COMP4 Coursework

Analysis

Introduction

Client Identification

My client is St. Andrew's Street Baptist Church, the administration consists of a team of up to five people of various ages with little experience with computers apart from performing basic tasks such as word processing and using simple spreadsheets. Currently the church has a simple file sharing between a small network of 5 computers, these computers include Apple and Windows computers.

All of the members of the administrative team at St. Andrew's Street Baptist are required to attend various meetings and complete certain tasks, all of which have potential to be confidential. The team provides pastoral care and other supportive services to people all across Cambridgeshire and sometimes further. Being a large city centre church, the membership and the composition of the administrative team is subject to change on a regular basis.

The Church has expressed a desire to use a computer system to organise, centralise and control all of the data involved in operating the Church. With the proposed system, the admin team would like to be able to keep a record of all of their meetings and tasks as well as keep track of the quantities of a few finite resources used in the offices.

Define the Current System

The current system in place is a manual paper based system which involves each member of the administrative team writing down details of meetings, appointments and tasks and recording it in a personal dairy and/or planner. This information includes: a title for that meeting, appointment or task, who else is meant to attend, the location of the meeting or appointment and the date & time at which this meeting will take place.

If a meeting involves more than one person (as most meetings do!) then the team relies on either verbal or email communication of the key pieces of information for that meeting, the person receiving the request for meeting then replies to that email to confirm or deny their attendance to the meeting, if the accept the meeting, they then add a copy of the information to their planner, if not they archive the email and take no further action.

There is also a central list of the resources available to the office staff which is updated on a regular basis with the new amounts of the various resources. All members of the administrative team have access to this list, and there is shared responsibility of who goes to purchase additional resources if the current stock is depleted.

Describe the Problems

The current system should work well, in theory, however there have been many occasions when a meeting has been missed because an email failed to send or the organiser forgot to tell them. Often the office has ran out of a particular resource because nobody updated the list or nobody saw that they were running out. Each person has a separate copy of each meeting that they are due to attend which could (and often does) lead to inconsistencies in the information that each person has, also the duplication of the data requires a large amount of physical space. The Church also plans to move it's offices so having a large amount of data increases the risk of data being lost or damaged during the move. Furthermore, the data is not stored in a secure location, it is either left in an office which is not always locked during the day, while the Church is open to the public or it is with it's owner who is liable to drop/forget/lose it which means the data is not secure.

Investigation

The current system

Data sources and Destinations

In the current system, there is a definite flow of data between the different people working in the office, each person is both a source and destination of data. When a person creates a meeting they will write it in their own personal diary, and then they will either email or speak the information about that meeting to whoever they are requesting to attend. The person who is being asked to attend sends information accepting or rejecting the request of attendance back to the person who 'owns' the meeting.

Source	Data	Example Data	Destination
Meeting Owner	Meeting title, meeting location, meeting date & time, people requested to attend the meeting	Coffee with Steve; Ian's Coffee House; Tuesday 13th October 10:15am; with Steve, Joel and Sabrina	Meeting Attendees
Meeting Attendee	Meeting title, Confirm Attendance?	Coffee with Steve, Attending	Meeting Owner
Task Owner	Task title and a brief description of the task	Refile the copier paper; Make sure you use the yellow paper for this week's service sheets.	A scrap of paper pinned to a noticeboard, or a blank page in a personal notebook
Team member	Resource name, resource quantity, resource cost etc	Teabags, 50, 4.30	The resources book
Resources book	Resource name, enough of this resource available?	Teabags, no	Any member of staff

Algorithms

In the current system, there are a few basic algorithms used. The first of which is for checking if a meeting will have all of the requested people in attendance.

```
AllAgreed ← True
Attendees ← [A list of attendees]
FOR index ← 1 TO length(Attendees) DO
      IF(Attendees[index] = False) THEN
            AllAgreed ← False
      END IF
END FOR
IF(AllAgreed = True)THEN
      Meeting goes ahead
ELSE
      Alert meeting owner that not everyone has responded
END IF
```

Another algorithm used has the purpose of checking if someone has completed a task they set themselves, this also ensures that time is not wasted between tasks.

```
TaskComplete ← False
WHILE TaskComplete = False DO
      IF Busy = False THEN
            CompleteTheTask()
      END IF
END WHILE
```

The third, and final algorithm used by the team is to check if there are any resources that need replenishing.

```
ResourceInNeed ← EmptyList()
Resources ← [A list of resources & their quantities]
FOR index ← 1 TO length(Resources) DO
      IF Resources[index][RequiredAmount] < Resources[index][CurrentAmount] THEN
            ResourcesInNeed.append(Resource[index])
      END IF
END FOR

FOR index ← 1 TO length(ResourcesInNeed) DO
      OUTPUT ResoucesInNeed[index]
END FOR
```

Data Flow Diagrams

Key:

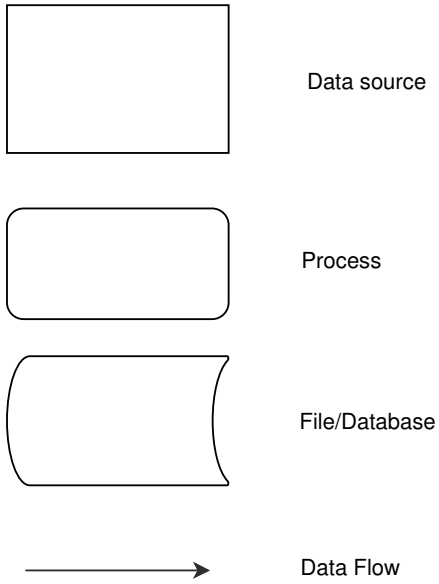

Diagram for the meetings subsystem:

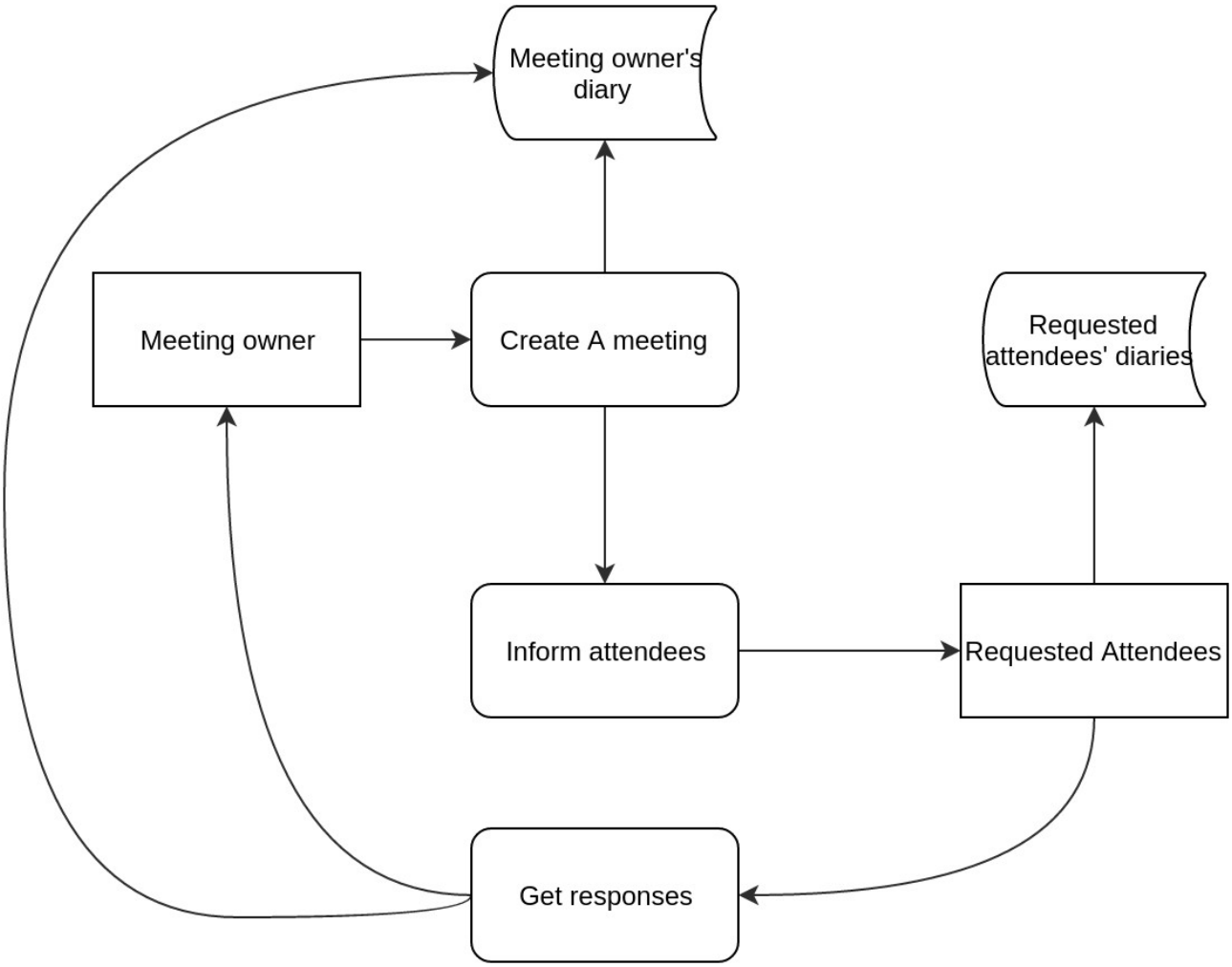

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Diagram for the tasks subsystem:

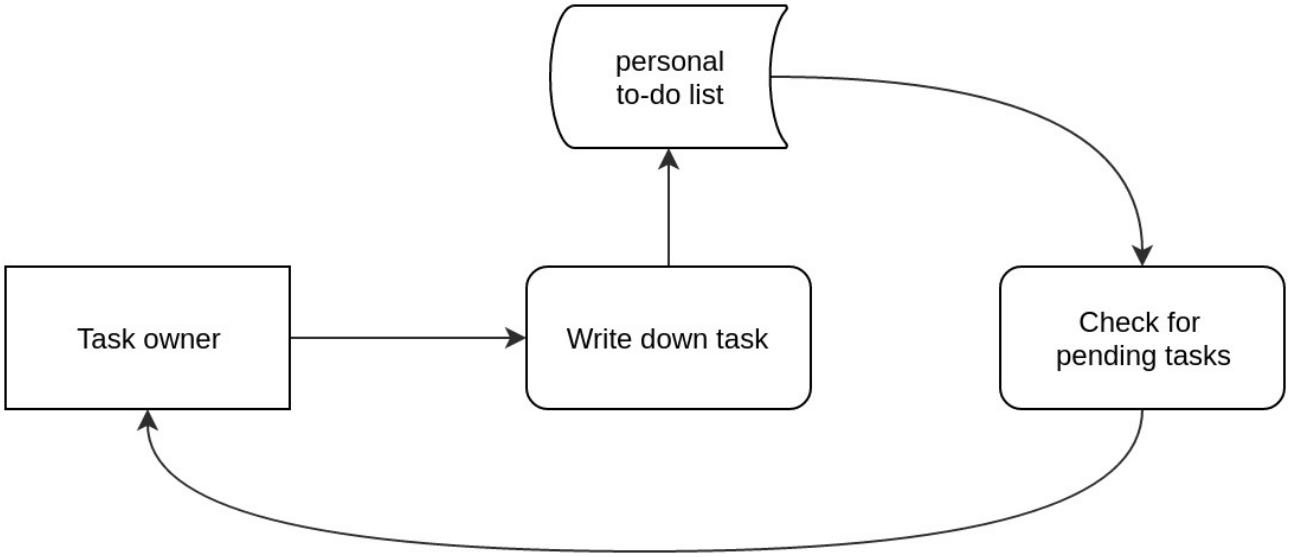
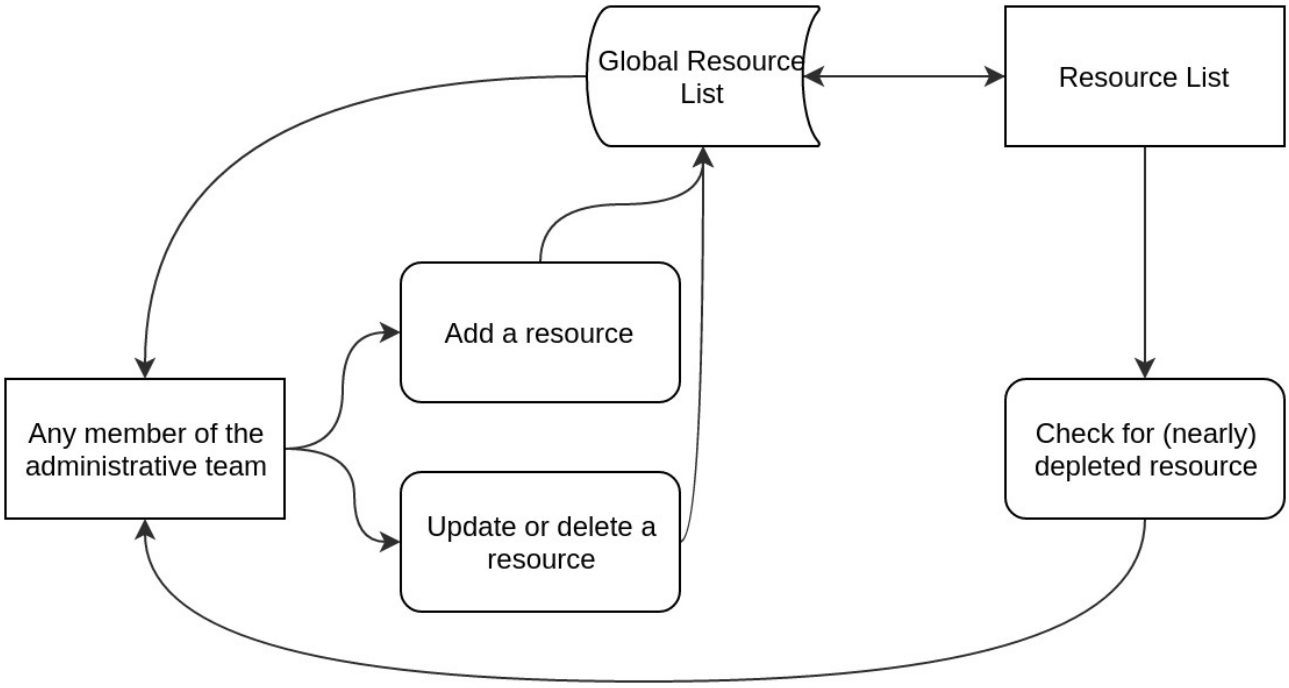


Diagram for the resources subsystem:



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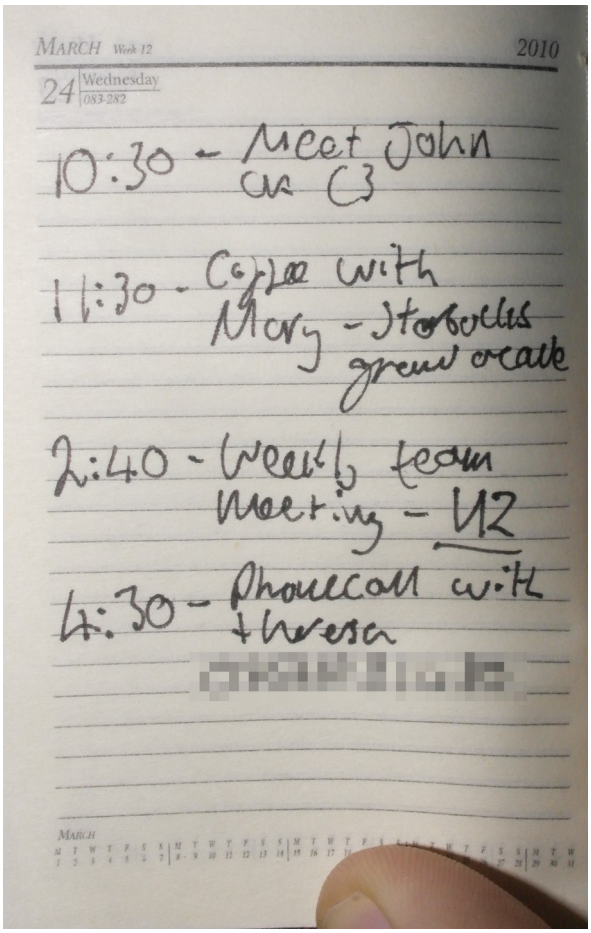
Input Forms, Output forms and Report Formats

The current system has three input forms – The team member's personal diaries, the general format used for making notes of tasks and the record book containing the list of resources. The current system has similar output forms, for meetings, often the members of the team give each other photocopied pages from their diaries and for tasks the output form is identical to the input form.

Below is a copy of an old (but still using the same system of notation) diary from one of the supporting staff at the Church, this is both an input and an output form. It contains a list of the day's appointments, with their date & time, a brief subject line and the location of the meeting, as well as any other attendees. Unfortunately



the latest record I was able to obtain was from 2010 as often the contents of the diaries are strictly confidential because the Church is responsible for caring for many vulnerable people – hence some of the information has been omitted.

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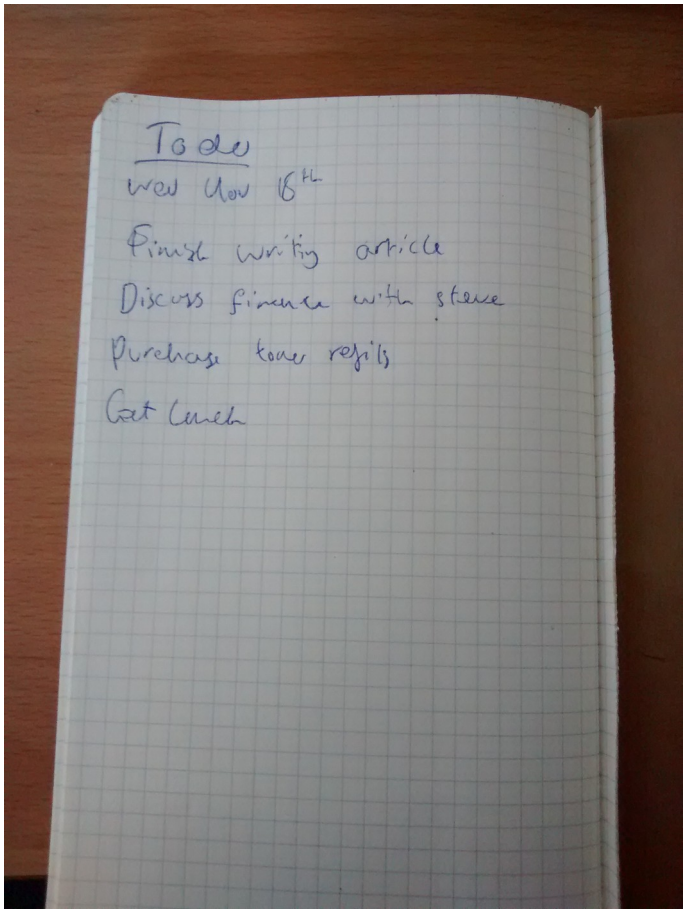
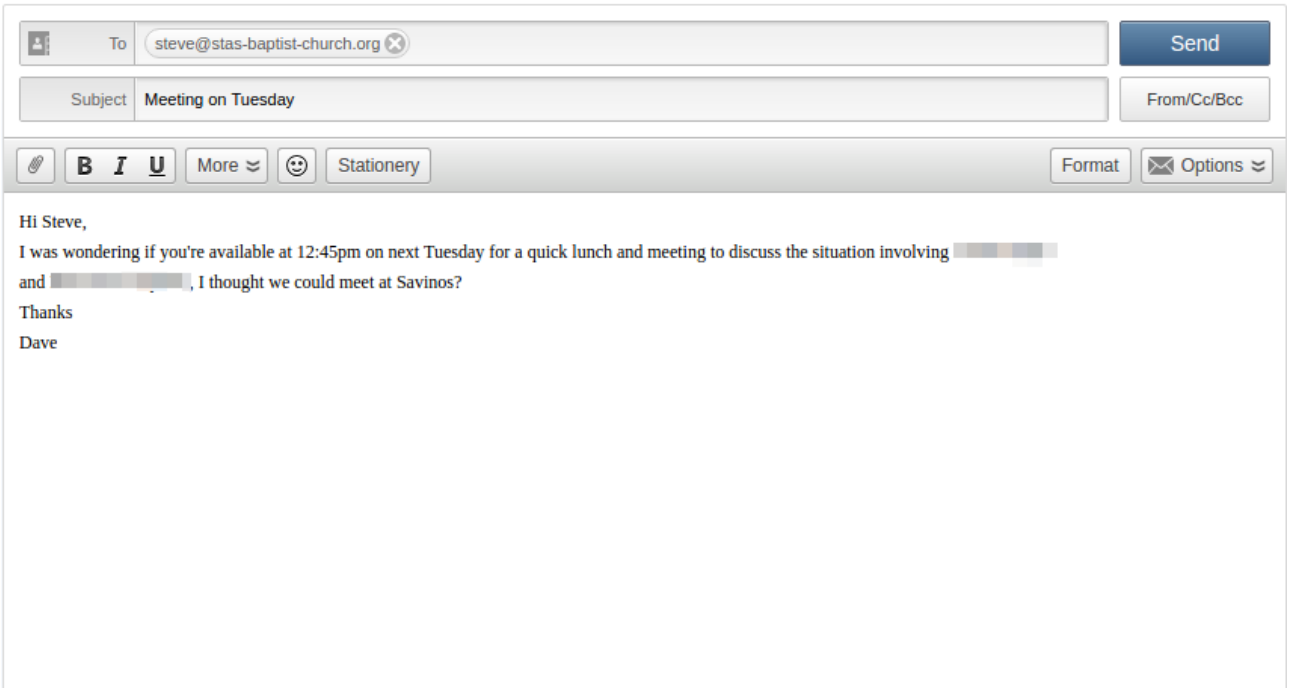
Below is an example of a list of tasks from one of the office staff's notebook, it contains a list of tasks that they need to get done that day. The team also uses Post-It notes, record cards or digital reminders on their phones as alternatives to having a list of to-dos.



Here is an example of an email requesting someone to attend a meeting:



Note that the message is concise and to the point, the staff team deals with hundreds of emails per week and none of them have time to read through a detailed explanation for each meeting they're going to attend.

