Tracker”*

The screenshot displays the BORG application window. The title bar reads 'B BORG'. The menu bar includes 'Action', 'Options', 'Categories', 'Import / Export', and 'Undo'. The toolbar contains icons for various functions. The main window has three tabs: 'Month View', 'Tasks', and 'NEW Item', with 'NEW Item' being the active tab. Below the tabs, the 'Project Information' section contains the following fields:

Item #	NEW	Category	<No Category>
Status	OPEN	Start Date	
Due Date		Days Left	
Description			
Parent		Total Tasks	
		Open Tasks	

Below the 'Project Information' section is a 'Save' button. The 'Links' section is empty. At the bottom of the 'Links' section are buttons for 'Link file', 'Attach File', 'URL', and 'B BORG'. The 'Tasks' section is also empty.

**the “Add New Project” tab of the “Task Tracker”**

B BORG

Action Options Categories Import / Export Undo Help

Month View Tasks

Project Tree Projects Tasks

Status: All Project: All

Filter:  ☐ Case Sensitive

Item #	Status	Type	Pri	Days Left	Description	Start Date	Due Date	Duration	Elapsed	Project	Cate
1	CLOSED	TASK	3	9	search for a suitable open source program	Jun 10, 2011	Sep 8, 2011	90	80	"software e...	
--	CLOSED	TASK	3	--	create accounts at sourceforge.net and tigris.org	Jun 10, 2011		--	80	"software e...	
2	CLOSED	TASK	3	9	contact the program's developer and ask for his permission to write the S...	Jun 10, 2011	Sep 8, 2011	90	80	"software e...	
3	IN_PRG	DOC	3	9	write the SRS document	Jun 10, 2011	Sep 8, 2011	90	81	"software e...	
4	OPEN	TASK	3	9	send it to the developer to check and upload it	Jun 10, 2011	Sep 8, 2011	90	81	"software e...	
5	OPEN	TASK	3	9	create a presentation of the whole project and show it to the professor	Jun 10, 2011	Sep 8, 2011	90	81	"software e...	
6	CLOSED	TASK	3	0	plan and create a layout of the final room/rooms	Aug 9, 2011	Aug 23, 2011	14	20	basement r...	
7	CLOSED	TASK	3	0	take care of the plumbing, the wiring and the insulation that is required	Aug 9, 2011	Aug 23, 2011	14	20	basement r...	
8	CLOSED	TASK	3	0	clean the entire basement space	Aug 9, 2011	Aug 23, 2011	14	20	basement r...	
9	CLOSED	TASK	3	0	add the flooring and any toilets or sinks needed	Aug 9, 2011	Aug 23, 2011	14	20	basement r...	
10	CLOSED	TASK	3	0	furnish the basement	Aug 9, 2011	Aug 23, 2011	14	20	basement r...	

10 items

Add Change Delete Close Clone Show Subtasks

**the "Tasks" tab of the "Task Tracker"**

**B BORG**

Action Options Categories Import / Export Undo Help

Month View Tasks **NEW Item**

**Task Information**

Item # NEW Category <No Category>

Status Pri 3

Type DEFECT PA

Start Date Close Date

Due Date Days Left

Project

Description Resolution History Links

**SubTasks**

Closed	Subtask ID	Description	Start Date	Due Date	Duration	Days Left	Close Date
<input type="checkbox"/>	--		--	--	--	--	--

Save

**the “Add New Task” tab of the “Task Tracker”**



*the "Task State Editor" window*

B BORG

Action Options Categories Import / Export Undo Help

Month View Search

Search String  ☐ Case Sensitive

Category  ☐ Whole Word

Start Date

EndDate

☒ Appointment ☒ Address ☒ Task ☒ Project ☒ Memo

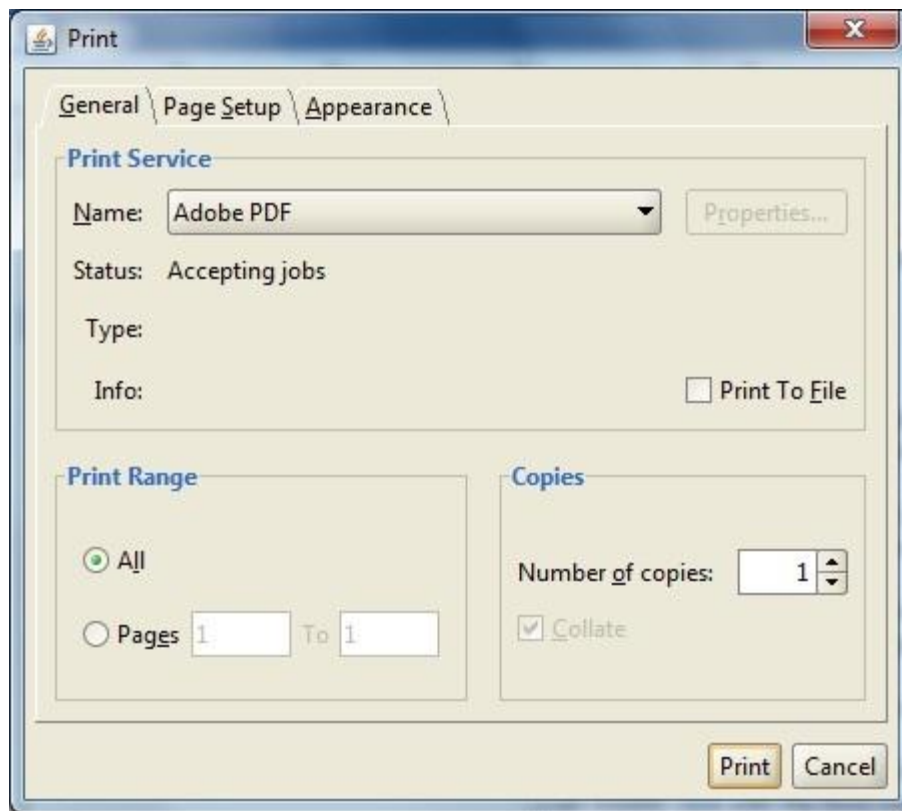
☐ To Do ☐ Repeating ☐ Vacation ☐ Holiday ☐ Has Links