The proposed System

Data sources and destinations

In the proposed system, the users will input the information for their meetings, tasks and resources into various forms.

Source	Data	Data Type	Destination
Meeting Owner	Meeting Date & Time	String	Database – Meetings
	Meeting Title		
	Brief meeting description		
	Location		
	Requested Attendees – UserID	Integers	
Database - Meetings	Meeting Title	String	Requested Attendee
	Meeting Date & Time		
	Brief description of meeting		
	Location of meeting		
	(Other) requested attendees	Integers	
Requested Attendee	MeetingID	Integer	Database - Meetings
	Confirm Attendance?	Boolean	
Database – Meetings	MeetingID	Integer	Meeting Owner
	Confirm Attendance?	Boolean	
Task owner	Task Title	String	Database – Tasks
	Task Description		
Database – Tasks	Task Title		Task Owner
	Task Description		
Member of staff	Resource Title		Database – Resources
	Resource Cost	Integer	
	Resource Current Quantity	Integer	
	Resource Required Quantity		
Database – Resources	Resource Title	String	Member of Staff

Source	Data	Data Type	Destination
	Resource Cost	Integer	
	Resource Quantity		
	Resource Required?	Boolean	

Data Flow Diagrams

{do these later}

Data Dictionary

Volumetrics

There are 5 members of the staff team which will have between 2 and 5 meetings per day, which means in one month, the system will have up to 750 meetings, each of which will require up to 1815 Bytes, which will total at 1.3MiB per month for the meetings system. However, the number of people who will be involved in meetings will be subject to change on a weekly basis, it could easily double, triple or more which means that this part of the database could use up to 5MiB per month and up to 60MiB per year. The user's table will contain a record of each user who has meetings, which totals at 798 Bytes per person. In a large city centre Church, there are approximately 250 congregates, of which 50 will be involved with meetings, which means the user's database will require at minimum, 39KiB. However this number is subject to change and could easily double in the space of a year, but because of the data protection act, some means of ensuring the data does not expire would mean that as, or shortly after new users are added, the old users are removed so the size of the table will only fluctuate by $\pm$10KiB, so to ensure there's always enough space, this table will be allocated 60KiB. The tasks table, which is effectively a record of each user's to-do list, will contain records for between 5 and 10 users each with up to and estimated 15 items per day. Each item is 5170 Bytes, which means every day, each user will generate up to 76Kib, with up to 10 users totalling at 760Kib, so in a month the database will contain up to 22.8Mib. However, the nature of the tasks means that they will expire after a certain amount of time, which will limit the size of the database. If the expiry period of each task is set to one year, this table will not exceed 273.6MiB. The resources table will contain a record of all of the things the Church regularly buys, including cleaning supplies, food, drinks, cafe supplies. The church has several areas which require resources, some of which require more than others. If in total, the Church, buys 300 consumable products, each record will require 271 Bytes, with 300 items, the table will require 80KiB, however there is potential for new items to be added on a regular basis, so this table could easily grow to 100KiB.

The total database requirements are 334MiB, for a year's worth of data. The program itself, the PyQt Library and Python will require about 130Mib, which means the total estimated size of the system will be 464MiB.

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Objectives:

General Objectives:

- A simple and clear layout structure for viewing recorded meetings.
- A simple and clear layout for adding new meetings.
- A simple and clear layout for adding and viewing a to-do list of tasks.
- A clear and effective way of monitoring stock levels of various resources.
- A way to edit the user information

Specific Objectives

- Viewing meetings:
  - A clear and consistent structure used for displaying meeting objects.
  - Minimal controls to ensure accessibility and to reduce the necessity for training.
  - Only essential information shown.
- Adding meetings:
  - An input structure that follows a pattern similar to how the meetings are displayed.
  - Easy selection of attendees from a pool of available users.
  - Validation of the user's input.
- Adding and Viewing To-Dos:
  - A clear, prioritized list of tasks
  - The option to mark tasks as “Done”
- Viewing and editing resources:
  - An ordered table of information for all the recorded resources
  - The ability to add additional resources at any time
  - The ability to update the quantity of resources available.
  - A way to quickly view a list of resources that are below the required level.
- Editing user information
  - A way to change the user's password

Core Objectives

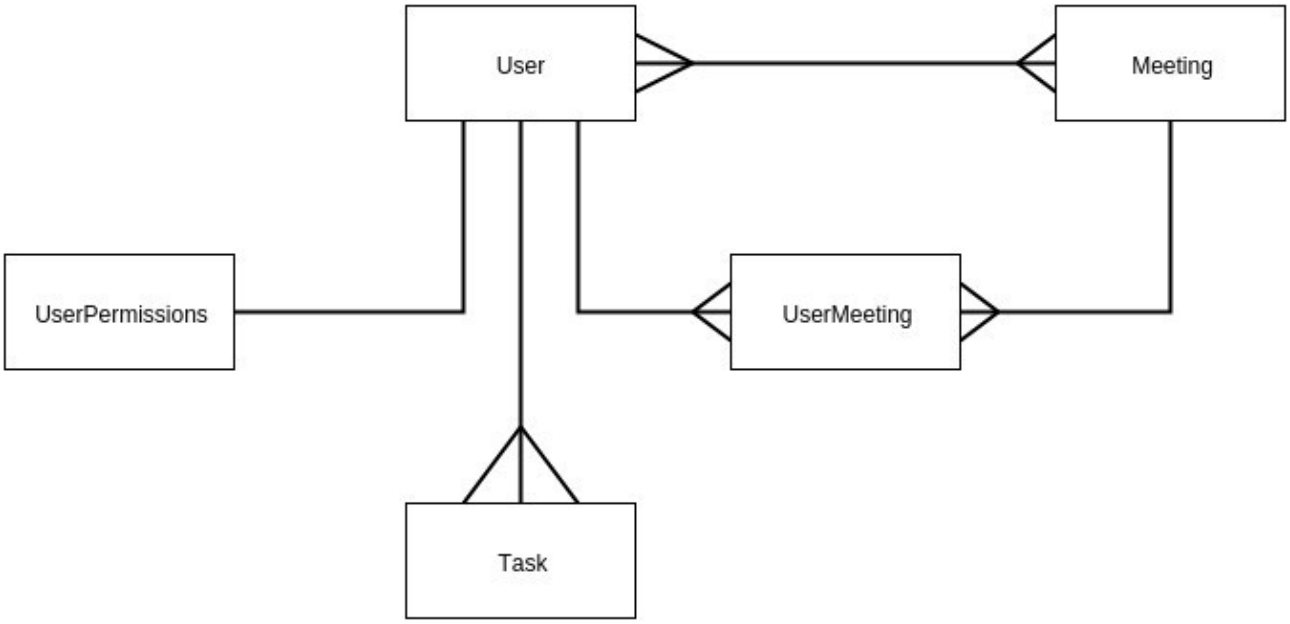
- Meetings viewing/adding

- Tasks viewing/adding
- Monitoring Resources

Other Objectives

- Editing user data

E-R Diagrams & Descriptions



Entity Descriptions:

User(UserID, Username, UserFirstname, UserLastname, UserPasswordHash, Permissions)

Meeting(MeetingID, MeetingOwner, MeetingTitle, MeetingDateTime, MeetingPlace)

MeetingAttendee(UserID, MeetingID, UserMeetingConfirmation)

Task(TaskID, TaskTitle, TaskDescription, TaskOwner, TaskExpiry, Priority)

Resource(ResourceID, ResourceName, ResourceCost, ResourceQuantity, ResourceRequiredQuantity)

Object Analysis

Object Listing

- Meeting
- Task
- User

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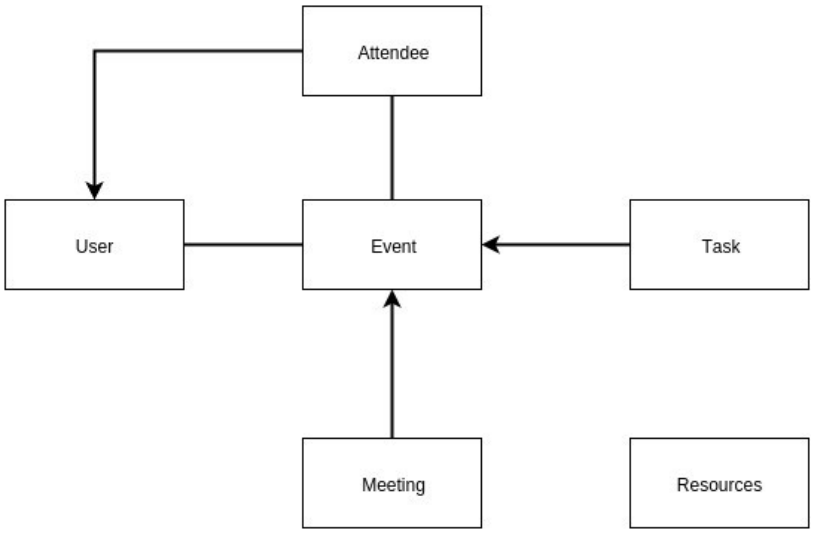
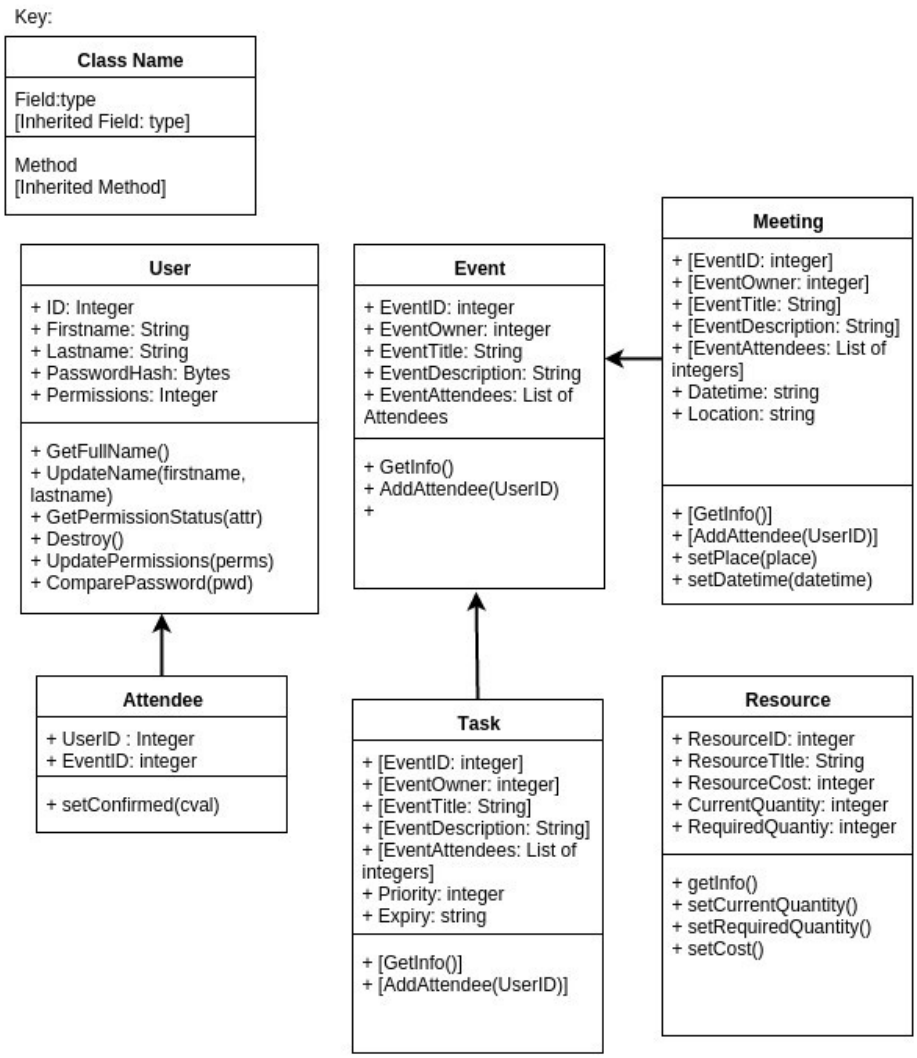
- Resources

Relationship Diagrams



Class Definitions



Other Abstractions

Constraints

Hardware

The Church currently uses a variety of low-spec PCs and Apple iMacs, the proposed system does not require and particularly high performance hardware to execute it's various tasks, however it does have some dependencies which might not be present on older computers.

The lowest specification compute that is still used in the Church has these specifications:

- 15” 4:3 Display
- Intel® Pentium 2.13GHz (Mid 2009)
- 2Gib DDR2 Ram
- 100MBit NIC
- 60GB Hard Disk Drive
- Integrated Graphics

The proposed system will not require computational resources beyond this computer. Maybe when the database gets large, the users may notice a slight delay in the computer accessing the database, but the effects should be negligible.

The staff team uses a variety of Laptops and Desktops all connected to a central server which shares some files and resources between the different computers, the database file for the proposed system is going to be stored on this server so the users will have to be connected to the Church's local network for the proposed system to work.

Software

Some of the users of the system are not trained to use computers and may be disorientated by radical changes to a computer system such as changing the operating system, however Python, and the PyQt library that the proposed system will be using are cross platform and will work on Windows, Mac and Linux.

Time

The only deadline for this software is the January 2016 deadline set by my teacher. There is no rush as far as the Church is concerned.

User Knowledge

None of the members of the staff team have qualifications in ICT or computing related subjects and there is no corporate scheme to train the staff team. Beyond basic word processing and dealing with emails, the staff team has little or no knowledge of computers which is why it's essential for the software to be as familiar and logical as possible, as well as being supplied with a full user manual.

Access Restrictions

Each user of the system needs their own section that contains all of their data, which will be password protected.

Due to the sensitive nature of much of the data held within the system, the administration will have to carefully consider how they will comply with the data protection act with the storage of their database file.

Limitations

Areas to be included in future computerisation

An extension to the system could be developed to replace the checkout element of the cafe which would automatically update resources and it would be able to keep financial records and report them to the cafe management on a regular basis, this would completely cut out the time required to input the updates to the sales information at the end of the day, and it would give the management live insights into the operation of the cafe.

Solutions

Alternative Solutions

Solution	Advantages	Disadvantages
Custom set of spreadsheets	Does not require bespoke software	does not store data securely, does not organise data, difficult to share information between people. No support for notifications
“Webapp”	Cloud resource, accessible anywhere from any device, off-site backups & server resources. Support can be issued remotely	Has a regular service charge, a web based application is open to everyone in the world therefore the application must be secure.
Revising the current system	Very low cost, no external contractors required, no need to retrain and/or learn new skills.	All of the current problems will still exist, management of data becomes a manual and laborious task.
Command Line application (CLA)	Quicker and easier to program, most storage and processing efficient solution	Requires significant training and documentation. Most of the users working for the client have little or no computer experience therefore a command line application would be completely foreign to them and would probably scare them away from using it.
Desktop application with GUI	Can be written in Python so all of the core code will be the same as in a CLA, except it will have a GUI to operate those functions. Layout can be easy to use and can include easy to reach help at every point of	GUIs are more time consuming to program than CLAs as the layout of the UI requires significant design process. Also rendering and operating GUI requires more processing than a CLA.

Solution	Advantages	Disadvantages
	entry. Could be used with a touch screen for ease of use.	

I have chosen a python GUI desktop application because:

- The application will meet my client's specific needs in a user friendly way that cannot accidentally be changed, unlike a spreadsheet.
- The digital storage of the user's data will fit on existing hardware.
- All the data contained in the database can be easily backed up and restored.
- The GUI has all of the advanced features of the CLA but they are more easily accessible.
- The python language has a balance programming simplicity and computing versatility that make it perfect applications such as these, when there's a relatively small time frame but the task requires some advanced features.

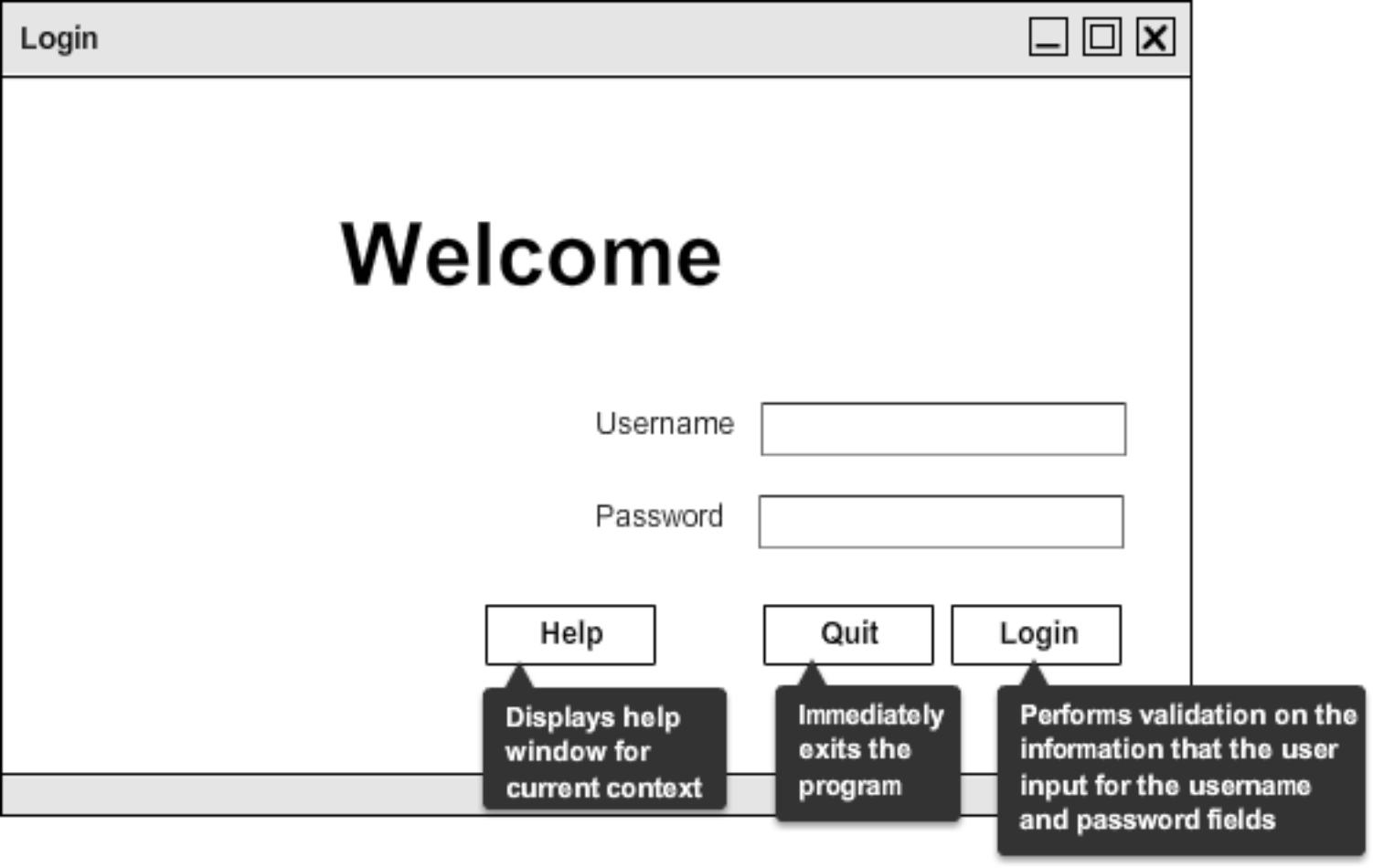
Design

Short Description of the Main Parts of the System

The system contains three main elements: The subsystem for managing meetings, the subsystem for managing referral tickets and the subsystem for managing resources and accounting. The meeting management subsystem will contain a record of all the meetings for each member of the staff team, therefore as part of the global system, there will be a representation of the staff team and anyone who might be involved in any meetings. This subsystem will also be responsible for the reminding the users of their meetings and informing users when they've been invited to a meeting. The next subsystem is the system for managing support and referral tickets, this will automatically pass the ticket on to whoever is on the rota to deal with that ticket at the given time. The tickets will be listed in order of priority, which is set when they're submitted, the priority will increase with time to ensure that nothing is ignored for too long as often the issues that would be reported are very time sensitive. The tickets will be kept securely in an encrypted section of the database, and each individual ticket will only be accessible by people for whom it is relevant to ensure confidentiality and compliance with various laws concerning such information. The third subsystem, designed for managing the material resources within the Church will consist of a record of all of the finite resources that the Church regularly purchases and sells, the subsystem will also keep track of the money throughput. Because many of the people who would operate this system will not be trained nor contractually obliged to give a satisfactory quality of service, the security and access rights components of the system are of paramount importance, not only to prevent breaches in confidentiality but also to ensure that nobody is confused when the interface is more complicated than necessary therefore the system needs to determine which parts of the system are relevant to a particular person and only show them those parts.

Flowchart showing overview of the entire system

User Interface Design


Login
Welcome
Username
Password
Help
Quit
Login
Displays help window for current context
Immediately exits the program
Performs validation on the information that the user input for the username and password fields

Home

?

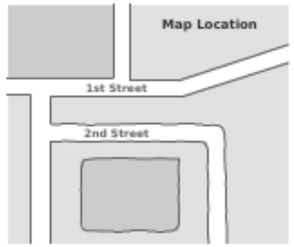
Logout

Meetings | Tasks Referrals | Resources | User Management

Outstanding Meetings

Meeting With Steve

12:30 PM
Midsummer Common



- Staff Team Meeting
- Café Management Meeting
- Dinner With The Smiths
- Bi-Weekly Management Meeting
- Weekly Prayer

Expandable list of pending meetings, data comes from database and is updated once every 30 seconds

New Appointment

Respond to Pending Appointments

New Appointment

Title of event:

Attendees:

Location:

August 2009

S M T W T F S

1

On change: perform some validation and username completion based on `users` table

Validated and must be in a format compatible with GMaps

Cancel | Save

Creats a new entry in the meetings database table

Respond to Appointments

- Meeting With Dave
- Staff Team Meeting
- Coffee with Sue
- Other Stuff

Used to select the meeting to respond to, the list comes from the database of meetings for this user that have not already happened and are prioritized depending on if the user has already responded to them

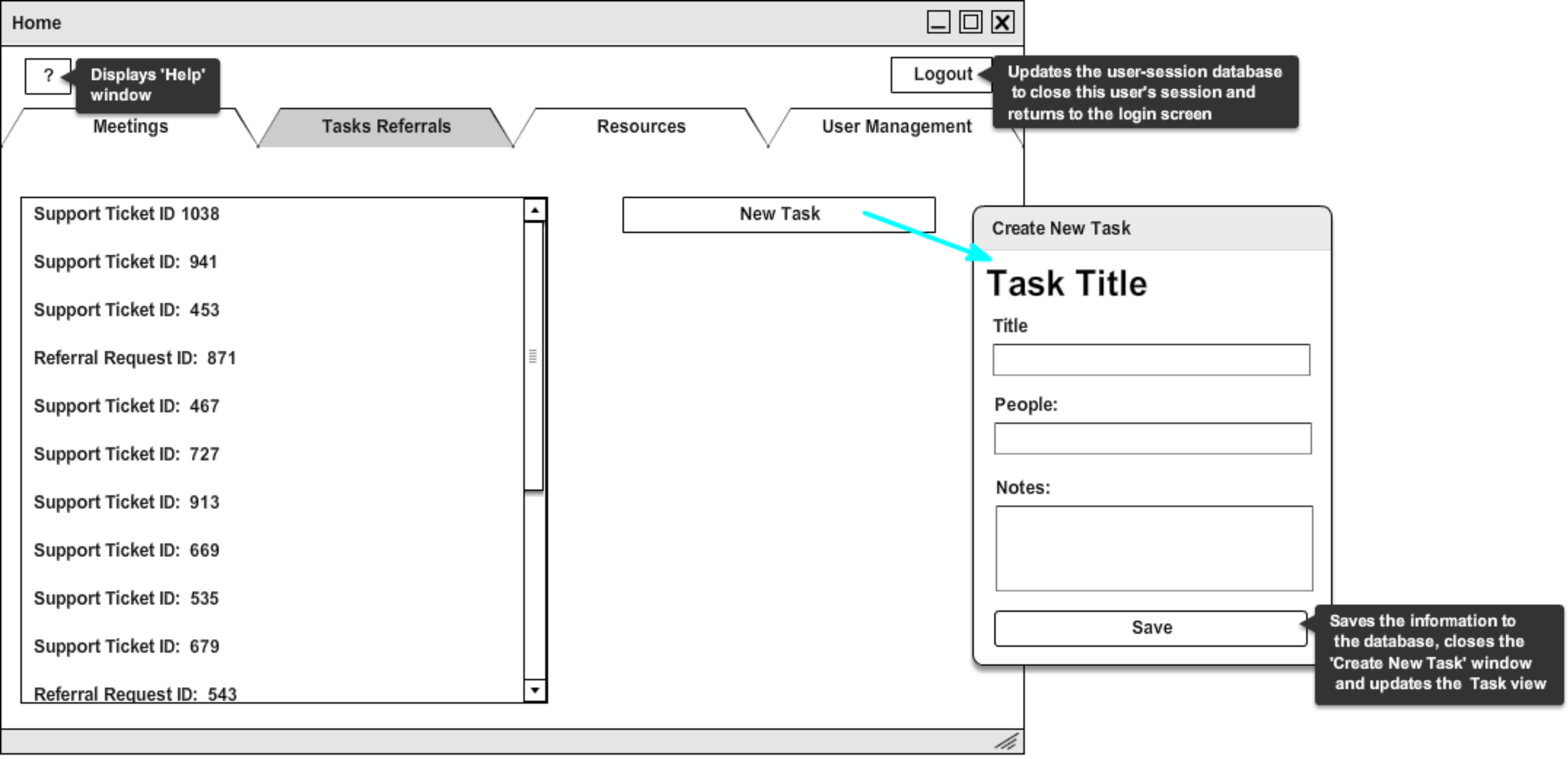
Staff Team Meeting

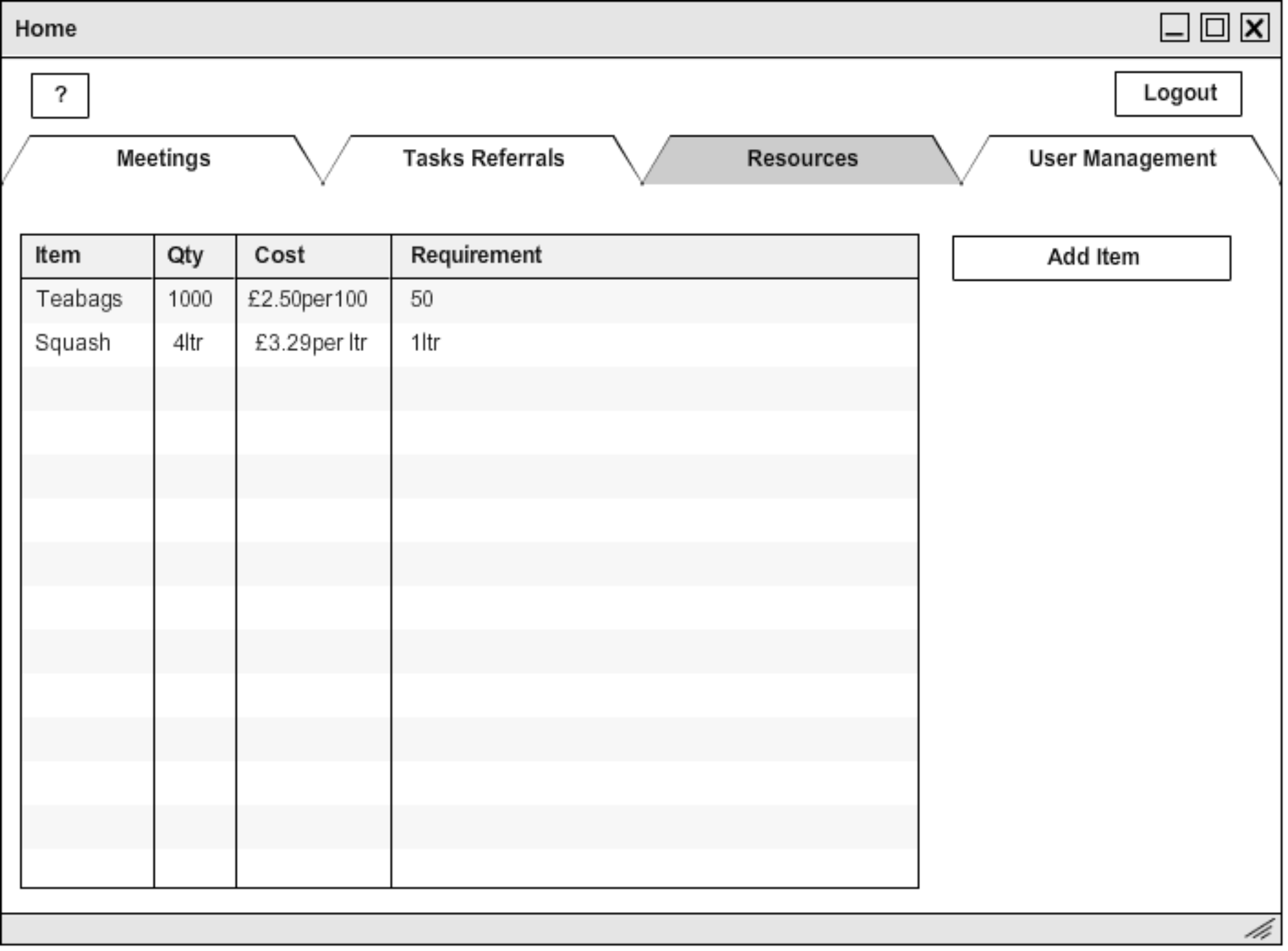
Attending?

Contains "Yes", "No", and "Tentative"

Cancel | Save

Updates the selected meeting entry in the database

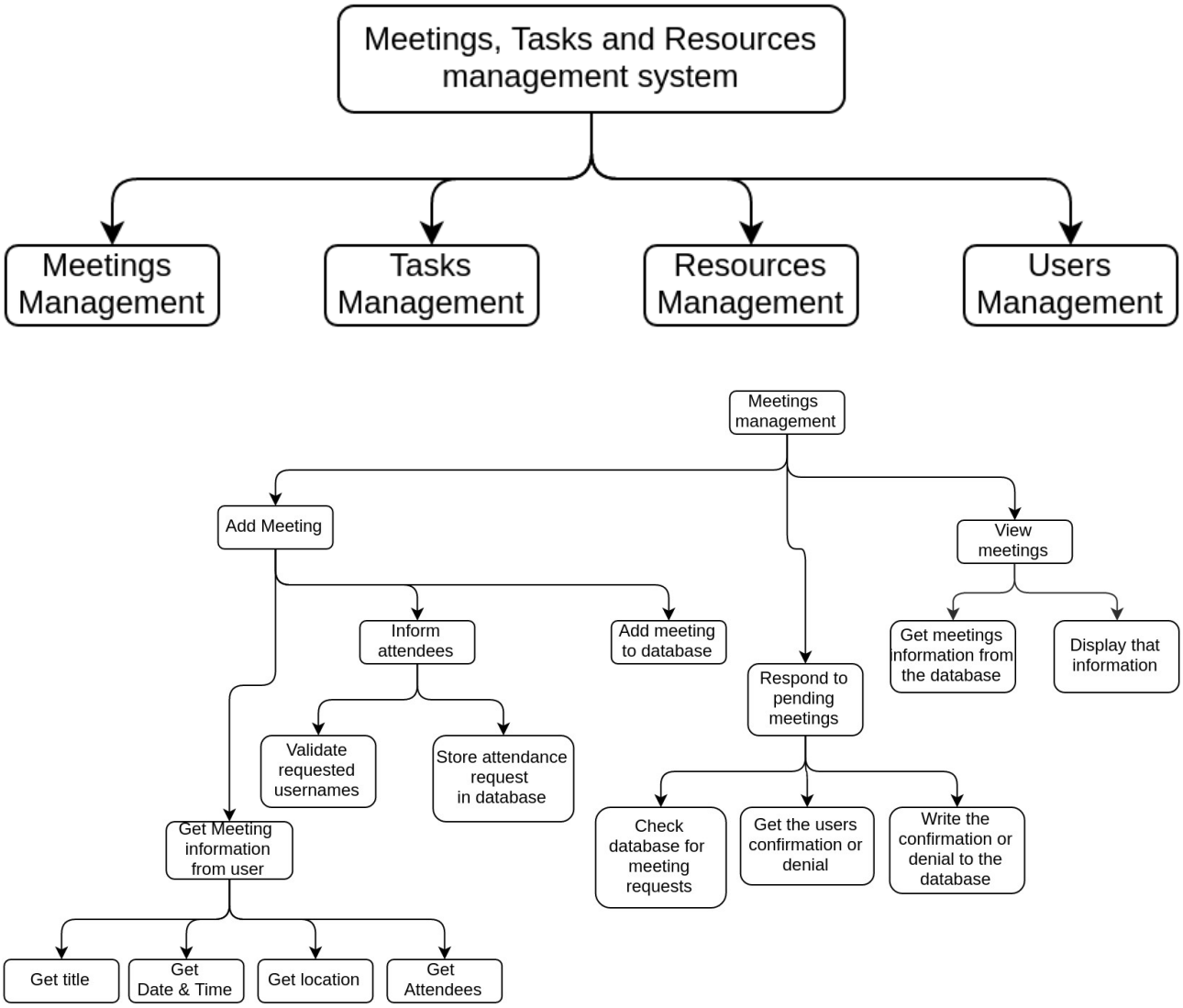

Home
?
Displays 'Help' window
Logout
Updates the user-session database to close this user's session and returns to the login screen
Meetings
Tasks Referrals
Resources
User Management
Support Ticket ID 1038
Support Ticket ID: 941
Support Ticket ID: 453
Referral Request ID: 871
Support Ticket ID: 467
Support Ticket ID: 727
Support Ticket ID: 913
Support Ticket ID: 669
Support Ticket ID: 535
Support Ticket ID: 679
Referral Request ID: 543
New Task
Create New Task
Task Title
Title
People:
Notes:
Save
Saves the information to the database, closes the 'Create New Task' window and updates the Task view

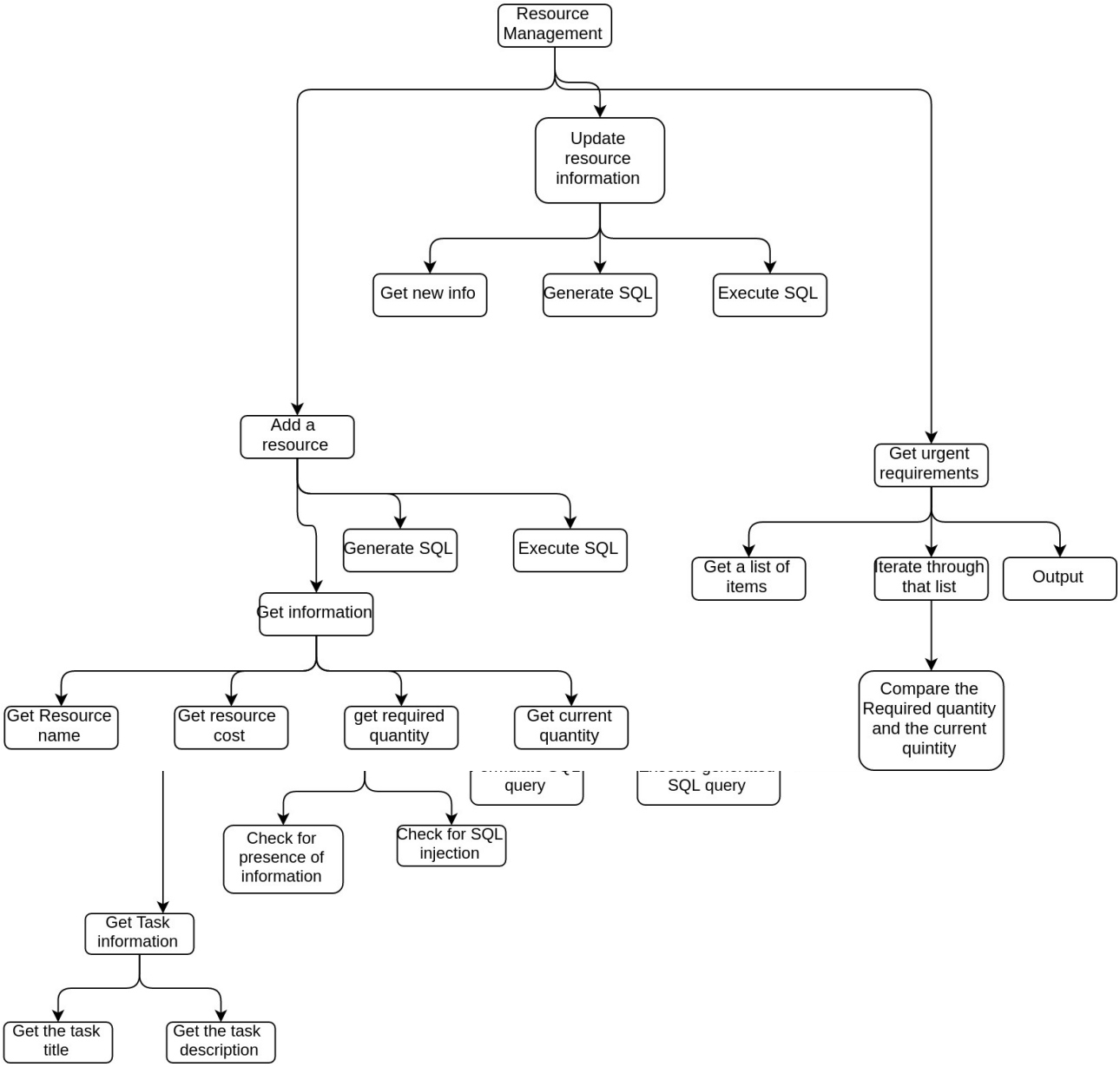

Home
?
Logout
Meetings
Tasks Referrals
Resources
User Management
Item
Qty
Cost
Requirement
Teabags
1000
£2.50per100
50
Squash
4ltr
£3.29per ltr
1ltr
Add Item

Hardware Specification

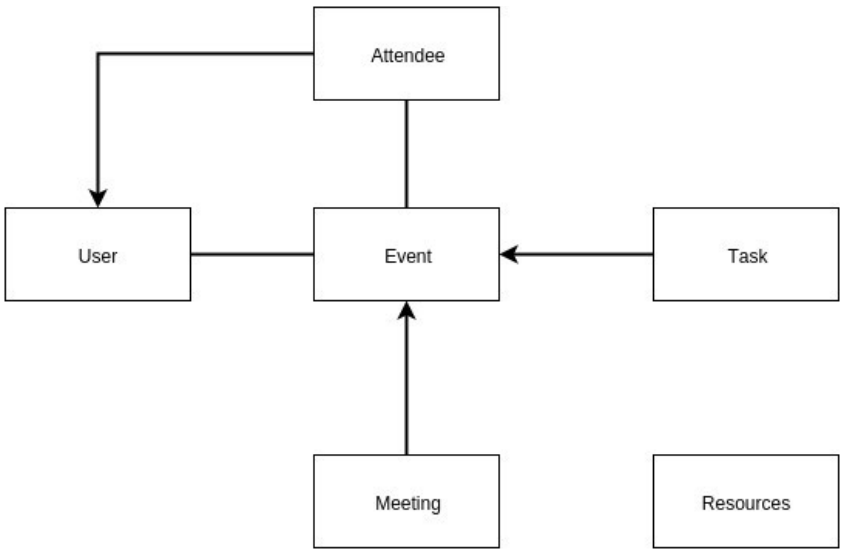
The system will run on both desktops and laptops, with a minimum screen resolution of 1024x768 (4:3 aspect ratio) and all of the PCs are running Windows Vista or later. This is important as the graphic user interface must fit within this area otherwise the users may not be able to operate it. A combination of a keyboard and a mouse will be used for inputting information into the forms and the majority of the navigation within the program will be done using a mouse. All of the storage will be on a remote NAT (network attached storage) and the output will be directly to a monitor.

Program Structure





Object Diagrams



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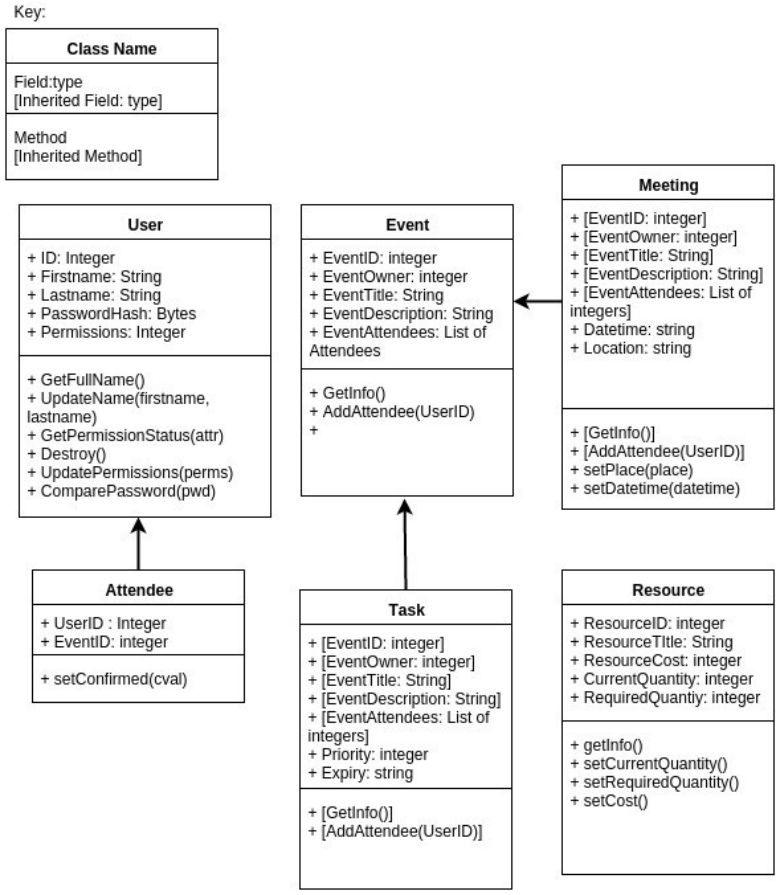
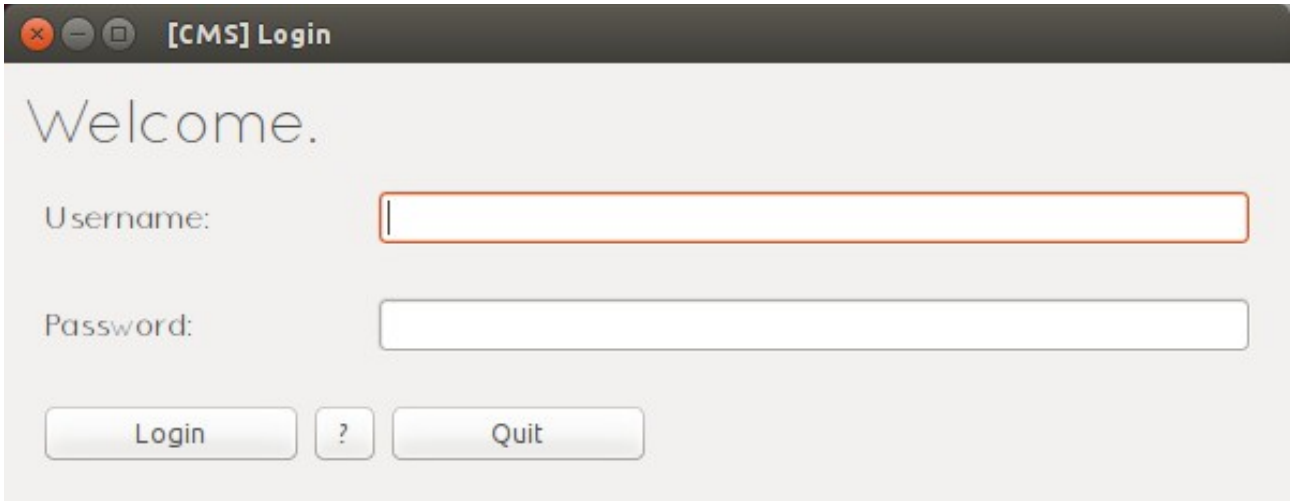
Class Definitions