Search Results

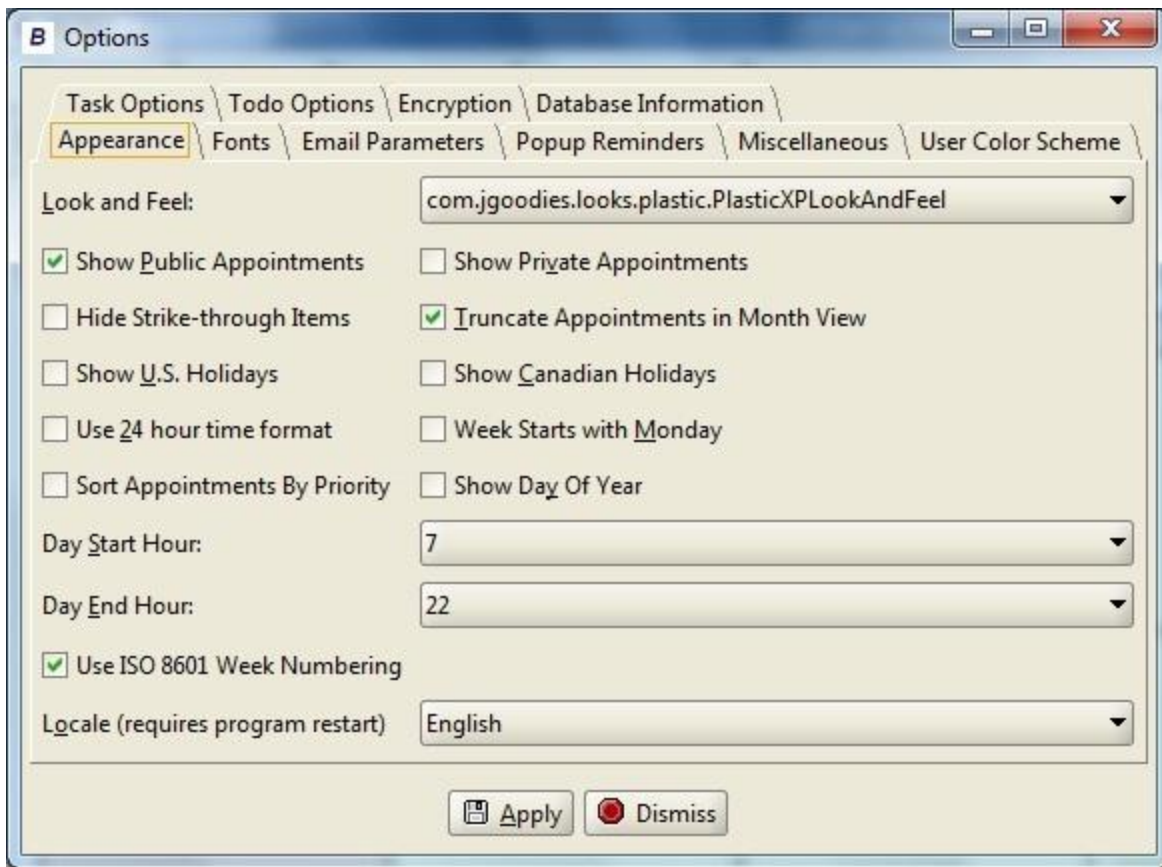
Item	Type	Date
"software engineering" project	Project	
Jack Rivers	Address	
Jason Stevens	Address	
Lucy Andrews	Address	
add the flooring and any toilets or sinks needed	Task	
basement renovation	Project	
buy a birthday gift for Jack	Appointment	Aug 30, 2011
clean the entire basement space	Task	
contact the program's developer and ask for his permission to write the Soft...	Task	
create a presentation of the whole project and show it to the professor	Task	
furnish the basement	Task	
guitar lesson	Appointment	Aug 15, 2011
meet Helen at the mall	Appointment	Aug 25, 2011
paintball with friendscall John, Paul and George to check if they will come	Appointment	Aug 21, 2011
personal information	Memo	
plan and create a layout of the final room/rooms	Task	
search for a suitable open source program	Task	
send it to the developer to check and upload it	Task	
ship departurefrom gate 8	Appointment	Aug 2, 2011
take care of the plumbing, the wiring and the insulation that is required	Task	
tidy up my roomwe are expecting visitors...	Appointment	Aug 27, 2011
turn off the oven!	Appointment	Aug 29, 2011
useful windows 7 shortcuts	Memo	
visit doctoraddress of the doctor's office: 17 Lawrence St.	Appointment	Aug 15, 2011
wash the car	Appointment	Aug 1, 2011
write the SRS document	Task	