Prototyping

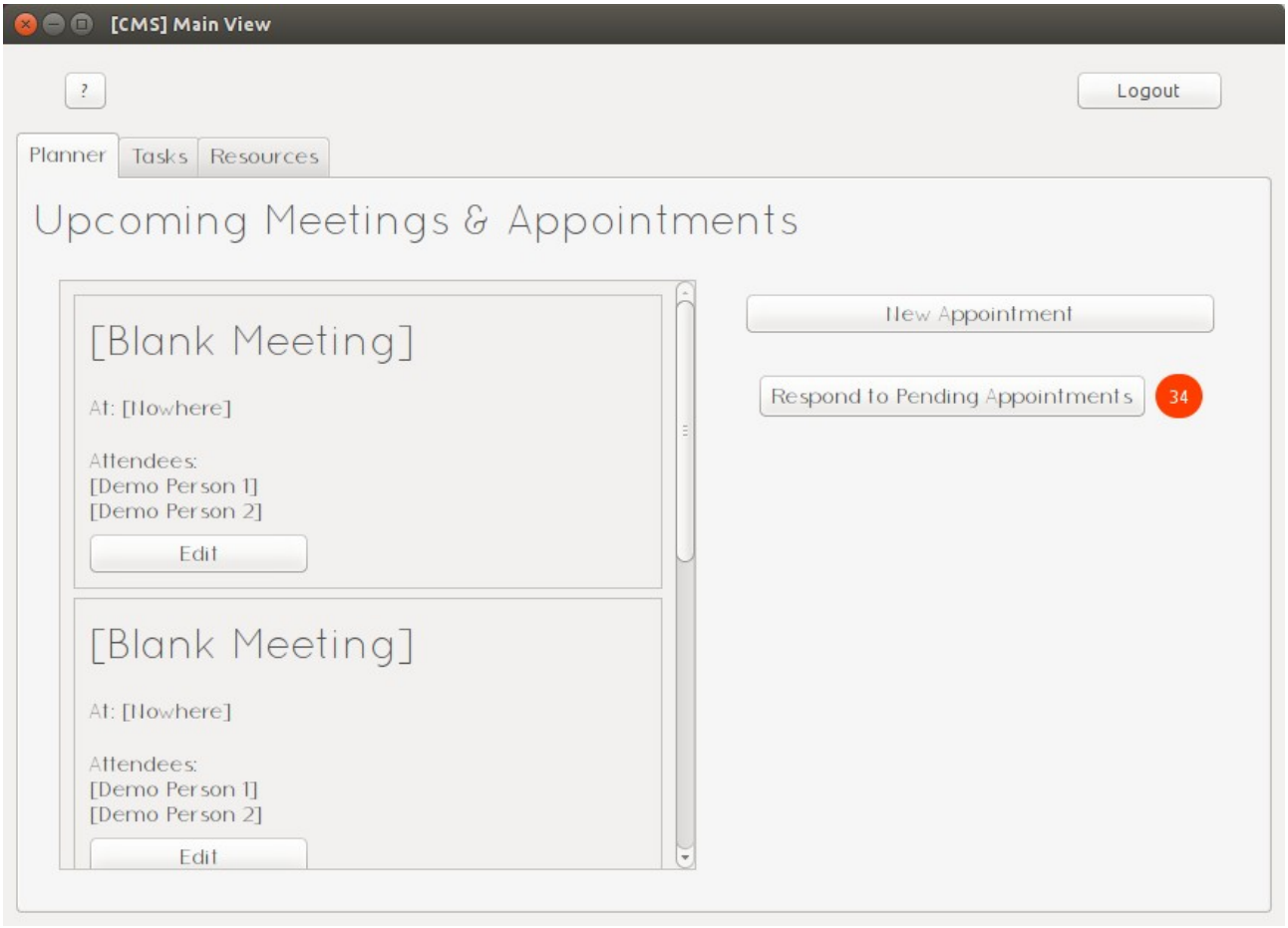
Prototyping allows me to test out different aspects of the system, allowing me to evaluate how easily they can be made using the tools available. The main part of this system is the graphical user interface (GUI), and is the most experimental part, so to make sure the various elements work and work together.

The first part of the system is the login window, this needs to be clear and simple to use so that the users can enter their information with little or no guidance.

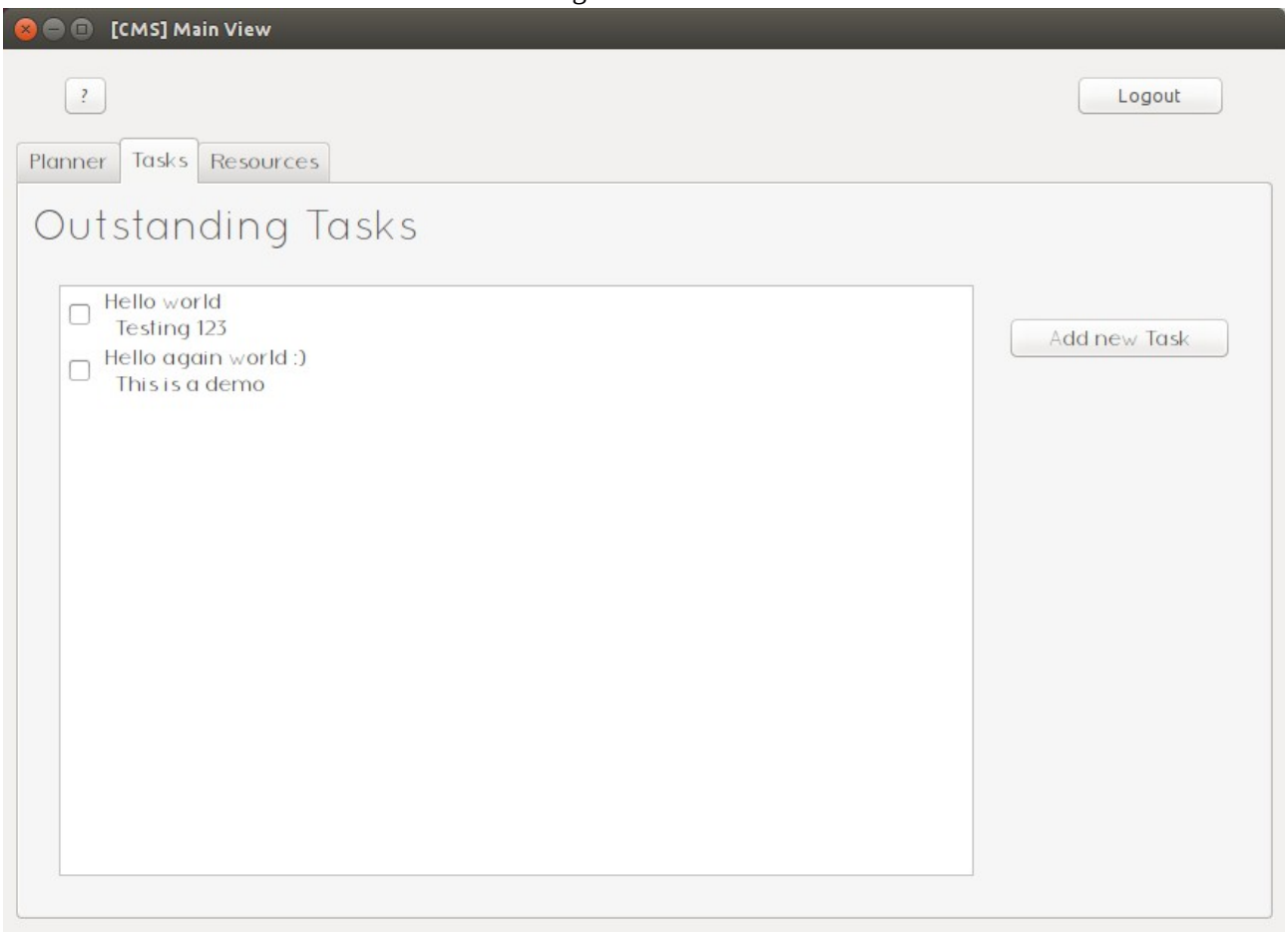


The next part of the system is the meetings list view, which contains a list of all the meetings belonging to a user. The '34' in the orange circle is just to test the indicator widget I designed, in the actual software, it will

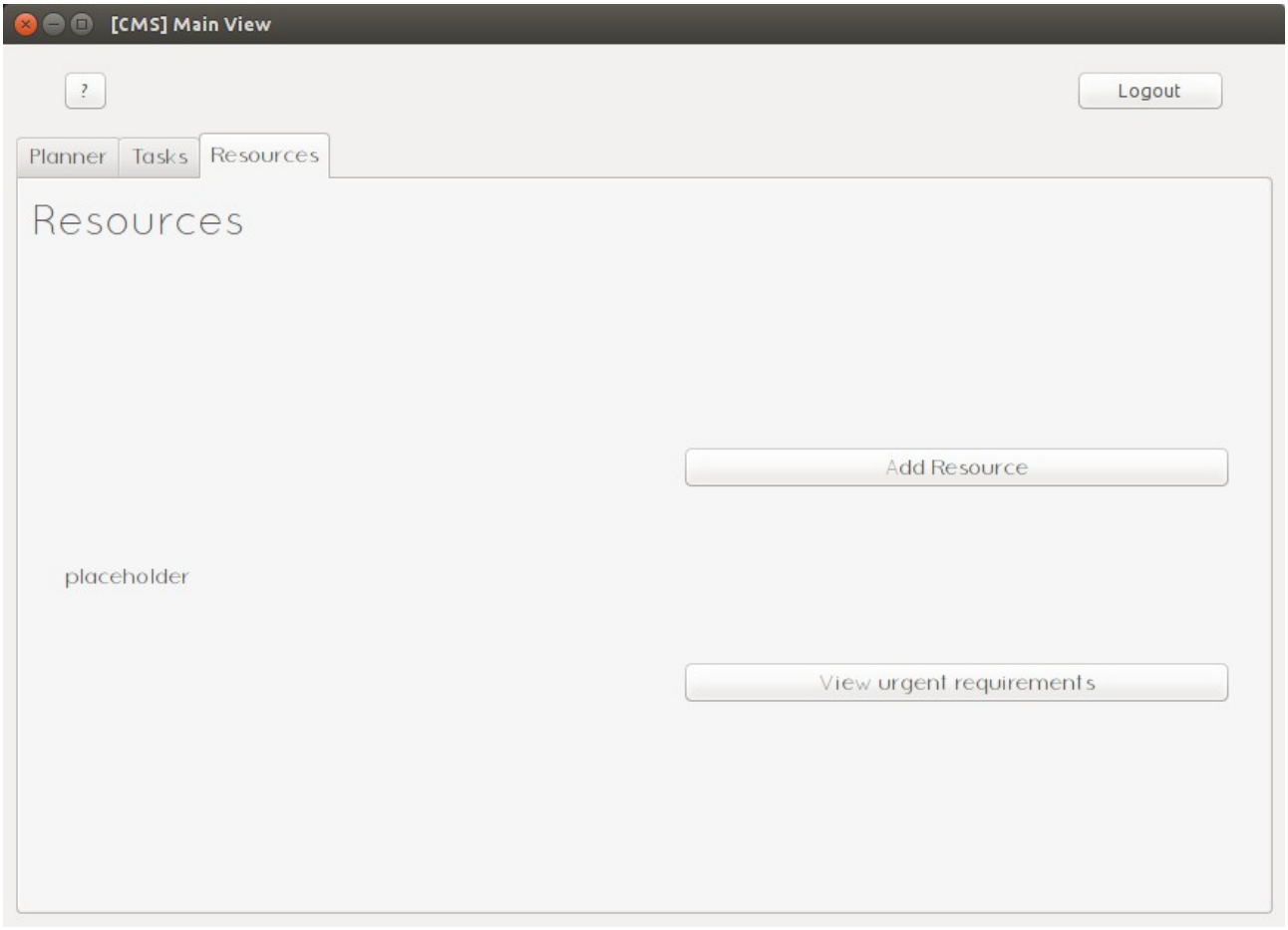
show the number of appointments that the user has been invited to attend but has not responded to yet. The list on the left contains a list of blank placeholder meeting widgets to show what each meeting could look like.



The next part of the system is the tasks management screen, which contains a tick-able list of tasks on the left and various controls to interact with this on the right.

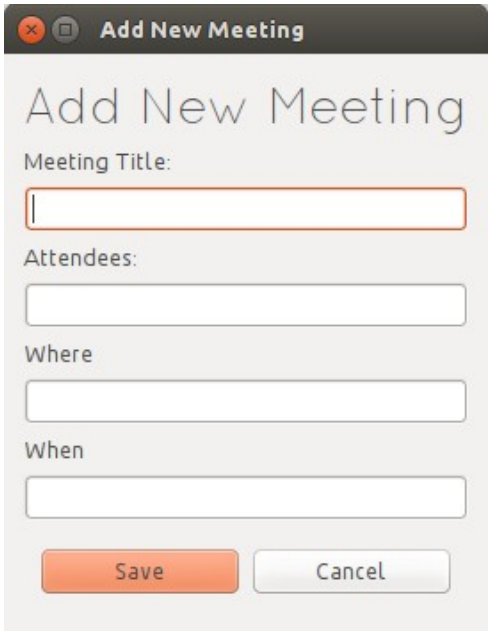


For the resources management, getting a table of data required more time and resources than I initially expected so, the actual table is not included in the prototype, I spoke to my liaison with the client about this and the conclusion of that meeting was that support for the resource management section was of a lower priority than the meetings and tasks subsystems. In this prototype, the resources table is replaced with the

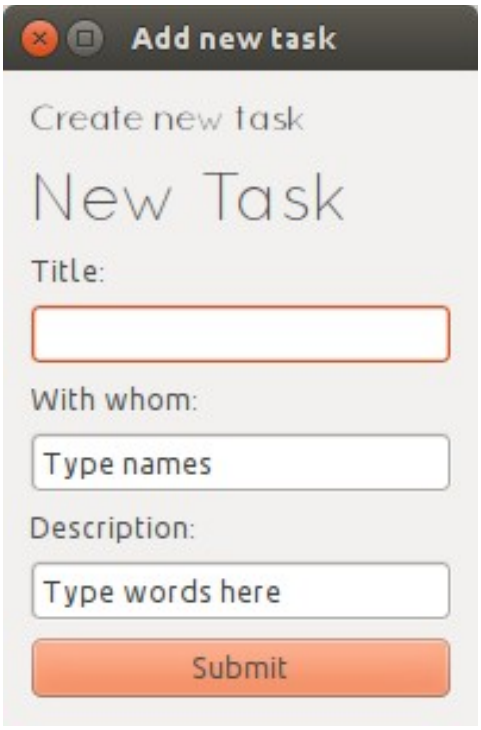


word “placeholder”.

For the input form for adding new meetings, ease of use is of paramount importance, so I styled the form in a way that is similar to standardized input forms found in mobile applications, which is something most members of the team are familiar with so it follows a logical order of organisation of information.

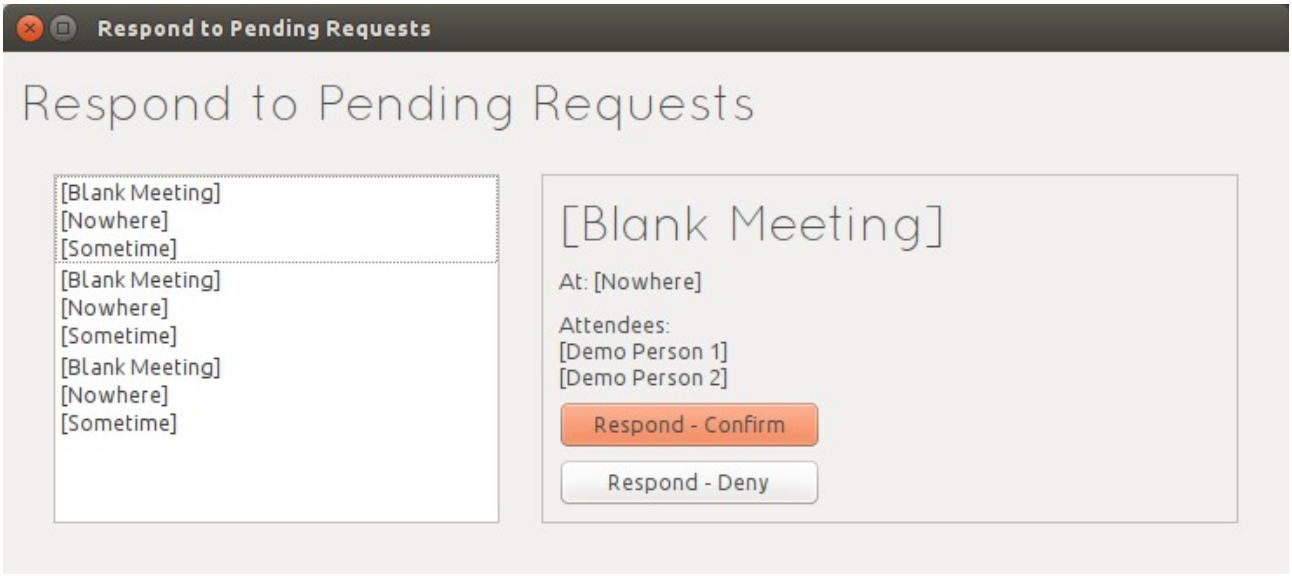


I used a similar set of design principles when designing and prototyping the form to add tasks

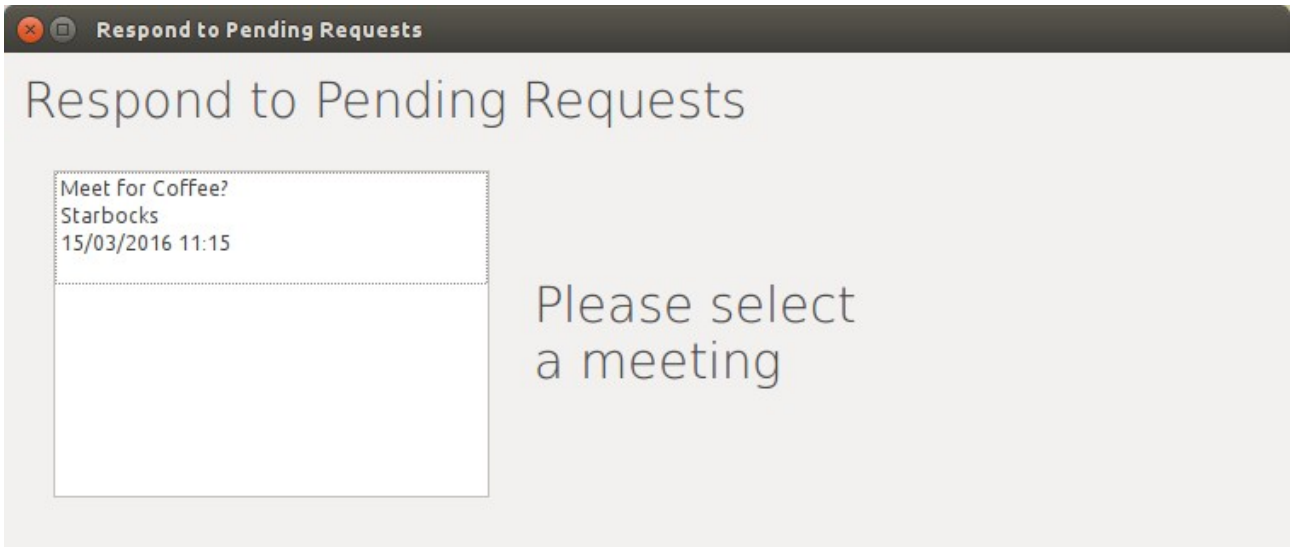


I'm still unsure if tasks need to have the option to add attendees, so I included it just in case.

For responding to meetings, I used the same system of a list of options and information on the left and more detailed information and controls on the right.



I realised when I created this prototype that it might not be obvious that a user should select a meeting from the list on the left, so I changed it so that if the user has not selected a meeting, a message is shown as below:



Definition of Data Requirements

Identification of all Data Input Items

- User name
- Password
- Meeting title
- Meeting location
- Meeting date & time
- Meeting attendees
- Task title
- Task description
- Task completed?
- Meeting request accepted or rejected
- Resource title
- Resource cost
- Resource current amount
- Resource required amount
- Updated password

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Identification of all data output items

- Meeting title
- Meeting date & time
- Meeting location
- Meeting attendees
- List of confirmed attendees
- Task title
- Task description
- Resource name
- Resource cost
- Resource quantity
- Resource required quantity
- List of urgently required resources

  Output to database

- Meeting title
- Meeting date & time
- Meeting location
- Meeting attendees
- Meeting Owner
- Task title
- Task description
- Task owner
- Resource name
- Resource cost
- Resource quantity
- Resource required quantity

Explanation of how Data Output is generated

Context	Output	How it's generated
Viewing meetings in the meeting list found in the 'Planner' tab	Meeting Title	Fetched from the table 'Meetings' in the database. All of the data in this table is generated when a user adds a meeting.
	Meeting Date & Time	
	Meeting Location	
	Meeting Attendees	
Viewing Requested meetings	Meeting Title	
	Meeting Date & Time	
	Meeting Location	
	Meeting Attendees	
	Meeting Owner	Referenced from the table 'Users' in the database, is associated with a meeting when it's created.
Viewing a list of tasks	Task Title	Taken directly from the 'Tasks' table of the database, which contains data the user input into the 'add task' form.
	Task Description	
Updating a task	Task title	
	Task Description	
Viewing Resources	Resource name	Taken directly from the 'Resources' table in the database, which contains data that comes directly from the user.
	Resource cost	
	Resource quantity	
	Resource required quantity	
Viewing a list of urgently required resources	Resource name	Selected from the database table 'Resources' on the condition that the current quantity is lower than the required quantity.
	Resource cost	
	Resource quantity	
	Resource required quantity	

Data Dictionary

Name	Data Type	Length	Validation	Example Data	Comment
UserID	Integer	2 Bytes	Number, unique	35	Is used to reference individual users across the system, must be unique.
UserName	String	45 chars	No more than 45 chars, must not be empty	Steve Johnson	Is used to identify users in a human readable way.
UserPassword	String	32 chars	Md5 checksum	35ff99022aa9a2c6	The system never

Name	Data Type	Length	Validation	Example Data	Comment
			– only in hexadecimal characters	8d11b2b820579532	stores the user's passwords in plaintext, so the password is stored as a md5 checksum
UserAccessRights	Integer	2 Bytes	Must be present, between 0 and 31.	30	A 5-bit integer used to represent the user's access to various areas of the system.
UserUsername	String	60 chars	Must be present & unique	SteveJohnson	Used for logging in and referring to other users when requesting attendance.
MeetingID	Integer	2 bytes	Must be present and unique	478	Used to reference individual meetings across the system
MeetingOwnerID	Integer	2 bytes	Must be present, unique and a valid UserID	35	A foreign key referring to the Users table
MeetingTitle	String	60 chars	Must be present	Coffee with James	Holds the title for the meeting
MeetingDateandTime	String	45 chars	Must be present and follow the format: YYYY/MM/DD hh:mm	2016/02/15 14:23	Holds the date and time for the meeting in ISO standard formatting, can easily be used with Python's *datetime* library.
MeetingLocation	String	45 chars	None	Costa Coffee, Grand arcade	Contains the location of the meeting
TaskID	Integer	2 bytes	Must be present and unique	348	Is a unique identifier for each task
TaskTitle	String	45 chars	Must not be longer than 45 chars and must be present	Get lunch for the family	Contains a title for each task, used by the user to identify tasks
TaskDescription	String	255 chars	None	Go to Sainsco's and get some vegetables and oven chips	Contains a short description about the task for the user.
ResourceID	Integer	2 bytes	Must be present and unique	75	A unique identifier used to reference

Name	Data Type	Length	Validation	Example Data	Comment
					resources throughout the system
ResourceName	String	45 chars	Must be present	Fairtrade instant coffee	A human readable identifier for various resources.
ResourceCost	Integer	2 bytes	Must be present, defaults to zero if not present	129	The cost of an item, in pence.
ResourceQuantity	Integer	2 bytes	Must be present, defaults to zero if not present	29	The amount of an item currently in stock
ResourceRequiredQuantiy	Integer	2 bytes	Must be present, defaults to zero if not present	23	The minimum amount of the resource that can be in stock without raising warnings.

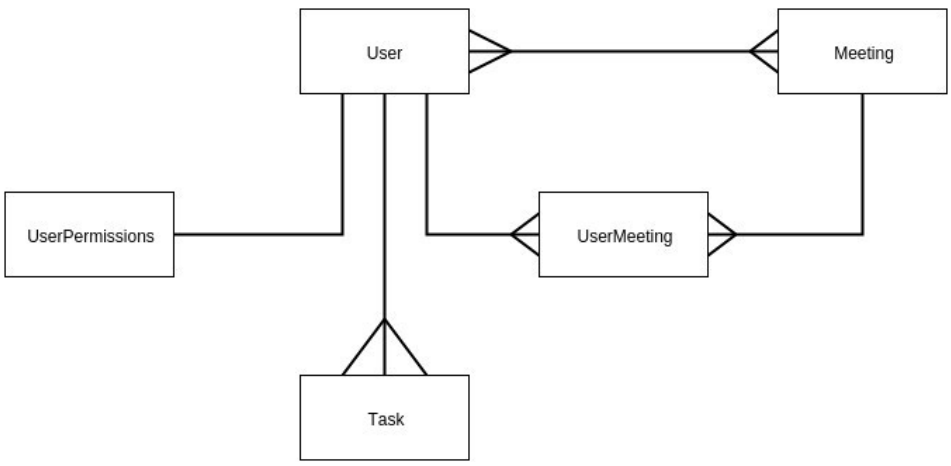
Identification of Appropriate Storage Media

Because there is potential for there to be a large amount of data, which is likely to be changed and updated frequently, a single non RAID spinning HDD would be ample to store the data, because the system is only going to be accessed by a maximum of 10 users simultaneously, speed increasing RAID is not necessary, however a redundancy drive would be useful to provide a continuous backup of the data. Solid state drives would not be appropriate because of the continuous rewriting of storage locations which would relatively quickly wear out a solid state disk which would not be cost effective to replace.

Database Design

Normalisation

ER-Diagrams



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UNF to 3NF

Un-normalised
UserUsername UserName UserID UserPermissions UserPassword MeetingID MeetingOwner MeetingTitle MeetingLocation MeetingDateandTime MeetingAttendees MeetingConfirmed? TaskID TaskOwner TaskTitle TaskDescription ResourceTitle ResourceCost ResourceID ResourceQuantity ResourceRequiredQuantity

1NF	
Repeating	Non-Repeating
MeetingID MeetingOwner MeetingTitle MeetingLocation MeetingDateandTime MeetingAttendees **TaskID** TaskOwner TaskTitle TaskDescription MeetingConfirmed?	UserUsername UserName **UserID** UserPermissions UserPassword ResourceTitle ResourceCost **ResourceID** ResourceQuantity ResourceRequiredQuantity

2NF	
Repeating	Non-repeating
MeetingID MeetingOwner MeetingTitle MeetingLocation MeetingDateandTime **MeetingID** **UserID** Confirmed?	UserUsername UserName **UserID** UserPermissions UserPassword ResourceTitle ResourceCost **ResourceID** ResourceQuantity ResourceRequiredQuantity

TaskID **UserID** TaskTitle TaskDescription	

3NF

Meeting

MeetingID
OwnerID
MeetingTitle
MeetingLocation
MeetingDateAndTime

User

UserID
UserUsername
UserName
UserPassword
UserPermissions

MeetingAttendee

UserID
MeetingID
Confirmed?

Task

TaskID
OwnerID
TaskTitle
TaskDescription

Resource

ResourceID
ResourceTitle
ResourceCost
ResourceQuantity
ResourceRequiredQuantity

Entity Relationships

Meeting(MeetingID, *OwnerID*, MeetingTitle, MeetingLocation, MeetingDateAndTime)

User(UserID, Username, Password, Name, Permissions)

MeetingAttendee(*UserID*, *MeetingID*, confirmed?)

Task(TaskID, *OwnerID*, TaskTitle, TaskDescription)

Resource(ResourceID, ResourceTitle, ResourceCost, ResourceQuantity, ResourceRequiredQuantity)

SQL Queries

These are the frameworks for generating SQL queries that I have used throughout this project. The reason I say 'frameworks' is because the SQL queries will be passed through python's string formatter with the appropriate information included.

SQL	Description
`CREATE TABLE IF NOT EXISTS Users (UserID INTEGER PRIMARY KEY AUTOINCREMENT,Name TEXT, Username TEXT, Password TEXT, Permissions INTEGER );`	This is an example of an SQL statement to create a table within a database, note the use of the AUTOINCREMENT keyword, this ensures that all of the values in that field are unique, hence it is useful for defining primary keys.
`INSERT INTO Users(Name, Username, Password, Permissions) VALUES({0});`	This is an example of a query to add a user to the table Users, the payload represented by the "{0}" is a comma seperated list of values for the Name, Username, Password and Permissions
`SELECT * FROM Users {0};`	This is a simple sql query for getting all of the information about a particular user, the part of the query denoted with "{0}" will be replaced by something similar to "WHERE UserID = 20" to select a specific user.
`SELECT UserID FROM Users WHERE (Username = '{0}');`	This is a similar query, designed to get the UserID based on username. This is useful for the login process, where a 'user' object is selected by username.
`UPDATE MeetingAttendee SET Confirmed = 1 WHERE {0}`	This statement will update the value of if a meeting request is confirmed or not to 1 using a SQL update statement. The placeholder denoted by "{0}" will be replaced with something similar to "MeetingID = 34 and UserID = 2"
`DELETE FROM MeetingAttendee WHERE {0}`	This statement deletes a meeting attendance request, the placeholder "{0}" will be replaced with something similar to "MeetingID = 39 AND UserID = 3" or just "MeetingID = 23" to delete all of the requests for a specific meeting.

(*Note: A complete listing of SQL constructs will be found in the code listing later on in the project)*

Security & Integrity

This system will store sensitive information about potentially vulnerable people, which means the storage of this data is encompassed under the Data Protection Act 1998 (DPA). This means the personal information must be kept up to date, and kept securely. The data stored shouldn't be stored any longer than necessary, in the case of the Church, they currently have a policy of renewing data annually (when they get new dairies), so the database has to be implemented in a way that makes it easy for the system to comply with this policy. The Church currently has a secure file server located on site which they currently use for sharing and storing other private information in accordance to the DPA, each member of staff has a username and password which they can use to access this server and all attempts to access it are logged.

When the data is input, it needs to be validated to ensure it is correct (also necessary for compliance with the DPA), part of the validation can be ensure by using drop down menus wherever possible. I will also need to ensure the database is not left with missing dependencies when data is added, removed or changed, I will do this with software checks as part of the system that run when data is transferred in and out of the database.

System Security

Because this system is critical to the operation of the Church's administrative and pastoral aspects, it is important that the data is not interfered with, lost or stolen. Access to the system is controlled by username-password pairs and there will be no support for 'guest' accounts. If there is an invalid username, password or combination of the two, no access to the system will be granted. The system has support for user permissions, so that each user can be given access to specific areas of the system, as required.

The conditions of complying with the Data Protection Act are as follows:

- The data will remain in the UK
- The data will be held securely, and is inaccessible to unauthorised people
- The data stored will only be used by the Church and will not be disseminated under any circumstances
- The data will be destroyed as soon as it is no longer required
- The data is kept up-to date and accurate
- Only necessary data will be collected and stored.

Validation

Item	Example	Validation	Comments
Username	username1	Presence Check, Verified against the database	The entry form immediately cancels it's verification if left empty, obviously the username is checked against the database to determine if it's a valid user.
Password	Pa\$\$w0rd	resence Check, checksum	The entry form

Item	Example	Validation	Comments
		verified against the database.	immediately cancels if this is left blank, if not left blank, the system will generate a hash of the user's input and then check that against the hash stored in the database.
Meeting Title	Dinner With the Smiths	Presence Check	To ensure that a title is entered, this is how the meetings are identified for the user, so it's essential that they have a name. Because often there are recurring meetings, it is not necessary to ensure that the meeting title is unique.
Meeting Attendees	username1, username2	Validated against the database	Usernames which are not recognised are not used when adding the MeetingAttendee database entries. The user should be informed when an invalid username is entered.
Meeting Location	Norwich Forum	Presence Check	The user is informed if the location field is left empty and the form will refuse to submit.
Meeting Start Date & Time	1/28/16 7:54PM	Discrete set of values	This will be a spin box, which is a widget that only allows the user to select input from a set list of values.
Task Title	File A Tax Return	Presence Check and enforced truncation	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required. If the entered data is too long, it will be truncated and an ellipsis will be appended to the text.
Task Description	Make sure you fill out every single little field	Presence Check	If the field is left empty when the user attempts to submit the form, the form

Item	Example	Validation	Comments
			will not submit and the user will be reminded gently that that field is required.
Resource Name	Teabags	Presence Check	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required.
Resource Quantity	100	Presence Check, Integer Validation	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required. The system will attempt to change the value into an integer, if it fails it will notify the user and the form will not submit.
Resource Cost	£10.40	Presence check, regex check	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required. A regular expression will be used to check if the entered price is in a valid format (either £{int}.{int} or {int}p)
Resource Required Quantity	200	Presence Check, Integer Validation	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required. The system will attempt to change the value into an integer, if it fails it will notify the user and the form will not submit.
New Password	P4\$\$w0Rd	Presence Check	If the field is left empty when the user attempts to submit the form, the form will not submit and the user will be reminded

Item	Example	Validation	Comments
			gently that that field is required.
Confirm New Password	P4\$\$w0Rd	Presence Check, verified against field "New Password"	If the field is left empty or does not match the field "New Password" when the user attempts to submit the form, the form will not submit and the user will be reminded gently that that field is required.

Test Plan

Test Series and number	Purpose	Test Data	Expected Result	Actual Result	Evidence in appendix
1.1	Navigate between tabs correctly	Click on tabs	Viewport changes to clicked on tab	Viewport changes	See 1.1
1.2	'New Appointment' dialogue shows when requested	Click on 'New Appointment' button	'New Appointment' window is shown	'New Appointment' window is shown	See 1.2
1.3	'Respond to meeting request' dialogue shows when requested	Click on 'Respond to meeting requests'	'Respond to meeting requests' dialogue is shown	'Respond to meeting requests' dialogue is shown	See 1.3
1.4	'Add new task' dialogue shown when requested	Click on 'Add new Task' button	'Add new task' dialogue box shown	'Add new task' dialogue box shown	See 1.4
2.1	Validate Username & Password entry	Username:"p", password: "hello" (correct) (normal data)	Login window closes and main screen is shown	As Expected	See 2.1.1-2.2.3
		Username: "f", password: "rfskbkb" (incorrect) (erroneous data)	Error dialogue is shown, user is returned to the login screen.	As Expected	
		Username: inion..."(part of a 1024 character string), password: "skljnsjns..."(part of a 1024 character string) (extreme data)	Error dialogue is shown, user is returned to the login screen.	As Expected	
2.2	Validate New Password – current password	"hello" - correct password (normal data)	Form submits (assuming it passes the other checks)	As Expected	See 2.2.1
		"goodbye" - incorrect password (erroneous data)	Warning is shown and form does not submit	As Expected	2.2.2
2.3	Validate the two new passwords	"goodbye" and "goodbye" entered – passwords match (normal data)	The form submits (assuming the data passes all other checks)	As Expected	2.3.1
		"goodbye" and "marmaduke" - passwords to not match (erroneous data)	A warning is shown and the form does not submit	As Expected	2.3.2
2.4	Validate the new task name	"soibsfsbse" - string of	The form submits and the user is allowed to continue	As Expected	2.4.1

		characters less than 45 in length (Normal data)			
		“rslskkubsilesbslob…” - string of characters 50 in length (erroneous & extreme data)	The form truncates the string at 45 characters and continues as normal	As Expected	2.4.2
2.5	Validate attendees in new meeting	“sv” - a valid username (normal data)	The form submits, assuming it passes other checks	As Expected	2.5.1
		“ubhsbwhiu” - an invalid username (erroneous data)	The form submits, but does not include the invalid data	As Expected	2.5.2
		“sv, p” - a list of valid usernames (normal data)	The from submits the data – one entry to the Meetings table and one entry for the each of the usernames in the MeetingAttendee table.	As Expected	2.5.3
		“sv, p, esflkjbsjhb” - a list with some correct and some invalid values (normal & erroneous data)	The form submits the meeting data to the Meetings Table and adds attendance data for each of the correct usernames.	As Expected	2.5.4
		“kjsb, 3ijbalij, aekjbslkj” - A list of invalid usernames (erroneous data)	Meeting data submitted to database, attendees are ignored	As Expected	2.5.5
3.1	Check that the list of resources is loaded correctly	Open the Resources view	All of the resources listed in the database should be displayed	As Expected	3.2
3.2	Check that the list of meetings loaded correctly	Open the meetings view	All the meetings for that specific user should be present	As Expected	1.1
3.3	Check that the list of tasks loads correctly	Open the tasks view	All the tasks for the current user should be present	As Expected	3.1.0
3.4	Check that the list of attendance requests loads correctly	Open the “Respond to meeting requests” dialogue	All the meetings that user has been requested to attend should be listed	As Expected	3.4
3.5	Check that the correct user's name is displayed in the user admin area.	Open the user admin area.	The current user's name (the user used for testing is called 'Dick') should be shown at the top of the screen	As Expected	3.3
4.1.1	Check that the Meeting data is stored to the	AddNewMeeting – fill form with valid data	The data should be inserted into the Meetings Table in the database.	As Expected	2.5.1

	correct table				
4.1.2	Check that the attendees data is stored into the correct table	AddNewMeeting – with a list of valid attendees	Each of the attendees should be stored in the MeetingAttendee table with the corresponding meetingID	As Expected	2.5.3
4.3	Check that the Task data is stored in the correct table	AddNewTask – fill form with valid data and submit	The data should be inserted into the Tasks table	As Expected	4.1
4.4	Check that the updated password data is stored in the correct table	UpdatePassword – fill form with valid data and submit	The database should update the correct table and update the correct record	As Expected	4.2

Test Series	Purpose of test series
1	Test the flow of control: Menu choices linked to correct interfaces. User can only choose the correct choices.
2	Validation of data input performed correctly.
3	Test that the dynamic aspects of the software are loaded correctly from the database.
4	Data is saved into the correct table, fields or files.