the "Search" tab

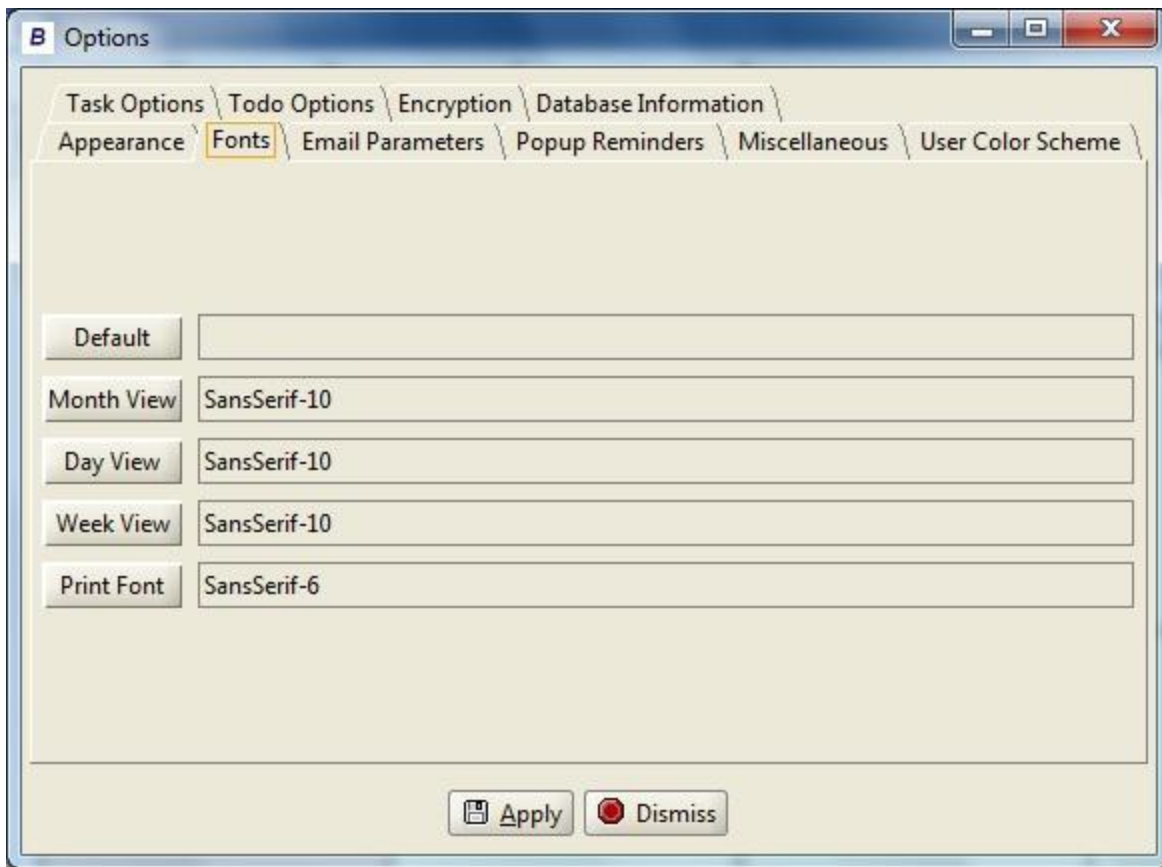




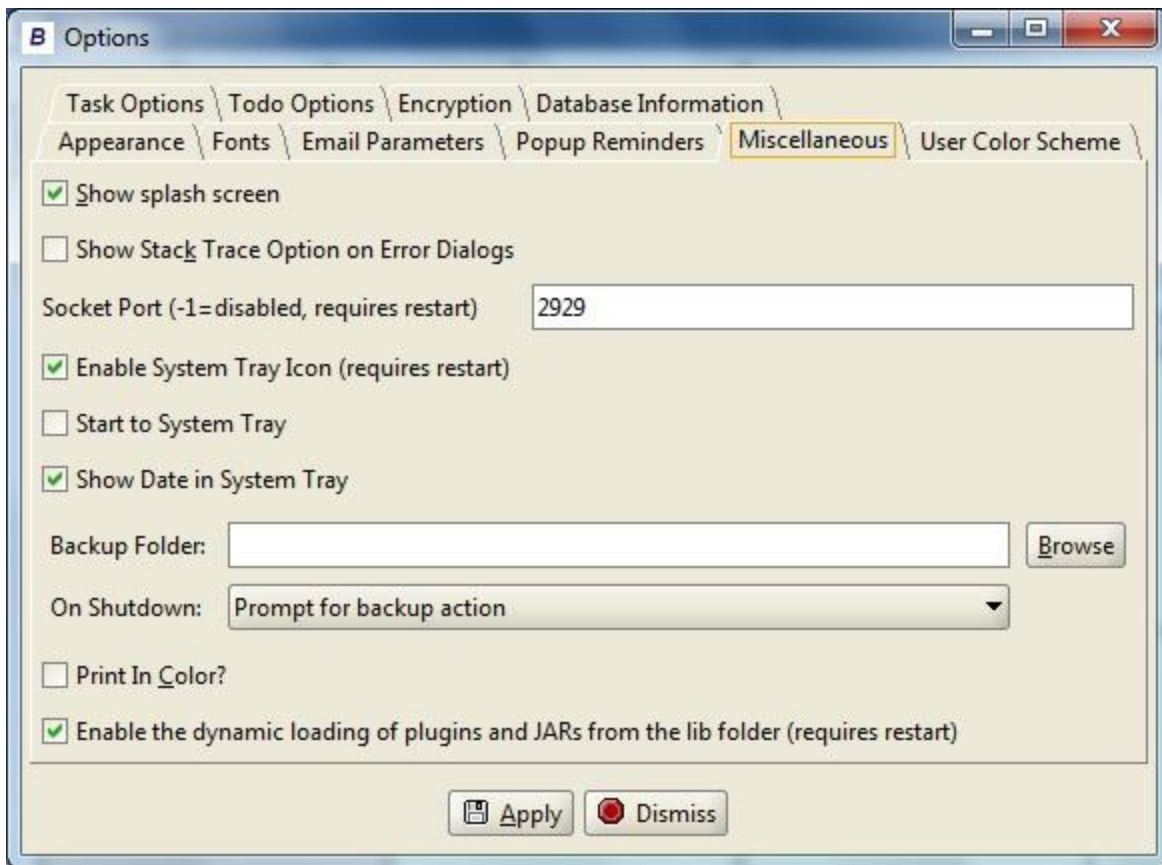
*the “Printing Properties” window*



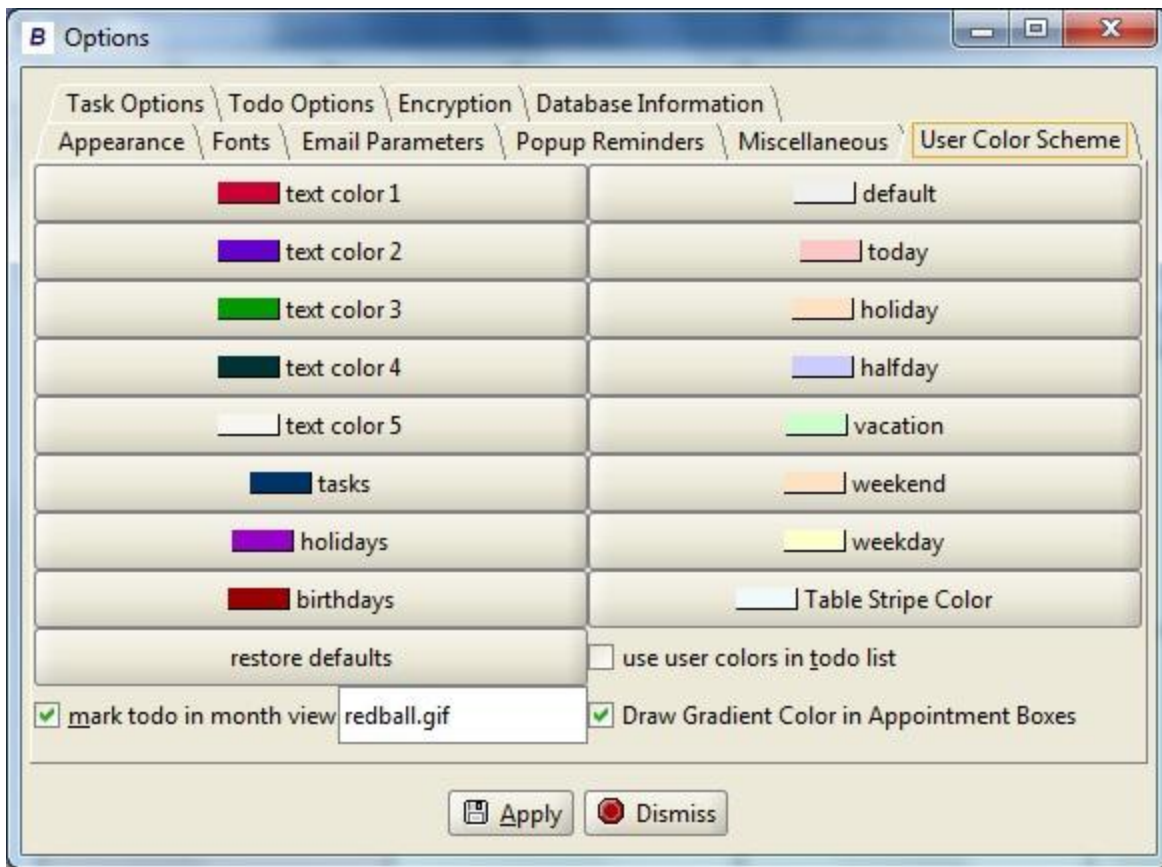
*the "Appearance" tab of the "Options" window*