Code Listing

```
# file - Meetings.py - 49 lines
# Meetings.py - Class definition for use with meetings stuff

from GlobalResources import *
from DatabaseInit import MeetingsInfo, UsersInfo

class Meeting:
	def __init__(self, title="[Blank Meeting]", place="[Nowhere]", attendees=["[Demo Person 1]", "[Demo Person 2]"], when="[Sometime]", meeting_id=1):
		#Attendees to be a list of people objects

		self.title = title
		self.place = place
		self.attendees = attendees
		self.when = when
		self.meeting_id = meeting_id

		self.info = {"Title":title, "Location":place, "Attendees":attendees, "ISOTime":when, "MeetingID":meeting_id}

		self.load_meeting_from_database()

		self._update_info()

	def load_meeting_from_database(self, info=None):
		#provide functionality to get an individual meeting from a database.


		if info == None:
			info = self.info

		dbmeeting = MeetingsInfo(info)

		raw_info = dbmeeting.get_meeting_info()
		self.info = {"Title":raw_info[2], "Location":raw_info[4], "ISOTime":raw_info[3], "MeetingID":raw_info[0], "OwnerID":raw_info[1]}

	def _update_info(self):
		self.title = self.info["Title"]
		self.place = self.info["Location"]
		self.attendees = [] # this'll be the entry point for the DB query
		self._get_attendees_from_database()
		self.when = self.info["ISOTime"]
		self.meeting_id = self.info["MeetingID"]

	def _get_attendees_from_database(self):
		attendees = MeetingsInfo().get_meeting_attendees(self.meeting_id)

		for a in attendees:
```

```
                attendee_id = a[0]
                # Lookup the username
                username = UsersInfo().get_username_by_uid(attendee_id)
                self.attendees.append(username)
# file - setup.py - 30 lines
# This is the setup script which will install the software package into the
# wherever it's meant to be.

import sys, uuid, random, os
import httplib

Dependancies = True

# Check that the user has PyQt installed
try:
    import PyQt4.QtCore
except ImportError:
    print("You do not have the correct version of PyQt installed :(")
    Depedancies = False
    # TODO: Automatically download the PyQt installation file for the
    # detected OS

# Check that the user has access to SQLite

try:
    import sqlite3
except ImportError:
    print("You are unable to use databases because you're a spaz")
    Dependancies = False

# The dependencies checks are done, now for the

if Dependancies:
    pass
# TODO: Implement the PyPacker code to unpack the squashed project code.
# file - NewResourceDialog.py - 27 lines
from DatabaseInit import ResourcesInfo
from PyQt4 import QtCore, QtGui
from GlobalResources import *

class NewResourceDialog(QDialog):
    def __init__(self, user):
        super().__init__()

        self.setWindowTitle("Add a Resource")
        self.layout = QVBoxLayout()

        self.title = QLabel("Add a resource")
        self.title.setFont(GTitleFont)
        self.layout.addWidget(self.title)

        self.name_label = QLabel("Resource Name:")
        self.layout.addWidget(self.name_label)
```

```
            self.name_input = QLineEdit()
            self.layout.addWidget(self.name_input)

            self.cost_input = QLineEdit()
            self.layout.addWidget(self.cost_input)

            self.current_quantity = QLineEdit()
            self.layout.addWidget(self.current_quantity)
            self.setLayout(self.layout)
# file - NewMeetingDialog.py - 119 lines
# New Meeting Dialog

import re

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *
from DatabaseInit import *
from UsernameLookupDialog import *

class NewMeetingDialog(QDialog):
    def __init__(self, user = None):
            super().__init__()
            self.user = user
            self.main_layout = QVBoxLayout()

            self.setWindowTitle("Add New Meeting")

            self.title = QLabel("Add New Meeting")
            self.title.setFont(GTitleFont)
            self.main_layout.addWidget(self.title)


            self.meeting_title_label = QLabel("Meeting Title:")
            self.main_layout.addWidget(self.meeting_title_label)
            self.meeting_title_entry = QLineEdit()
            self.main_layout.addWidget(self.meeting_title_entry)

            self.attendees_label = QLabel("Attendees:")
            self.main_layout.addWidget(self.attendees_label)

            self.attendees_container = QWidget()
            self.attendees_layout = QHBoxLayout()

            self.attendees_entry = QLineEdit()
            self.attendees_layout.addWidget(self.attendees_entry)
            # self.attendees_entry.textChanged.connect(self._add_attendees)

            self.username_lookup_button = QPushButton("...")
            self.username_lookup_button.setFixedWidth(30)
            self.username_lookup_button.clicked.connect(self.show_username_lookup)
            self.attendees_layout.addWidget(self.username_lookup_button)
```

```
        self.attendees_container.setLayout(self.attendees_layout)
        self.main_layout.addWidget(self.attendees_container)
        self.attendees_info_label = QLabel("A list of usernames seperated by semicolons")
        self.attendees_info_label.setFont(GSmallText)


        self.where_label = QLabel("Where")
        self.main_layout.addWidget(self.where_label)
        self.where_entry = QLineEdit()
        self.main_layout.addWidget(self.where_entry)

        self.when_label = QLabel("When")
        self.main_layout.addWidget(self.when_label)
        self.when_entry = QDateTimeEdit()
        self.when_entry.setMinimumDate(QDate.currentDate())
        self.when_entry.setMinimumTime(QTime.currentTime())
        self.main_layout.addWidget(self.when_entry)

        self.button_container_widget = QWidget()
        self.button_container_layout = QHBoxLayout()

        self.save_button = QPushButton("Save")
        self.save_button.clicked.connect(self.add_meeting)
        self.button_container_layout.addWidget(self.save_button)
        self.cancel_button = QPushButton("Cancel")
        self.cancel_button.clicked.connect(self.close)
        self.button_container_layout.addWidget(self.cancel_button)

        self.button_container_widget.setLayout(self.button_container_layout)
        self.main_layout.addWidget(self.button_container_widget)

        self.setLayout(self.main_layout)


    def add_meeting(self):
        info = {"OwnerID": self.user.id, # This is where to do the username lookup
                "Title":self.meeting_title_entry.text(),
                "ISOTime":self.when_entry.text(),
                "Location":self.where_entry.text()
        }
        meeting = MeetingsInfo(info)
        meeting.add_meeting()
        if self._add_attendees(meeting):
            pass
        self.close()

    def _add_attendees(self, meeting):
        valid = True
        raw_attendee_list = self.attendees_entry.text()
        #Parse this into a list of attendees, seperated by eiter semicolons or commas.
        pattern = re.compile("([a-zA-Z]+;?)")
        # Iterate through the list of attendees
        print(pattern.findall(raw_attendee_list))
```

```
            for string in pattern.findall(raw_attendee_list):

                if string[-1] == ";":
                    string = string[0:-1]
                try:
                    attendeeID = UsersInfo().get_uid_by_username(string)
                except IndexError:
                    print("[WARN] Username '{0}' not recognised".format(string))
                    attendeeID = 0
                    valid = False
                    # Show a warning dialog and prevent the form from completing.
                if attendeeID:
                    meeting.add_meeting_attendee(attendeeID)
            return valid

        def show_username_lookup(self):
            u = UsernameLookup(self)
            #u.show()
            #u.raise_()
            u.exec_()
# file - MainScreenGui_DiaryView.py - 143 lines
from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *

from MeetingWidget import *
from NewMeetingDialog import *
from Meetings import Meeting
from RespondToPendingRequestsDialog import *
from IndicatorBadge import *

class DiaryView(QWidget):
    def __init__(self, user = None):
        super().__init__()
        self.user = user
        print("[INFO] Created MainScreenGuiDiaryView")

        self.main_layout = QVBoxLayout()

        self.title = QLabel("Upcoming Meetings & Appointments")
        self.title.setFont(GTitleFont)

        self.main_layout.addWidget(self.title)

        self.middle_widget = QWidget()
        self.middle_layout = QHBoxLayout()

        # Define the left-side stuff
        self.left_side_widget = QWidget()
        self.left_side_layout = QVBoxLayout()

        self.meetings_widget = QWidget()
```

```
            self.meetings_layout = QVBoxLayout()

            # Start to do a slightly more indepth meetings code
            # Get meetings from the database
            # Enumerate these meetings
            # have an array of meetingss objects

            # #Get a list of meetings
            # self.meetings_list = MeetingsInfo(None).get_meetings_by_owner(user.id)
            # print("{0} Meeting(s) found.".format(len(self.meetings_list)))
            # self.meetings_widgets = []
            # for m in self.meetings_list:
            #     self.meetings_widgets.append(MeetingOverview(Meeting(meeting_id=m[0])))
            #     self.meetings_layout.addWidget(self.meetings_widgets[-1])

            self.meetings_widget.setLayout(self.meetings_layout)
            #self.meetings_widget.setMinimumSize(300, 700)


            self.meetings_container_widget = QScrollArea()
            self.meetings_container_widget.setWidget(self.meetings_widget)
            self.meetings_container_widget.setVerticalScrollBarPolicy(2)
            self.left_side_layout.addWidget(self.meetings_container_widget)

            self.left_side_widget.setLayout(self.left_side_layout)
            self.middle_layout.addWidget(self.left_side_widget)

            # End of left side
            # Define the right side stuff

            self.right_side_widget = QWidget()
            self.right_side_layout = QVBoxLayout()#

            # Right side widgets...
            self.button_container = QWidget()
            self.button_container_layout = QVBoxLayout()

            self.add_new_appointment_button = QPushButton("New Appointment")
            self.add_new_appointment_button.clicked.connect(self.display_new_meeting_dialog)
            self.button_container_layout.addWidget(self.add_new_appointment_button)

            # TODO: Add some kind of indicator to show the amound of unread pending
meetings

            self.response_container = QWidget()
            self.response_layout = QHBoxLayout()

            self.respond_to_pending_appointments_button = QPushButton("Respond to Pending
Appointments")

self.respond_to_pending_appointments_button.clicked.connect(self.display_respond_to_meetin
gs_dialog)
            self.respond_to_pending_appointments_button.setFixedHeight(30)
            self.response_layout.addWidget(self.respond_to_pending_appointments_button)
```

```
            self.pending_number =
Indicator(len(MeetingsInfo().get_outstanding_meetings(self.user.id)))
            self.response_layout.addWidget(self.pending_number)

            self.response_container.setLayout(self.response_layout)
            self.button_container_layout.addWidget(self.response_container)

            self.button_container.setLayout(self.button_container_layout)
            self.right_side_layout.addWidget(self.button_container)

            self.spacer1 = QLabel(" ")
            self.spacer1.setFixedHeight(270)
            self.right_side_layout.addWidget(self.spacer1)


            self.right_side_widget.setLayout(self.right_side_layout)
            self.middle_layout.addWidget(self.right_side_widget)

            self.middle_widget.setLayout(self.middle_layout)
            self.main_layout.addWidget(self.middle_widget)
            self.setLayout(self.main_layout)

            # Update the list of meetings
            self._update_meeting_list()


        def _update_meeting_list(self):

            # This needs to be re-written so it works.

            # Remove all widgets
            for index in range(self.meetings_layout.count()):
                self.meetings_layout.removeItem(self.meetings_layout.itemAt(index))
            self.meetings_layout.update()
            # Start to do a slightly more indepth meetings code
            # Get meetings from the database
            # Enumerate these meetings
            # have an array of meetingss objects

            #Get a list of meetings
            self.meetings_list = MeetingsInfo(None).get_meetings_by_owner(self.user.id)
            print("{0} Meeting(s) found.".format(len(self.meetings_list)))
            self.meetings_widgets = []
            for m in self.meetings_list:
                self.meetings_widgets.append(MeetingOverview(Meeting(meeting_id=m[0])))
                self.meetings_layout.addWidget(self.meetings_widgets[-1])
            self.meetings_layout.update()

self.pending_number.update(len(MeetingsInfo().get_outstanding_meetings(self.user.id)))



        def display_new_meeting_dialog(self):
```

```
            new_meeting_dialog = NewMeetingDialog(self.user)
            new_meeting_dialog.show()
            new_meeting_dialog.exec_()
            self._update_meeting_list()

        def display_respond_to_meetings_dialog(self):
            respond_to_meetings_dialog = RespondToPendingMeetingDialog(self.user)
            respond_to_meetings_dialog.exec_()
            self._update_meeting_list()
# file - GlobalResources.py - 16 lines
# Global resources

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from LoginAction import User

GTitleFont = QFont("Segoe UI Light", 24)
#GTitleFont.setHintingPreference(QFont.PreferFullHinting)
GTitleFont.setStyleStrategy(QFont.PreferAntialias)
GBodyFont = QFont("Segoe UI Light", 12)
GBodyFont.setStyleStrategy(QFont.PreferAntialias)
GSmallText = QFont("Segoe UI Light", 10)
GSmallText.setStyleStrategy(QFont.PreferAntialias)

# userinfo = User()
# file - LoginScreenGui.py - 178 lines
import sys

# import Qt depenencies
from PyQt4.QtCore import *
from PyQt4.QtGui import *

from MainScreenGui import *
from GlobalResources import *

from LoginAction import *
from DatabaseInit import *

class PasswordWarningDialog(QDialog):
    def __init__(self, errormsg="", buttonmsg="Dismiss"):
        super().__init__()
        self.setModal(True)
        print("[INFO] Created Password Warning Dialog")

        self.setWindowTitle("Access Denied")

        self.main_layout = QVBoxLayout()

        self.title = QLabel("Access Denied")
        self.title.setFont(GTitleFont)
        self.main_layout.addWidget(self.title)

        self.text = QLabel(errormsg)
```

```
            self.text.setFont(GBodyFont)
            self.main_layout.addWidget(self.text)

            self.dismiss_button = QPushButton(buttonmsg)
            self.dismiss_button.clicked.connect(lambda: self.close())
            self.main_layout.addWidget(self.dismiss_button)

            self.subtext = QLabel("If the problem persists, please contact the system
administrator.")
            self.subtext.setFont(GSmallText)
            self.main_layout.addWidget(self.subtext)

            self.setLayout(self.main_layout)

class LoginWindow(QDialog):
    def __init__(self):
            super().__init__()
            print("[INFO] Created Login window")

            self.setWindowTitle("[CMS] Login")

            self.main_title = QLabel("Welcome.")


            self.main_title.setFont(GTitleFont)

            # Create a labeled username feild:

            self.username_item = QWidget()

            self.username_layout = QHBoxLayout()


            self.username_label = QLabel("Username:")
            self.username_label.setFont(GBodyFont)
            self.username_label.setFixedWidth(150)

            self.username_input = QLineEdit()

            self.username_input.setWhatsThis("Enter your username here:")

            self.username_layout.addWidget(self.username_label)
            self.username_layout.addWidget(self.username_input)

            self.username_item.setLayout(self.username_layout)


            # Create a password feild

            self.password_item = QWidget()

            self.password_layout = QHBoxLayout()

            self.password_label = QLabel("Password:")
```

```
        self.password_label.setFont(GBodyFont)
        self.password_label.setFixedWidth(150)

        self.password_input = QLineEdit()
        self.password_input.setEchoMode(QLineEdit.Password)
        self.password_input.returnPressed.connect(self._enter_submit)

        self.password_input.setWhatsThis("Enter your password here")

        self.password_layout.addWidget(self.password_label)
        self.password_layout.addWidget(self.password_input)

        self.password_item.setLayout(self.password_layout)

        self.button_layout = QHBoxLayout()

        self.submit_button = QPushButton("Login")
        self.submit_button.clicked.connect(self.login_action)
        self.submit_button.setDefault(True)

        self.help_button = QPushButton("?")
        self.help_button.setFixedWidth(30)

        self.quit_button = QPushButton("Quit")

        self.button_layout.addWidget(self.submit_button)

        self.button_layout.addWidget(self.help_button)
        self.button_layout.addWidget(self.quit_button)

        # Add actions to the buttons within buttons_widget

        self.quit_button.clicked.connect(lambda: sys.exit(1))

        self.buttons_widget = QWidget()
        self.buttons_widget.setFixedWidth(300)
        self.buttons_widget.setLayout(self.button_layout)

        self.layout = QVBoxLayout()

        self.layout.addWidget(self.main_title)
        self.layout.addWidget(self.username_item)
        self.layout.addWidget(self.password_item)
        self.layout.addWidget(self.buttons_widget)

        self.setLayout(self.layout)
        self.setFont(GBodyFont)

        self.setFixedWidth(600)

    def _show_error_dialog(self, text="", button="Dismiss"):
        er = PasswordWarningDialog(text, button)
        er.show()
        er.raise_()
```

```
            er.exec_()

        def login_action(self, e = None):
            try:
                # Get  the user's id
                userid = UsersInfo().get_uid_by_username(self.username_input.text())

                # Create a User object with data related to the current userid
                user = User(userid) # User - class defined in LoginAction.py

                # If the hash of the input password does not match the stored hash
                if not user.password_hash_cmp(self.password_input.text()):

                    # Show the warning dialog
                    self._show_error_dialog("Password not recognised")
                    # End the execution of the function.
                    return 0

                else:

                    # Create and run an instance of the MainScreen GUI.
                    self.main_screen = MainScreen(user, self)
                    self.main_screen.show()
                    self.main_screen.raise_()

                    # Hide this window.
                    self.hide()

            # If the search for the useername does not return any results:
            except IndexError:
                self._show_error_dialog("Username not recognised")


        def reset(self):

            # Set both the input fields to ""
            self.password_input.setText("")
            self.username_input.setText("")


        # Event handler for pressing enter key.
        def _enter_submit(self, e = None):

            self.login_action(self)
    # file - MainScreenGui_ResourcesView.py - 83 lines
    from PyQt4.QtCore import *
    from PyQt4.QtGui import *

    from GlobalResources import *
    from DatabaseInit import ResourcesInfo
    from NewResourceDialog import *


    class ResourcesView(QWidget):
```

```
    def __init__(self, user):

        # `user` - reference to instance created in
        self.user = user
        super().__init__()

        print("[INFO] Created ResourcesView")

        self.main_layout = QVBoxLayout()

        self.title =  QLabel("Resources")
        self.title.setFont(GTitleFont)
        self.main_layout.addWidget(self.title)

        self.pane_container = QWidget()
        self.pane_container_layout = QHBoxLayout()

        self.left_pane_container = QWidget()
        self.left_pane_layout = QVBoxLayout()


        self.table = QTableWidget(3, 4)
        self.table.setHorizontalHeaderLabels(["Name", "Cost", "Quantity", "Quantity
Needed"])
        for col in range(4):
            self.table.setColumnWidth(col, 580/4)
        self.table.setFixedSize(601, 400)
        self.left_pane_layout.addWidget(self.table)
        self.update_table()
        # This is where I'll define the tabular view.
        # there also needs to be some code for getting sections of information
        # from the database - otherwise it won't work.

        self.left_pane_container.setLayout(self.left_pane_layout)
        self.pane_container_layout.addWidget(self.left_pane_container)
        self.right_pane_container = QWidget()
        self.right_pane_layout = QVBoxLayout()

        self.add_items_button = QPushButton("Add Resource")
        self.right_pane_layout.addWidget(self.add_items_button)
        self.add_items_button.clicked.connect(self._open_new_resource_dialog)
        self.edit_resource_button = QPushButton("Edit Resource")
        self.right_pane_layout.addWidget(self.edit_resource_button)
        self.view_urgent_requirements_button = QPushButton("View urgent requirements")
        self.right_pane_layout.addWidget(self.view_urgent_requirements_button)

        self.right_pane_container.setLayout(self.right_pane_layout)
        self.pane_container_layout.addWidget(self.right_pane_container)

        self.pane_container.setLayout(self.pane_container_layout)
        self.main_layout.addWidget(self.pane_container)


        self.setLayout(self.main_layout)
```

```
    def _open_new_resource_dialog(self):
        dg = NewResourceDialog(self.user)
        dg.show()
        dg.exec_()

    def update_table(self):
        self.table.clear()

        # Get information from database

        raw_data = ResourcesInfo().get_all_resources()

        # Table dimentions
        x_total = self.table.columnCount()
        y_total = len(raw_data)
        self.table.setRowCount(y_total)
        self.table.setHorizontalHeaderLabels(["Name", "Cost", "Quantity", "Quantity
Needed"])
        for x in range(x_total):
            for y in range(y_total):
                self.table.setItem(y, x, QTableWidgetItem(str(raw_data[y][x+1])))
# file - compile.py - 87 lines
# PyPackager - a simple utility designed to compile and decompile a set of
# python files.

# Program stages
# Iterate through a python file, searching for import statements
# get the module name from those statements and check if it's in the
# module's directory
# open that file & find repeat the process

# once a list of filenames (&paths)  has been collected,
# open the files
# remove whitespace and comments
# (maybe) rename the variables to one or two character names
# write the squashed code to a (binary?) file or database ready for
# extraction

import os, sys
import re as regex

def parse_file(file_data, filenames_set):
        pattern = regex.compile("from +[a-zA-Z\_]* import +[a-zA-Z\*]*\n")
        for string in pattern.findall(file_data):
                filename = string[string.find(" ")+1:string.find(" ", string.find(" ")+1)]+".py"
                filenames_set.add(filename)
                parse_file(open(filename).read(), filenames_set)
                del filename
        pattern = regex.compile("import +[a-zA-Z\_]*\n")
        for string in pattern.findall(file_data):
                # find all the instances where the user uses import not from
                # whatever import class
                # This will also include all the imports of builtin classes
```

```
                    # so we're going to have to do some error handling! yay
                    filename = string[string.find(" ")+1:-1]+".py"
                    try:
                            open(filename)
                            filenames_set.add(filename)
                            parse_file(open(filename).read(), filenames_set)
                    except FileNotFoundError:
                            pass
def squash_file(filename):
        # returns a string of the squashed file
        f = open(filename)
        lines = f.readlines()
        f.close()
        outlines = ['@@@{0}@@@\n'.format(filename)]
        for l in lines:
                tmpl = l.strip()
                if tmpl == "":
                        pass
                elif tmpl[0] == "#":
                        pass
                else:
                        outlines+=l
        return "".join(outlines)
def conjoin_files(filenames_set):
        # returns a string of the conjoined file
        outfiles = []
        for f in filenames_set:
                outfiles.append(squash_file(f))
        return "\n".join(outfiles)

def unconjoin_files(conjoined_file_data):
        # creates a directory containing the various files that have been squashed
        inlines = conjoined_file_data.split("\n")
        startline, endline, alternator = 0, 0, False

        outfiles = []
        startlines = []

        for index, line in enumerate(inlines):
                if line[:3] == "@@@":
                        filename = line[3:line.find("@@@", 4)]
                        startlines.append(index)

        print("len slines:", len(startlines))
print(squash_file("main.py"))
#Testing stuff
filenames_set = {"main.py"}
f = open("main.py")
parse_file(f.read(), filenames_set)
print(filenames_set)
print(len(filenames_set))
for f in filenames_set:
        print(f)
c = conjoin_files(filenames_set)
```

```
print(c, file=open("allc.py", "w"))
unconjoin_files(c)
# file - main.py - 38 lines
#! /usr/bin/env python3
# import core depenencies
import sys, time, random

# import Qt depenencies
from PyQt4.QtCore import *
from PyQt4.QtGui import *

# import custom classes
from LoginScreenGui import LoginWindow
from DatabaseInit import UsersInfo


# Main Program

def main():

    print("[INFO] System Startup")

    print("[INFO] Initiate UsersInfo database table")
    u = UsersInfo()

    application = QApplication(sys.argv)
    login_window = LoginWindow()


    login_window.show()
    login_window.raise_()

    application.exec_()


    print("[INFO] Execution complete")


if __name__ == "__main__":
    # Launch the application.
    main()
# file - MainScreenGui_UserAdminView.py - 85 lines
from PyQt4.QtCore import *
from PyQt4.QtGui import *

from LoginAction import User
from GlobalResources import *

from ChangePasswordDialog import *

class UserOverview(QGroupBox):
    def __init__(self, user):
        self.user = user
        super().__init__()
```

```
            self.layout = QVBoxLayout()

            self.username_label = QLabel(user.info["Name"])
            self.username_label.setFont(GTitleFont)
            self.layout.addWidget(self.username_label)
            # Maybe add an image to represent the user's privelleges

            self.priv_label = QLabel("Standard User")
            self.priv_label.setFont(GSmallText)
            self.layout.addWidget(self.priv_label)

            self.control_bar = QWidget()
            self.controls_layout = QHBoxLayout()

            #Controls:
            # self.rename_button = QPushButton("Change Name")
            # self.controls_layout.addWidget(self.rename_button)
            # self.rename_button.setDisabled(not self.user.permissions["ChangeOwnData"])

            self.change_password_button = QPushButton("Change Password")
            self.controls_layout.addWidget(self.change_password_button)
            self.change_password_button.clicked.connect(self._show_change_password_window)
            self.change_password_button.setDisabled(not
self.user.permissions["ChangeOwnData"])
            print(not self.user.permissions["ChangeOwnData"])
            print(self.user.permissions)

            self.control_bar.setLayout(self.controls_layout)
            self.control_bar.setFixedWidth(300)
            self.control_bar.setFont(GSmallText)
            self.layout.addWidget(self.control_bar)

            self.setLayout(self.layout)
            self.setFixedHeight(160)
            self.setTitle("Me")

        def _show_change_password_window(self):
            pwdwindow = ChangePasswordDialog(self.user)

            pwdwindow.show()
            pwdwindow.exec_()

class UserAdminView(QWidget):
        def __init__(self, user):
            self.user = user
            super().__init__()

            print("[INFO] Created MainScreenGuiUserAdminView")


            self.master_layout = QVBoxLayout()

            self.this_user_header =  UserOverview(self.user)
```

```
            self.master_layout.addWidget(self.this_user_header)

            # Add the admin controls - which will either be hidden or disabled for the users without
            # the proper privellages

            self.admin_tools = QGroupBox()
            self.admin_tools.setTitle("Administrative Tools") #Set this to change depending on if the thing is locked or not
            self.admin_tools_layout = QVBoxLayout()

            # Show a scrollable list of the UserOverview(s) for all the registered users, and add management
            # tools, eg "Delete User", "Add new user"

            # It miggh be a good idea to wait until the card updating system is sorted.
            self.admin_tools.setLayout(self.admin_tools_layout)

            self.master_layout.addWidget(self.admin_tools)

            self.admin_tools.setFont(GBodyFont)

            self.setLayout(self.master_layout)
# file - MainScreenGui.py - 104 lines
# Copyright (c) 2015 Peter East All Rights Reserved.

import sys

from PyQt4.QtCore import *
from PyQt4.QtGui import *

# Import custom classes for this project

try:
    from MainScreenGui_DiaryView import *
    from MainScreenGui_TaskView import *
    from MainScreenGui_ResourcesView import *
    from MainScreenGui_UserAdminView import *
    from GlobalResources import *
except ImportError:
    print("[ERROR] Error loading modules")
    sys.exit(-1)



# Requires seperate widgets for each view in the tabbed layout
class MainScreen(QMainWindow):
    def __init__(self, user=None, parent=None):
        self.user = user
        self.parent = parent
        super().__init__()
        print("[INFO] Created MainScreenGui")

        self.setWindowTitle("[CMS] Main View")
```

```
        self.main_layout = QVBoxLayout()

        self.central_widget = QWidget()
        # Define the topbar
        self.topbar = QWidget()

        self.topbar_layout = QHBoxLayout()

        self.tb_help_button = QPushButton("?")
        self.tb_help_button.setFixedWidth(30)


        # Create a spacer to keep the thing spaced out
        self.tb_spacer = QLabel("  ")
        self.tb_spacer.setFixedWidth(600)

        self.tb_logout_button = QPushButton("Logout")
        self.tb_logout_button.setFixedWidth(100)
        self.tb_logout_button.clicked.connect(self._logout)

        self.topbar_layout.addWidget(self.tb_help_button)
        self.topbar_layout.addWidget(self.tb_spacer)
        self.topbar_layout.addWidget(self.tb_logout_button)

        self.topbar.setLayout(self.topbar_layout)

        # End of the topobar widget
        self.main_layout.addWidget(self.topbar)

        # Finish defining the topbar
        self.view_switcher = QTabWidget()

        # Define the views for the view_switcher
        # Diary View
        if self.user.permissions["Meetings"]:
            self.diary_view = DiaryView(self.user)
            self.view_switcher.addTab(self.diary_view, "Planner")
        # Task View
        if self.user.permissions["Tasks"]:
            self.task_view = TaskView(self.user)
            self.view_switcher.addTab(self.task_view, "Tasks")

        # Resources view
        if self.user.permissions["Resources"]:
            self.resources_view = ResourcesView(self.user)
            self.view_switcher.addTab(self.resources_view, "Resources")


        # User Admin View
        if self.user.permissions["ChangeOwnData"] or self.user.permissions["Admin"]:
            self.user_admin_view = UserAdminView(self.user)
            self.view_switcher.addTab(self.user_admin_view, "User Admin")
```

```
            # finish defining the view switcher


            self.view_switcher.setFont(GBodyFont)

            # End the definitions for the view swtich
            # Add the task view to the window
            self.main_layout.addWidget(self.view_switcher)


            # Fill in the window
            self.central_widget.setLayout(self.main_layout)
            self.setCentralWidget(self.central_widget)

        def _logout(self):
            self.user = None
            self.close()
            self.parent.show()
            self.parent.reset()
# file - DatabaseInit.py - 166 lines
# DatabaseInit
# main program

#This tidies all of the SQL queries into another namespace.
import SqlDictionary
import random
import hashlib
import sqlite3

def gen_pw_hash(password):
    phash = hashlib.md5()
    phash.update(bytes(password, "UTF-8"))
    return phash.hexdigest()

class Database:
    """This is the general database wrapper that I'll use throughout the system"""
    def __init__(self, child, database_name="cmsdb.db"):
        #print("[INFO] Created database object")

        self.db_name = database_name

    def _connect_and_execute(self, sql="", database_name=None):
        #print(sql)
        if database_name == None:
            database_name = self.db_name

        with sqlite3.connect(self.db_name) as dbcon:
            cursor = dbcon.cursor()
            cursor.execute(sql)
            results = cursor.fetchall()

        #print("[INFO] Executed SQL query \"{0}\"".format(sql))
        return results
```

```
class ResourcesInfo(Database):
	def __init__(self):
		super().__init__(self)
		self.create_table()

	def create_table(self):
		self._connect_and_execute(SqlDictionary.CREATE_RESOURCES)

	def get_all_resources(self):
		return self._connect_and_execute(SqlDictionary.GET_ALL_RESOURCES)

	def add_resources(self):
		pass


class UsersInfo(Database):
	def __init__(self, uid = 0):
		super().__init__(self)
		self.create_table()

	# NB: all input MUST be sanitized at this point.
	def create_table(self):
		self._connect_and_execute(SqlDictionary.CREATE_USERS)
		self._create_initial_admin_user()

	def _create_initial_admin_user(self):
		# This is to create an initial administrative user in case something happens to the
database
		pwd = "".join([chr(random.choice(range(ord('A'), ord('z')))) for c in range(10)])

		new_user_info = {"Name":"ADMIN - TMP", "Username":"default_admin", "Password":
gen_pw_hash(pwd), "Permissions": 29}

		if len(self.get_all_users("WHERE(Username = 'default_admin')")) == 0:
			print("[INFO] Empty users table detected, adding default user...")
			self.add_user(new_user_info)
			print("[INFO] Default user added,\n\tUsername: 'default_admin'\n\tPassword:
'{0}'".format(pwd))

	def get_all_users(self, condition = ""): # Add a SQL condition? maybe? TODO: refactor
this bit
		return self._connect_and_execute(SqlDictionary.GET_ALL_USERS.format(condition))

	def get_uid_by_username(self, username=""):
		return self._connect_and_execute((SqlDictionary.GET_USER_ID.format(username)))
[0][0]

	def get_username_by_uid(self, uid=None):
		return
self._connect_and_execute(SqlDictionary.GET_USERNAME_BY_UID.format(uid))[0][0]

	def add_user(self, info):
```

```
            #info follows the format {"SQL value":Data value}
            values = "'{0}', '{1}', '{2}', {3}".format(info["Name"], info["Username"],
info["Password"], info["Permissions"])

            return self._connect_and_execute(SqlDictionary.ADD_USER.format(values))

        def update_user_password(self, password, uid):
            sql = SqlDictionary.UPDATE_PASSWORD.format("'{0}'".format(password), uid)
            return self._connect_and_execute(sql)


class TasksInfo(Database):

        def __init__(self):
            super().__init__(self)
            self.create_table()

        def create_table(self):
            self._connect_and_execute(SqlDictionary.CREATE_TASKS)
            self._connect_and_execute(SqlDictionary.CREATE_TASKATTENDEE)

        def get_info_by_id(self, task_id):
            sql = SqlDictionary.GET_TASK.format("WHERE (TaskID = {0})".format(task_id))
            raw = self._connect_and_execute(sql)[0]
            return {"TaskID":raw[0], "Title":raw[1], "Description":raw[2], "OwnerID":raw[3],
"Attendees":raw[4]}

        def get_ids_by_owner(self, owner_id):
            sql = SqlDictionary.GET_TASK_ID_LIST.format("WHERE Owner =
{0}".format(owner_id))
            output_ids = []
            for row in self._connect_and_execute(sql):
                output_ids.append(row[0])
            return output_ids

        def add_task(self, info):
            SQL_DATA = """'{0}', '{1}', {2}, {3}""".format(info["Title"], info["Description"],
info["OwnerID"], info["Attendees"])
            self._connect_and_execute(SqlDictionary.ADD_TASK.format(SQL_DATA))



class MeetingsInfo(Database):
        def __init__(self, meeting_info = None):
            super().__init__(self)
            self.create_table()
            self.meeting_info = meeting_info
            self.id = None

        def create_table(self):
            self._connect_and_execute(SqlDictionary.CREATE_MEETINGS)
            self._connect_and_execute(SqlDictionary.CREATE_MEETINGS_ATTENEDEES)

        def add_meeting(self):
```

```
            SQL_DATA = "{0}, '{1}', '{2}', '{3}'".format(self.meeting_info["OwnerID"],
                  self.meeting_info["Title"],
                  self.meeting_info["ISOTime"],
                  self.meeting_info["Location"])
            self._connect_and_execute(SqlDictionary.ADD_MEETING.format(SQL_DATA)) #TODO
Sort out the formatting.
            self.id = self._connect_and_execute("SELECT Max(MeetingID) FROM Meetings;")[0][0]

      def get_meeting_info(self):
            sql_condition = "WHERE (MeetingID = {0})".format(self.meeting_info['MeetingID'])
            q = SqlDictionary.GET_MEETING.format(sql_condition)
            results = self._connect_and_execute(q)
            return results[0]

      def add_meeting_attendee(self, user_id):
            sql_values = """{0}, {1}, 0""".format(self.id, user_id)
            return
self._connect_and_execute(SqlDictionary.ADD_MEETING_ATTENDEE.format(sql_values))


      def get_meetings_by_owner(self, OwnerID):
            sql_condition = "WHERE (OwnerID = {0})".format(OwnerID)
            q = SqlDictionary.GET_MEETING_ID_LIST.format(sql_condition)
            return self._connect_and_execute(q)

      def get_outstanding_meetings(self, OwnerID):
            results =
self._connect_and_execute(SqlDictionary.GET_OUTSTANDING_MEETINGS_TO_BE_ATTENDED.for
mat(OwnerID))
            return results

      def get_meeting_attendees(self, MeetingID):
            return
self._connect_and_execute(SqlDictionary.GET_MEETING_ATTENDEES.format(MeetingID))

      def respond_to_attendance_request(self, attending, MeetingID, UserID):
            if attending:
                  self._connect_and_execute(SqlDictionary.ACCEPT_MEETING.format("UserID =
{0} AND MeetingID = {1}".format(UserID, MeetingID)))
            else:
                  self._connect_and_execute(SqlDictionary.REJECT_MEETING.format("UserID =
{0} AND MeetingID = {1}".format(UserID, MeetingID)))
# file - IndicatorBadge.py - 40 lines
# Indicator Badge -  a PyQt widget to display a numerical indicator Badge

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *

class Indicator(QFrame):
      def __init__(self, value = 0):
            super().__init__()
            self.value = value
```

```
            self.main_layout = QVBoxLayout()

            self.value_display = QLabel(str(self.value))

            self.main_layout.addWidget(self.value_display)

            self.setFixedHeight(30)
            #self.setFixedWidth(30)
            self.colour = QColor(255, 61, 0)

            self.setStyleSheet("QFrame {background-color: %s;  border-radius: 15; background-
clip: margin;}" % self.colour.name())

            self.text_colour = QColor(0xFF, 0xFF, 0xFF)

            self.value_display.setStyleSheet("QLabel {color: %s }" % self.text_colour.name())

            self.setFrameStyle(QFrame.StyledPanel + QFrame.Plain)
            self.setLayout(self.main_layout)

      def update(self, new_value):

            self.value = new_value

            self.value_display.setText(str(self.value))

            # do some cool stuff here :-)
      def getValue(self):
            return int(self.value)
# file - MainScreenGui_TaskView.py - 92 lines
from PyQt4.QtCore import *
from PyQt4.QtGui import *

from NewTaskDialog import *

from GlobalResources import *
from DatabaseInit import *
from Tasks import *

class TaskView(QWidget):
      def __init__(self, user = None):
            super().__init__()
            self.user = user

            self.main_layout = QVBoxLayout()


            self.title = QLabel("Outstanding Tasks")
            self.title.setFont(GTitleFont)

            self.main_layout.addWidget(self.title)

            # Set up the two-pane view
```

```
        self.pane_container = QWidget()
        self.pane_layout = QHBoxLayout()

        # Left side
        self.left_widget = QWidget()
        self.left_layout = QVBoxLayout()
        ##Task list

        self.task_list_view = QListView()

        self.update_task_list()


        self.left_layout.addWidget(self.task_list_view)
        self.left_widget.setLayout(self.left_layout)

        self.pane_layout.addWidget(self.left_widget)
        # End Left pane
        # Start right pane

        self.right_widget = QWidget()
        self.right_layout = QVBoxLayout()

        self.add_new_task_button = QPushButton("Add new Task")
        self.add_new_task_button.setFixedWidth(150)
        self.add_new_task_button.clicked.connect(self.display_new_task_dialog)
        self.right_layout.addWidget(self.add_new_task_button)

        self.spacer = QLabel(" ")
        self.spacer.setFixedHeight(300)
        self.right_layout.addWidget(self.spacer)

        self.right_widget.setLayout(self.right_layout)
        self.pane_layout.addWidget(self.right_widget)
        # End right pane


        self.pane_container.setLayout(self.pane_layout)
        self.main_layout.addWidget(self.pane_container)

        self.setLayout(self.main_layout)

    def display_new_task_dialog(self):
        new_task_dialog = NewTaskDialog(self.user)

        new_task_dialog.exec_()
        self.update_task_list()

    def update_task_list(self):

        # Make it so that when the item is clicked, and the check box is

        print("[INFO] Updating task list... ")
```

```
            # Add some data from the database
            data = QStandardItemModel()

            #Database fetch example
            ids = TasksInfo().get_ids_by_owner(self.user.id)
            print("[INFO] {0} Tasks found for user id: {0}".format(len(ids), self.user.id))
            self.tasks = []
            for taskID in ids:
                self.tasks.append(Task(databaseid=taskID))

                tmp = QStandardItem(self.tasks[-1].text)
                tmp.setCheckable(True)
                data.appendRow(tmp)
            self.task_list_view.setModel(data)
            print("[INFO] Task view update successful")
# file - Tasks.py - 25 lines
# This one's for taking the data out of the database

from DatabaseInit import TasksInfo

class Task:
    def __init__(self, title="", subtitle="", priority=1, databaseid=None):
            self.text = ""
            if databaseid == None:
                self.title = title
                self.priority = priority
                self.subtitle = subtitle
                self.text  = self.title + "\n  " + self.subtitle
            else:
                self.info = TasksInfo().get_info_by_id(databaseid)
                self.text = self.info["Title"] +"\n  "+self.info["Description"]
                # TODO: The tasks are gonna need a due date and priority in the database so
that
                # the listings can be ordered by priority.
                pass

    def load_task_from_database(self, taskid):
            pass

    def complete(self):
            self.title+= " [Done]"
            self.priority = -1
# file - ChangePasswordDialog.py - 135 lines
# The dialog for changing a user's password

from PyQt4 import QtCore
from PyQt4 import QtGui

from DatabaseInit import UsersInfo
from GlobalResources import *

class _PWErrorDialog(QDialog): #Blank error dialog
    def __init__(self):
            super().__init__()
```

```
            self.setWindowTitle("Error")
            self.layout = QVBoxLayout()
            self.title = QLabel("Password Error")
            self.title.setFont(GTitleFont)
            self.layout.addWidget(self.title)
            self.label = QLabel("")
            self.layout.addWidget(self.label)

            self.setLayout(self.layout)

class _PWMismatchErrorDialog(_PWErrorDialog):
    def __init__(self):
            super().__init__()
            self.label.setText("New passwords do not match, try again")

class _PWCurrentIncorrectError(_PWErrorDialog):
    def __init__(self):
            super().__init__()
            self.label.setText("You password is incorrect")


class ChangePasswordDialog(QDialog):
    def __init__(self, user):
            super().__init__()

            INPUT_WIDTH = 400
            LABEL_WIDTH = 200

            self.user = user

            self.setWindowTitle("Change your password")

            self.layout = QVBoxLayout()

            self.title = QLabel("Change your password")
            self.title.setFont(GTitleFont)
            self.layout.addWidget(self.title)

            self.pw_current_container = QWidget()
            self.pw_current_entry = QLineEdit()
            self.pw_current_entry.setFixedWidth(INPUT_WIDTH)
            self.pw_current_entry_label = QLabel("Enter your current password:")
            self.pw_current_entry_label.setFixedWidth(LABEL_WIDTH)
            self.pw_current_entry.setEchoMode(QLineEdit.Password)

            self.pw_container_layout = QHBoxLayout()
            self.pw_container_layout.addWidget(self.pw_current_entry_label)
            self.pw_container_layout.addWidget(self.pw_current_entry)

            self.pw_current_container.setLayout(self.pw_container_layout)
            self.layout.addWidget(self.pw_current_container)

            self.new_pw_container = QWidget()
            self.new_pw_label = QLabel("Enter your new password:")
```

```
        self.new_pw_label.setFixedWidth(LABEL_WIDTH)
        self.new_pw_entry = QLineEdit()
        self.new_pw_entry.setFixedWidth(INPUT_WIDTH)
        self.new_pw_entry.setEchoMode(QLineEdit.Password)

        self.new_pw_layout = QHBoxLayout()
        self.new_pw_layout.addWidget(self.new_pw_label)
        self.new_pw_layout.addWidget(self.new_pw_entry)

        self.new_pw_container.setLayout(self.new_pw_layout)
        self.layout.addWidget(self.new_pw_container)

        self.confirm_pw_container = QWidget()
        self.confirm_pw_label = QLabel("Confirm your new password:")
        self.confirm_pw_label.setFixedWidth(LABEL_WIDTH)
        self.confirm_pw_entry = QLineEdit()
        self.confirm_pw_entry.setFixedWidth(INPUT_WIDTH)
        self.confirm_pw_entry.setEchoMode(QLineEdit.Password)
        self.confirm_pw_entry.returnPressed.connect(self._pwchange_action)

        self.confirm_pw_layout = QHBoxLayout()
        self.confirm_pw_layout.addWidget(self.confirm_pw_label)
        self.confirm_pw_layout.addWidget(self.confirm_pw_entry)

        self.confirm_pw_container.setLayout(self.confirm_pw_layout)
        self.layout.addWidget(self.confirm_pw_container)

        self.button_container = QWidget()
        self.button_container_layout = QHBoxLayout()
        self.accept_button = QPushButton("Accept")
        self.accept_button.clicked.connect(self._pwchange_action)
        self.button_container_layout.addWidget(self.accept_button)

        self.reject_button = QPushButton("Cancel")
        self.reject_button.clicked.connect(lambda: self.close())
        self.button_container_layout.addWidget(self.reject_button)

        self.button_container.setLayout(self.button_container_layout)
        self.layout.addWidget(self.button_container)

        self.setFont(GBodyFont)

        self.setLayout(self.layout)

    def _pwchange_action(self):
        # Generate password hash
        # Get password hash from the database
        # Compare the two
        # if correct, update the database entry for the password
        # should be easy

        # Check that the pw entry and the pwconfirm are equal

        passwords_the_same = self.confirm_pw_entry.text() == self.new_pw_entry.text()
```

```
            current_pw_correct = self.user.password_hash_cmp(self.pw_current_entry.text())

            if passwords_the_same and current_pw_correct:
                UsersInfo().update_user_password(User.gen_pw_hash(None,
self.new_pw_entry.text()), self.user.id)
                self.close()
                # Proceed to change the password
                print("[DEBUG] Passwords changed successfully
(ChangePasswordDialog.py:126)")
            elif not passwords_the_same and current_pw_correct:
                e = _PWMismatchErrorDialog()
                e.show()
                e.exec_()
                # Display a messagebox explaining wtf is wrong.
            else:
                e = _PWCurrentIncorrectError()
                e.show()
                e.exec_()
# file - MeetingWidget.py - 103 lines
# Meeting overview widget

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *
from Meetings import Meeting
from DatabaseInit import UsersInfo, MeetingsInfo
#from Meetings import *

class MeetingOverview(QFrame):
    def __init__(self, meeting):
        """
        Should take a Meeting object as a parameter rather than passing all of the individual
parameters in.
        """
        super().__init__()
        self.meeting = meeting
        self.layout = QVBoxLayout()

        self.setFrameStyle(QFrame.StyledPanel + QFrame.Sunken)

        # Define the widgets

        self.title = QLabel(meeting.title)
        self.title.setFont(GTitleFont)
        self.layout.addWidget(self.title)

        self.place_title = QLabel("At: "+meeting.place)
        self.layout.addWidget(self.place_title)

        self.when_title = QLabel(meeting.when)
        self.layout.addWidget(self.when_title)

        self.owner_label = QLabel()
```

```
            self.layout.addWidget(self.owner_label)

            self.attendees_title = QLabel("Attendees:")
            self.layout.addWidget(self.attendees_title)

            self.attendees_list = []
            for index, person in enumerate(meeting.attendees):
                self.attendees_title.setText(self.attendees_title.text()+"\n"+person)

            #self.setMinimumHeight(100)
            self.buttons_widget = QWidget()
            self.buttons_layout = QHBoxLayout()

            self.delete_button = QPushButton("Delete")
            self.buttons_layout.addWidget(self.delete_button)

            self.edit_button = QPushButton("Edit")
            self.edit_button.setFixedWidth(150)
            self.buttons_layout.addWidget(self.edit_button)

            self.buttons_widget.setLayout(self.buttons_layout)
            self.layout.addWidget(self.buttons_widget)
            self.setLayout(self.layout)
            self.setMinimumSize(400, 200)

        def _edit_button_action(self):
            #Create a NewMeetingDialog with the information from this meeting
            pass


class PendingMeetingOverview(MeetingOverview):
        def __init__(self, meeting, user):
            super().__init__(meeting)
            self.meeting = meeting
            self.user = user
            # Get the owner's name
            owner_name = UsersInfo().get_username_by_uid(meeting.info["OwnerID"])
            self.owner_label.setText("From: {0}".format(owner_name))

            self.edit_button.setText("Respond - Confirm")
            self.edit_button.clicked.connect(self._accept_meeting)

            self.deny_button = QPushButton("Respond - Deny")
            self.deny_button.clicked.connect(self._reject_meeting)
            self.deny_button.setFixedWidth(150)
            self.buttons_layout.addWidget(self.deny_button)

        def _accept_meeting(self):
            MeetingsInfo().respond_to_attendance_request(True, self.meeting.meeting_id,
self.user.id)
            print("[INFO] Meeting accepted")

        def _reject_meeting(self):
            MeetingsInfo().respond_to_attendance_request(False, self.meeting.meeting_id,
```

```
self.user.id)
            print("[INFO] Meeting Rejected")

class PleaseSelectMeetingPlaceholder(QFrame):
    def __init__(self, empty = False):
            super().__init__()
            self.layout = QHBoxLayout()

            if not empty:
                self.label = QLabel("Please select\na meeting")
            else:
                self.label = QLabel("You have no\nnew meetings")
            self.label.setFont(GTitleFont)
            self.layout.addWidget(self.label)
            self.setLayout(self.layout)
            self.setFixedWidth(300)

# file - RespondToPendingRequestsDialog.py - 80 lines
# Respond to meeting requests

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *
from Meetings import Meeting
from MeetingWidget import *
from DatabaseInit import MeetingsInfo


class RespondToPendingMeetingDialog(QDialog):
    def __init__(self, user):
            self.user = user
            super().__init__()

            #Respond to meeting request,
            # two panes, one for a list of pending meetings,
            # another for a tools and controls to deal with those
            # pending meetings
            self.setWindowTitle("Respond to Pending Requests")
            self.main_layout = QVBoxLayout()

            self.title = QLabel("Respond to Pending Requests")
            self.title.setFont(GTitleFont)
            self.main_layout.addWidget(self.title)

            self.pane_container = QWidget()
            self.pane_container_layout = QHBoxLayout()
            self.left_pane = QWidget()
            self.left_pane_layout = QVBoxLayout()

            self.meetings_list_view = QListView()
            self.meetings_list_view.clicked.connect(self._switch_right_stack)

            # End of 'following code'
```

```
            self.left_pane_layout.addWidget(self.meetings_list_view)


            self.left_pane.setLayout(self.left_pane_layout)

            self.right_pane = QWidget()
            self.right_pane_layout = QStackedLayout()

            self.meeting_view =
PleaseSelectMeetingPlaceholder(len(MeetingsInfo({}).get_meetings_by_owner(self.user.id))==
0)
            self.right_pane_layout.addWidget(self.meeting_view)
            self.update_pending_meeting_list()

            self.right_pane.setLayout(self.right_pane_layout)
            self.pane_container_layout.addWidget(self.left_pane)
            self.pane_container_layout.addWidget(self.right_pane)
            self.pane_container.setLayout(self.pane_container_layout)
            self.main_layout.addWidget(self.pane_container)


            self.setLayout(self.main_layout)

        def update_pending_meeting_list(self):
            print("[INFO] Updating list of pending appointments")

            self.data = QStandardItemModel()

            ids = MeetingsInfo().get_outstanding_meetings(self.user.id)
            print("[INFO] {0} meetings found for user id: {1}".format(len(ids), self.user.id))

            self.meetings = []
            for meetingID in ids:
                self.meetings.append(Meeting(meeting_id=meetingID[0]))
                meeting = self.meetings[-1]
                self.right_pane_layout.addWidget(PendingMeetingOverview(meeting, self.user))
                tmp =
QStandardItem(meeting.title+"\n"+meeting.place+"\n"+meeting.when+"\n")
                tmp.setCheckable(False)
                self.data.appendRow(tmp)
            self.meetings_list_view.setModel(self.data)

            # Use a QStackedLayout to have the stack of meeting widgets

        def _switch_right_stack(self):
            index = self.meetings_list_view.selectedIndexes()[0].row()
            self.right_pane_layout.setCurrentIndex(index+1)
# file - LoginAction.py - 81 lines
#Login action:
#   The code and database actions performed when the user attempts to log into the system.

import hashlib

from DatabaseInit import *
```

```
import SqlDictionary

class User:
    def __init__(self, uid=0):
        self.info = {} # info to be retrieved from the database
        self.permissions = {}
        self.user_id = uid

        self.dbinterface = UsersInfo()

        self.update_user_info()

    def gen_pw_hash(self, password):
        # Create a md5 hash of the password
        phash = hashlib.md5()
        # (Encode the password - the python md5 implementation  only accepts binary
data.)
        phash.update(bytes(password, "UTF-8"))
        # return a hexadecimal representation of the md5 hash.
        return phash.hexdigest()

    def password_hash_cmp(self, password_input):
        currenthash = self.info["Password"]
        return currenthash == self.gen_pw_hash(password_input)

    def add_user(self, info=None):

        # If there's no info input, use the existing info for this instance of the
        # class.
        if info == None:
            info = self.info

        # Use the database module to add the user's info to the database.
        UsersInfo().add_user(info)

    def update_user_info(self):
        # get the first item in the list of users which have the UserID of
        # `self.user_id` (the length of the list should be 1)
        raw_info = self.dbinterface.get_all_users("WHERE(UserID =
{0})".format(self.user_id))[0]

        # raw_info follows the format [id, Name, Username, Password, Permissions]
        # put the indidual parts of the raw data into a python dictionary
        self.info["UserID"] =  self.user_id
        self.info["Name"] = raw_info[1]
        self.info["Username"] = raw_info[2]
        self.info["Password"] =  raw_info[3]
        self.info["Permissions"] = raw_info[4]

        # Generate the permissions array for this user.
        self.gen_permissions()
        self.id = self.info["UserID"]

    def gen_permissions(self):
```

```
            # Get the denary integer value for the user's permissions
            perm = self.info["Permissions"]

            # Create a list of the default values for the user's permissions
            blist = [False, False, False, False, False]

            # For each item in a list of the individual binary digits
            # The python `bin` function outputs a string in the format '0b10101'
            # which is why we need to get rid of the first two characters
            for index, digit in enumerate(bin(int(perm))[2:]):
                # set each item in the b(inary)list as a python Bool so it can easily
                # be used in selection statements
                blist[index] = (bool(int(digit)))
            permissions = {}
            permissions["Meetings"] = blist[0]
            permissions["Tasks"] = blist[1]
            permissions["Resources"] = blist[2]
            permissions["ChangeOwnData"] = blist[3]
            permissions["Admin"] = blist[4]

            # Overwrite the existing permissions number with a dictionary.
            self.permissions = permissions
            return permissions
# file - SqlDictionary.py - 110 lines
# sql dictionary
# This file will contain all of the SQL references used throughout the system, with string
formatting already
# added

#initialisation scripts

CREATE_USERS = """CREATE TABLE IF NOT EXISTS Users
                    (UserID INTEGER PRIMARY KEY AUTOINCREMENT,
                    Name TEXT,
                    Username TEXT,
                    Password TEXT,
                    Permissions INTEGER
                    );
"""

#Permissions: Like unix file permissions but using denary instead of octal
# and there are 5 bits rather than several.
# eg 0b11010 - will give the user permission to use the meetings, tasks and user admin, and
not resources management or privac.

# time to design databases - NOW!

CREATE_MEETINGS = """CREATE TABLE IF NOT EXISTS Meetings
                    (MeetingID INTEGER PRIMARY KEY AUTOINCREMENT,
                    OwnerID INTEGER,
                    Title TEXT,
                    ISOTime TEXT,
                    Location TEXT
                    );
```

```
"""

CREATE_MEETINGS_ATTENEDEES = """CREATE TABLE IF NOT EXISTS MeetingAttendee(
      MeetingID INTEGER,
      UserID INTEGER,
      Confirmed BOOLEAN
);"""

CREATE_TASKS = """CREATE TABLE IF NOT EXISTS Tasks
                  (TaskID INTEGER PRIMARY KEY AUTOINCREMENT,
                  Title TEXT,
                  Description TEXT,
                  Owner INTEGER,
                  Attendees INTEGER
                  );"""

CREATE_TASKATTENDEE = """CREATE TABLE IF NOT EXISTS TaskAttendee
                  (
                  TaskId INTEGER,
                  UserId INTEGER
                  );
"""

CREATE_RESOURCES = """CREATE TABLE IF NOT EXISTS Resources
                  (ResourceID INTEGER PRIMARY KEY AUTOINCREMENT,
                  Name TEXT,
                  Cost INTEGER,
                  QuantityAvailable INTEGER,
                  QuantityRequired INTEGER
);
"""

# Users

GET_ALL_USERS = """ SELECT * FROM Users {0}; """

GET_USER_ID = """ SELECT UserID FROM Users WHERE (Username = '{0}');"""

ADD_USER = """INSERT INTO Users(Name, Username, Password, Permissions) VALUES({0});"""

UPDATE_PASSWORD = """UPDATE Users SET Password = {0} WHERE UserID = {1};"""

# Meetings

ADD_MEETING = """INSERT INTO Meetings(OwnerID, Title, ISOTime, Location) VALUES({0})"""

GET_MEETING = """SELECT * FROM Meetings {0};"""

GET_OUTSTANDING_MEETINGS_TO_BE_ATTENDED = """SELECT * FROM MeetingAttendee
WHERE (UserID = {0} AND Confirmed = 0);"""

GET_MEETING_ID_LIST = """SELECT MeetingID FROM Meetings {0};"""

ADD_MEETING_ATTENDEE = """INSERT INTO MeetingAttendee(MeetingID, UserID, Confirmed)
```