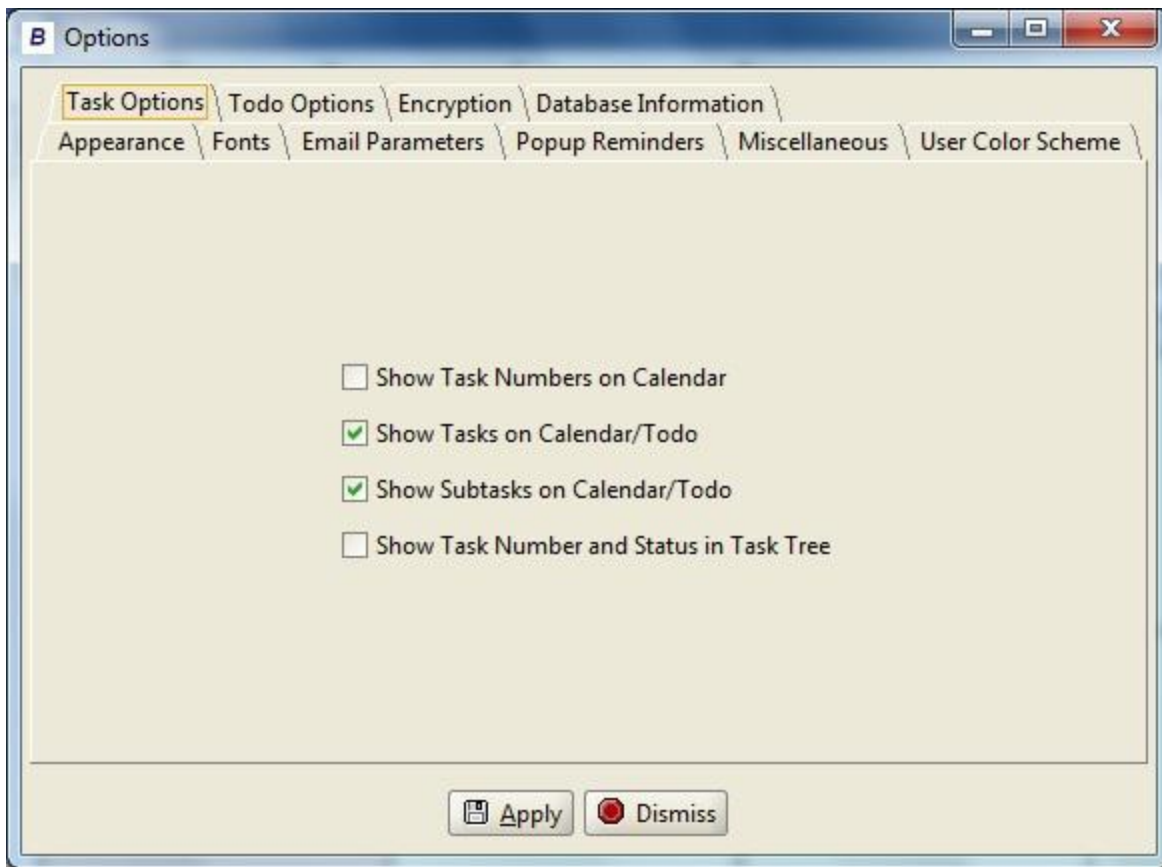
*the "Fonts" tab of the "Options" window*



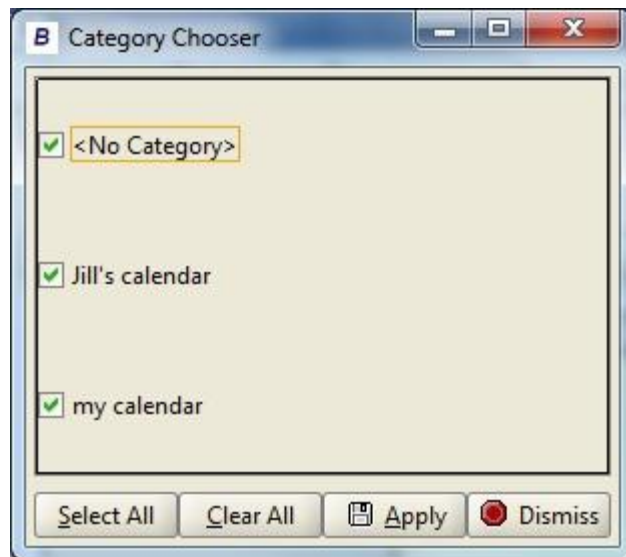
*the "Miscellaneous" tab of the "Options" window*



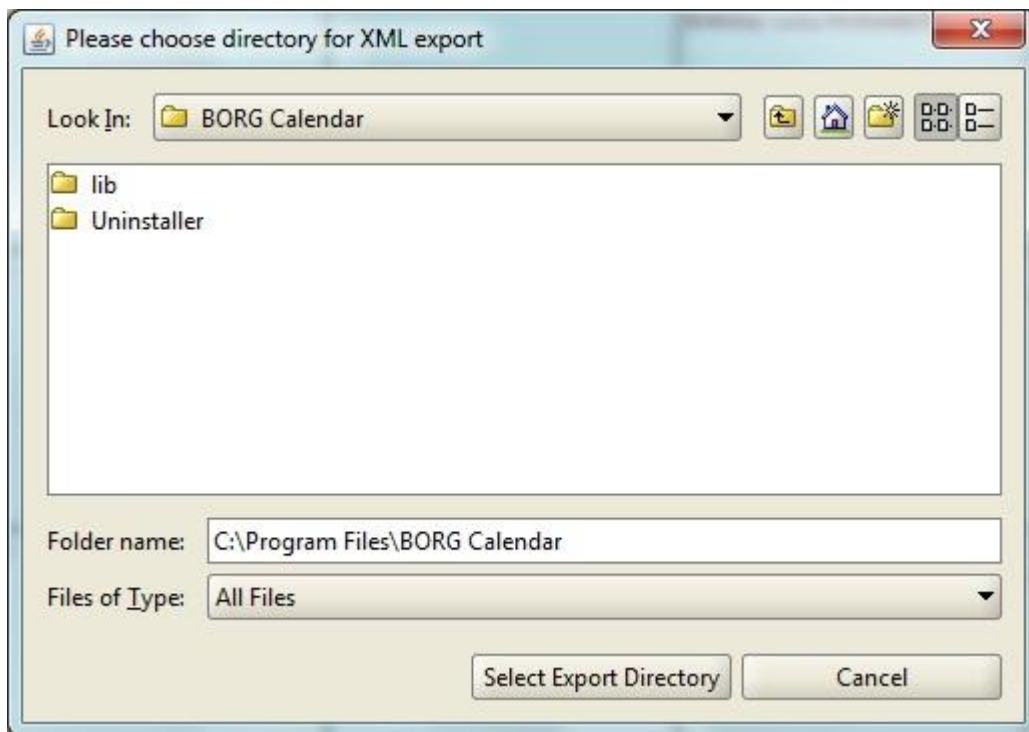
*the "User Color Scheme" tab of the "Options" window*