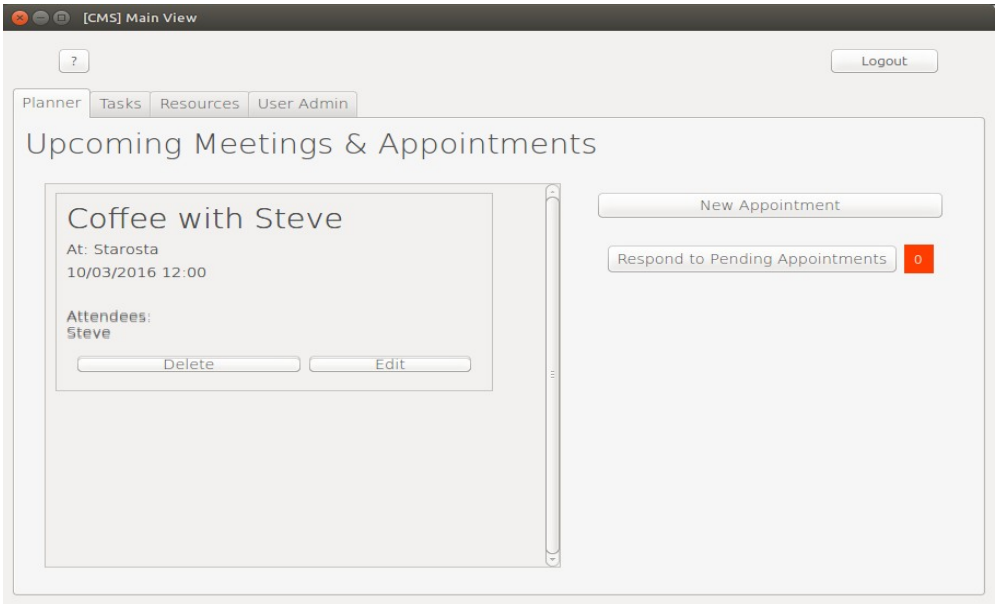
```
VALUES({0})"""

GET_MEETING_ATTENDEES = """SELECT UserID FROM MeetingAttendee WHERE (MeetingID =
{0})"""

ACCEPT_MEETING = """UPDATE MeetingAttendee SET Confirmed = 1 WHERE {0}"""

REJECT_MEETING = """UPDATE MeetingAttendee SET Confirmed = 0 WHERE {0}"""

DELETE_MEETING = """DELETE FROM MeetingAttendee WHERE {0}"""

# Tasks

GET_TASK = """SELECT * FROM Tasks {0};"""

GET_TASK_ID_LIST = "SELECT TaskID FROM Tasks {0};"""

ADD_TASK = """INSERT INTO Tasks(Title, Description, Owner, Attendees) VALUES({0});"""

GET_USERNAME_BY_UID = """SELECT Name FROM Users WHERE(UserID = {0})"""

# Resources

CREATE_RESOURCES = """CREATE TABLE IF NOT EXISTS Resources
                    (ResourceID INTEGER PRIMARY KEY AUTOINCREMENT,
                    ResourceName TEXT,
                    ResourceCost INTEGER,
                    ResourceQuantity INTEGER,
                    ResourceRequiredQuantity INTEGER);
                    """
GET_ALL_RESOURCES = """SELECT * FROM Resources;"""
# file - NewTaskDialog.py - 88 lines
# NewTaskDialogGui

from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *
from Tasks import *

from DatabaseInit import TasksInfo

class NewTaskDialog(QDialog):
    def __init__(self, user):
        self.user = user
        super().__init__()

        self.main_layout = QVBoxLayout()
        self.setWindowTitle("Add new task")
        self.smalltitle = QLabel("Create new task")
        self.smalltitle.setFont(GBodyFont)
        self.title = QLabel("New Task")
        self.title.setFont(GTitleFont)
```