*the "Task Options" tab of the "Options" window*

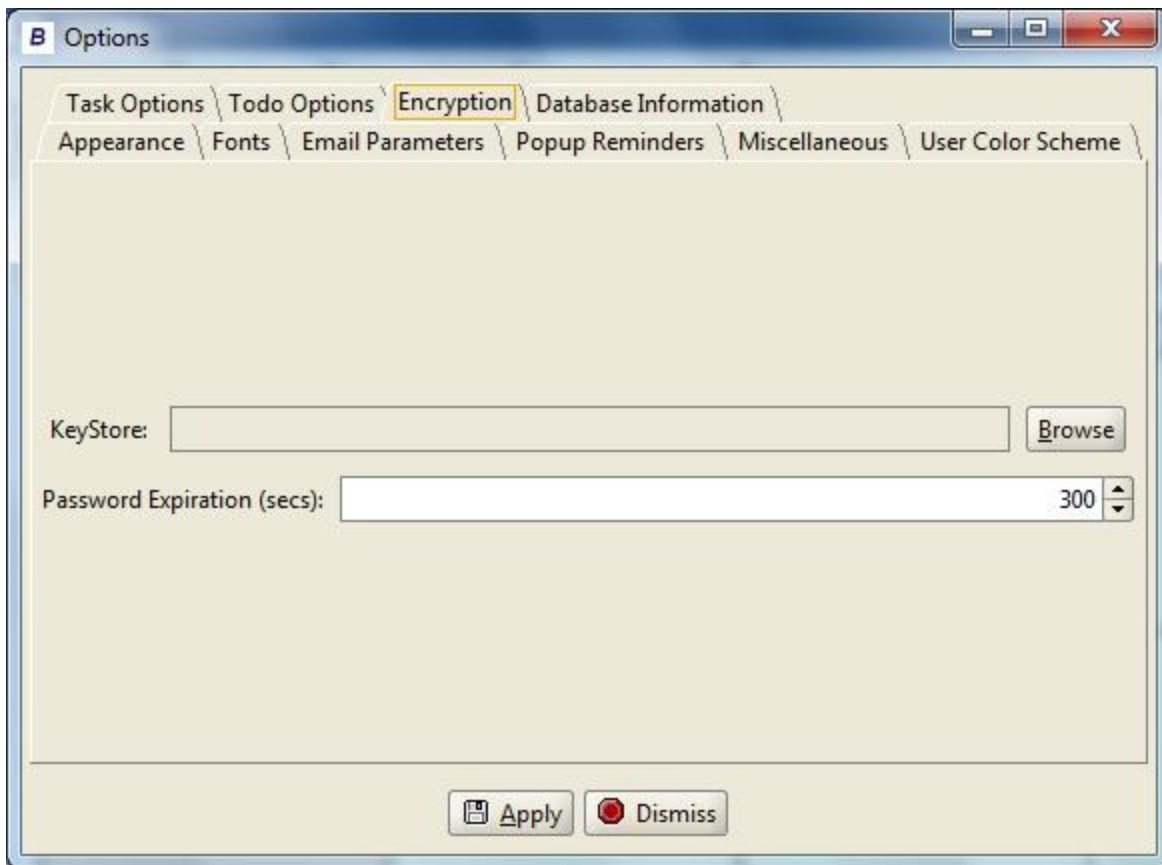


***the “Category Chooser” window***

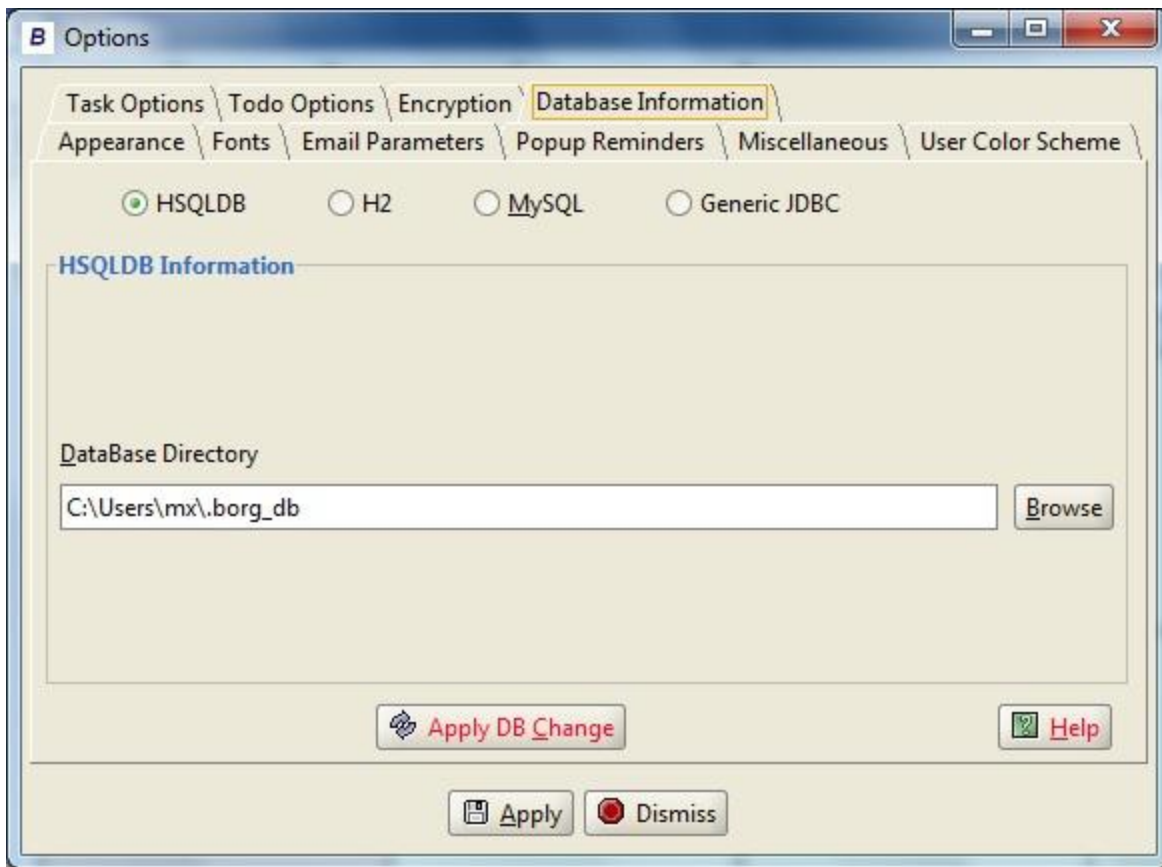


*the "Export XML" window*





*the "Encryption" tab of the "Options" window*



***the “Database Information” tab of the “Options” window***

## 4.2 Hardware Interfaces

BORG Calendar interacts with the following hardware components:

- **keyboard** and **mouse** to accept input from the users
- **monitor** to display the output
- **speakers** to deliver the various program's sounds (e.g. the notification sound of the "Popup Reminders" feature)
- **printer** to perform the "Print" function
- **router** to support the features that require an internet connection, such as the Email Reminders and the URL Links
- **cables** to connect the above-mentioned devices that are not wireless

## 4.3 Software Interfaces

The software components with which BORG Calendar interacts are the user's operating system and the installed Java platform. More detailed information on the program's operating environment is provided in section 2.4.

Moreover, it interacts with one of the supported databases, which are the **HSQLDB**, **H2**, **MySQL** and **Generic JDBC** database. If the HSQLDB database is selected (which as of version 1.6 is the default DB type), the data are stored in an embedded HSQLDB database. If the H2 database is selected (which is supported as of release 1.7.5), the H2 driver must be downloaded and put into the CLASSPATH. If the MySQL database is selected, the MySQL software has to be downloaded and set up, as well as a JDBC database driver for MySQL. Finally, if the Generic JDBC database is selected, a jdbc url has to be entered but this is a more advanced option and is not guaranteed to work in all cases. More information on the supported database types can be found in the online help (refer to section 1.5).

Additionally, the data can be exported and imported from/to the program as .xml files. Thus, the XML protocol is used. More information on the XML protocol can be found at: <http://en.wikipedia.org/wiki/XML>.

Finally, through the "Links and Attachments" feature, the program interacts with any program that has been specified in the user's operating system settings, as the default viewer for the target file's type.

## 4.4 Communications Interfaces

BORG Calendar supports e-mail sending (through the "Email Reminders" feature) for which the SMTP and the TLS protocols are used.

More information on the SMTP protocol can be found at:

[http://en.wikipedia.org/wiki/Simple\\_Mail\\_Transfer\\_Protocol](http://en.wikipedia.org/wiki/Simple_Mail_Transfer_Protocol)

and on the TLS protocol at:

[http://en.wikipedia.org/wiki/Transport\\_Layer\\_Security](http://en.wikipedia.org/wiki/Transport_Layer_Security).

Another communications function that is performed by the program (through the “URL Links” feature) is the connection to the Internet and the loading of web pages, for which a web browser and the HTTP protocol are used. More information on the HTTP protocol can be found at: [http://en.wikipedia.org/wiki/Hypertext\\_Transfer\\_Protocol](http://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol).

Finally, if the user has selected the MySQL database type, a “Sync with DB” synchronization mechanism is provided.

## 5. Other Nonfunctional Requirements

### 5.1 Performance Requirements

BORG Calendar doesn't put a strain on the user's computer. It requires a small amount of disk space for its installation (approximately 3.5 MB) and can run at various screen resolutions. (Of course, in very small screens, such as smart phones' screens, the layout of the program's windows may be distorted and illegible.)

Additionally, regarding the “Print” function, when the user tries to print for the first time, the Java print service is queried to find a printer that can do the printing. It may take a few seconds before Java scans the printers on the system and pops up the printing properties window. This delay is normal and unavoidable.

### 5.2 Safety Requirements

BORG Calendar stores and extracts data only from its database folder, thus no loss or damage to the system's files or services could result from the use of this program.

However, as it is an open source program and licensed under the GNU General Public License version 2 or later, there is no warranty for it. (A copy of the GNU GPL 2 is included in the installation files and can be accessed either directly (in the program's installation folder) or from within the program itself (using the Help menu option)).

Nevertheless, as there is always a small possibility that the program's own data will be lost, the users are strongly encouraged to take regular backups of their data (using the “Export to XML” feature) or even turn on the automatic backup feature which exports the entire database to a time-stamped zip file every time the program shuts down.

### 5.3 Security Requirements

Since BORG Calendar can contain personal information that the user wants to keep private, two options are provided to achieve this. First, the less secure one. In the appointment editor there is a “Private” checkbox, which if selected the appointment is going to be private and it will not appear in the calendar or the print output unless the “Show Private Appointments” option in the Options window is selected. The other option that is used to protect the data is the “Encryption” feature. It can be applied to appointments and memos and uses AES symmetric encryption to encrypt and decrypt text. This encryption is meant to be secure enough to protect any sensitive information. More information about the technical structure of this feature as well as advice on how to get the most out of it can be found in the online help (refer to section 1.5).

Apart from the above-mentioned, there are no other requirements regarding security or privacy issues surrounding the use of this program (e.g. no user identity authentication is required).

## 5.4 Software Quality Attributes

The software quality characteristics that could be most objectively attributed to BORG Calendar are:

- ✓ **availability**, as it is an open source program and thus can be freely copied and distributed
- ✓ **portability**, as it can run on various operating environments (refer to section 2.4) or even directly from a thumb drive
- ✓ **maintainability and testability**, as the program's source code is quite clear and readable and divided into modules (in Java they are called class methods) and thus its various functions can easily be tested and any potential faults can easily be identified and fixed

## 5.5 Other Requirements

Regarding the internationalization of BORG Calendar, as of release 1.3 it supports Locales (i.e. regional settings) for most of the countries in the world. The regional settings mainly include the date formats, month names and weekday names. However, the majority of text strings in the program's GUI come from .properties files. Of course, the program is not translated in every existing language. Refer to section 2.5 for a list of the existing translations. Translations to other languages would only require a translated version of the "borg\_resource.properties" file that comes in the "borg.jar" file inside the program's installation folder. For anyone who is interested in contributing to the project, instructions on how to provide a new translation can be found in the online help (refer to section 1.5).

## **Appendix A: Glossary**

### ***Acronyms***

SRS — Software Requirements Specification

PIM — Personal Information Manager

XML — Extensible Markup Language

DB — Database

SQL — Structured Query Language

HSQldb — Hyper Structured Query Language Database

JDBC — Java Database Connectivity

OS — Operating System

POSIX — Portable Operating System Interface for Unix

HP-UX — Hewlett Packard Unix

OpenVMS — Open Virtual Memory System

SMTP — Simple Mail Transfer Protocol

TLS — Transport Layer Security

SSL — Secure Sockets Layer

JAR — Java Archive

AES — Advanced Encryption Standard

URL — Uniform Resource Locator (previously Universal Resource Locator)

GUI — Graphical User Interface

HTTP — Hypertext Transfer Protocol

GPL — General Public License

## **Appendix B: Issues List**

At the development and distribution website of BORG Calendar (refer to section 1.5) users can submit new feature requests as well as report bugs that they have found.

Some of the requested features for version 1.7.6 are:

- ✓ In the “Frequency” dropdown menu of the “Recurrence” section of the appointment editor, add the “Every 12<sup>th</sup> Month” and “Every 3<sup>rd</sup> Week” options.
- ✓ Provide a standard menu bar for all windows.
- ✓ Add a “scale” option (in the form of zoom buttons) for the Day and Week Views of the calendar and make sure that they do not affect the print output.
- ✓ Add the ability to open any view of the calendar from the system tray icon menu.
- ✓ Add Reminders for Projects, Tasks and Subtasks that are open and have due dates.
- ✓ Add the ability to add appointments that span multiple days.

Some of the reported bugs to be fixed in version 1.7.6 are:

- ✗ The “Categories” feature is not consistent across different Borg clients.
- ✗ The “Print” function does not work for the “Project Tree” and “Tasks” tabs of the Task Tracker.
- ✗ The Help window is not loaded by default. (This can be solved by checking, in the “Miscellaneous” tab of the “Options” window, the “Enable the dynamic loading of plugins and JARs from the lib folder” option which is deselected by default.)
- ✗ BORG Calendar dies after hibernation.
- ✗ The menu and desktop shortcuts are not created properly for Linux.