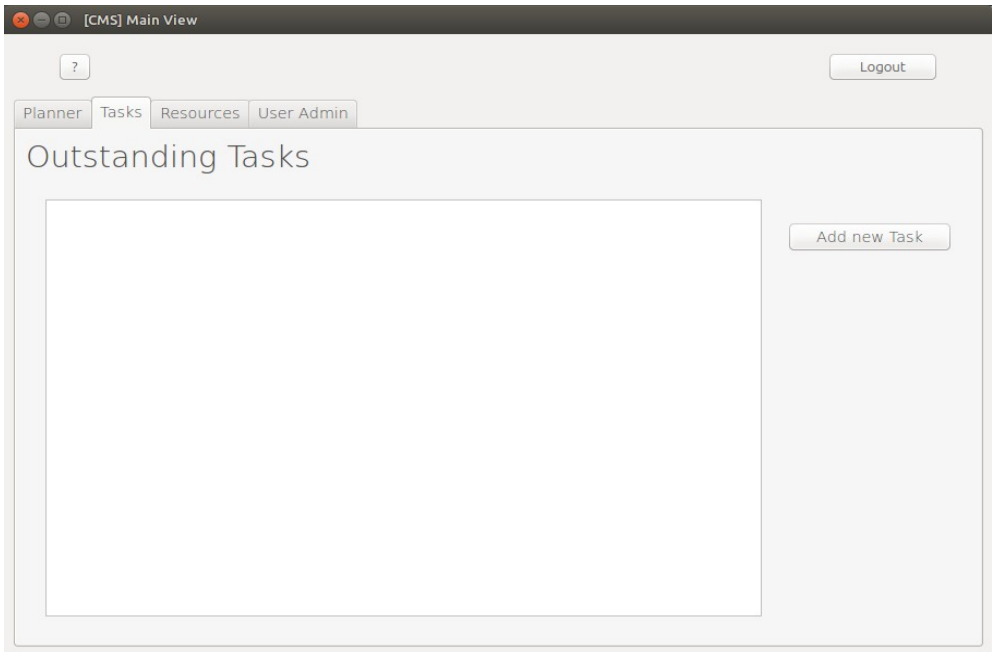
```
        self.main_layout.addWidget(self.smalltitle)
        self.main_layout.addWidget(self.title)

        self.title_entry_label = QLabel("Title:")
        self.main_layout.addWidget(self.title_entry_label)
        self.title_entry = QLineEdit("")
        self.title_entry.textChanged.connect(self.update_window_title)
        self.main_layout.addWidget(self.title_entry)

        #self.people_entry_label = QLabel("With whom:")
        #self.main_layout.addWidget(self.people_entry_label)

        #self.people_entry = QLineEdit()
        #self.people_entry.setPlaceholderText("Type usernames here")
        #self.people_entry.textChanged.connect(self.check_names)
        #self.main_layout.addWidget(self.people_entry)

        self.description_entry_label = QLabel("Description:")
        self.main_layout.addWidget(self.description_entry_label)

        self.description_entry = QLineEdit()
        self.main_layout.addWidget(self.description_entry)

        self.submit_button = QPushButton("Submit")
        self.submit_button.clicked.connect(self.submit)
        self.main_layout.addWidget(self.submit_button)

        self.setLayout(self.main_layout)
        self.setFont(GBodyFont)

    def update_window_title(self):
        newtext = self.title_entry.text()[0:45]
        if len(newtext) == 45:
            newtext += "..."
        if newtext == "":
            self.title.setText("New Task")
        else:
            self.title.setText(newtext)
        self.title_entry.setText(newtext)
        self.setWindowTitle(newtext)


        self.title_entry.setFixedWidth(self.title.width())

    def check_names(self):
        # Add some name checking functionality
        pass

    def validate(self):
        valid = True
        valid *= not (self.title_entry.text().strip() == "")
        # valid *= not (self.people_entry.text().strip() == "")
        valid *= not (self.description_entry.text().strip() == "")
```

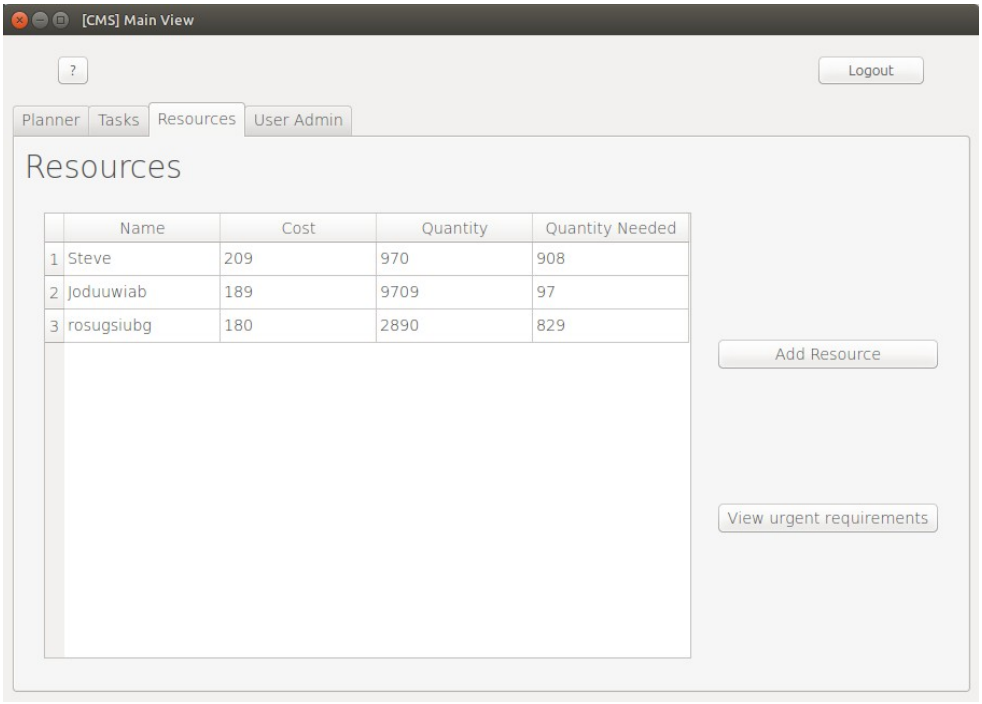
```
            return valid


        def submit(self):
            if self.validate():
                info = {"Title":self.title_entry.text(), "Description":self.description_entry.text(),
"OwnerID":self.user.id, "Attendees":""}
                TasksInfo().add_task(info)
                self.close()
            else:
                self.title_entry.setPlaceholderText("Required")
                #self.people_entry.setPlaceholderText("Required")
                self.description_entry.setPlaceholderText("Required")
# file - UsernameLookupDialog.py - 35 lines
from PyQt4.QtCore import *
from PyQt4.QtGui import *

from GlobalResources import *

from DatabaseInit import *

class UsernameLookup(QDialog):
    def __init__(self, parent):
        super().__init__()
        self.setWindowTitle("Select a user")

        self.raise_()
        self.parent = parent
        self.layout = QVBoxLayout()
        self.list = QListView()
        self.list.clicked.connect(self._select_user)
        self.users = UsersInfo().get_all_users()

        data = QStandardItemModel()

        for user in self.users:
            data.appendRow(QStandardItem(user[1]))

        self.list.setModel(data)

        self.layout.addWidget(self.list)
        self.setLayout(self.layout)

        # Get a list of names,
        # Onclick pass names down to the parent.
    def _select_user(self):
        user = self.users[self.list.selectedIndexes()[0].row()]
        self.parent.attendees_entry.setText(self.parent.attendees_entry.text()+",
{0}".format(user[2]))
        self.close()
```

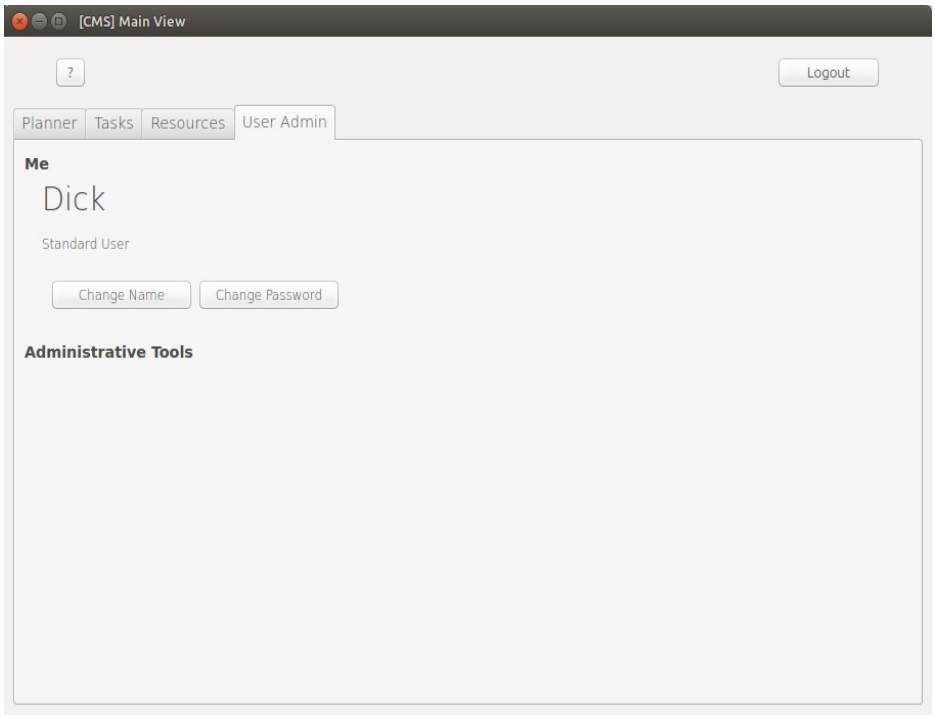
Testing Evidence

1.1



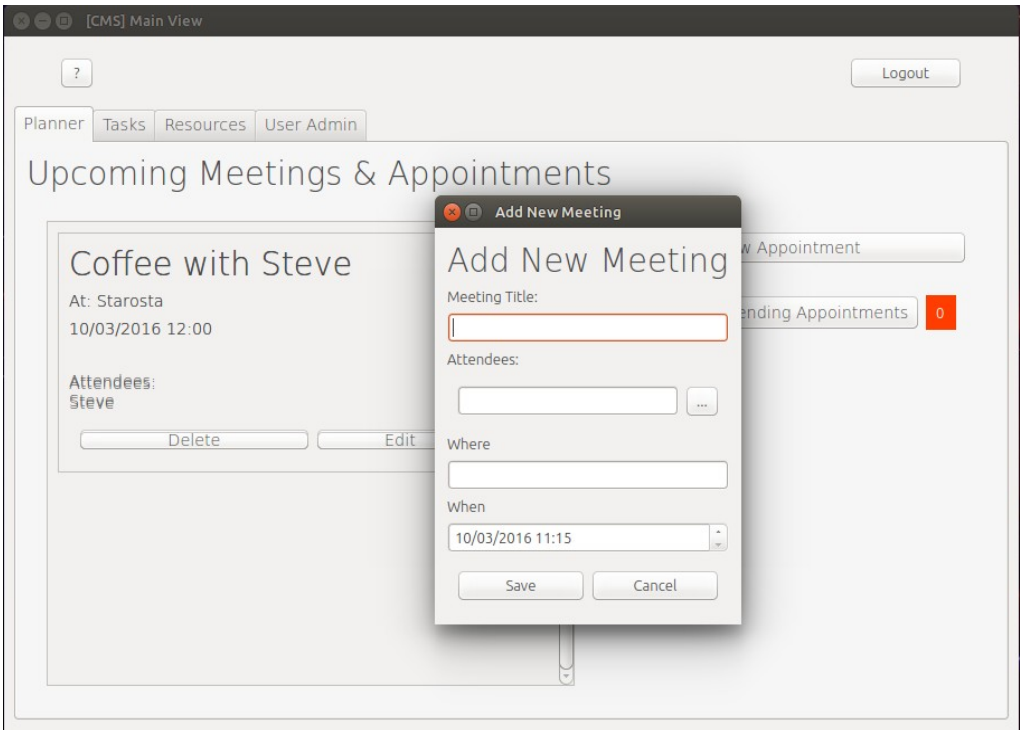




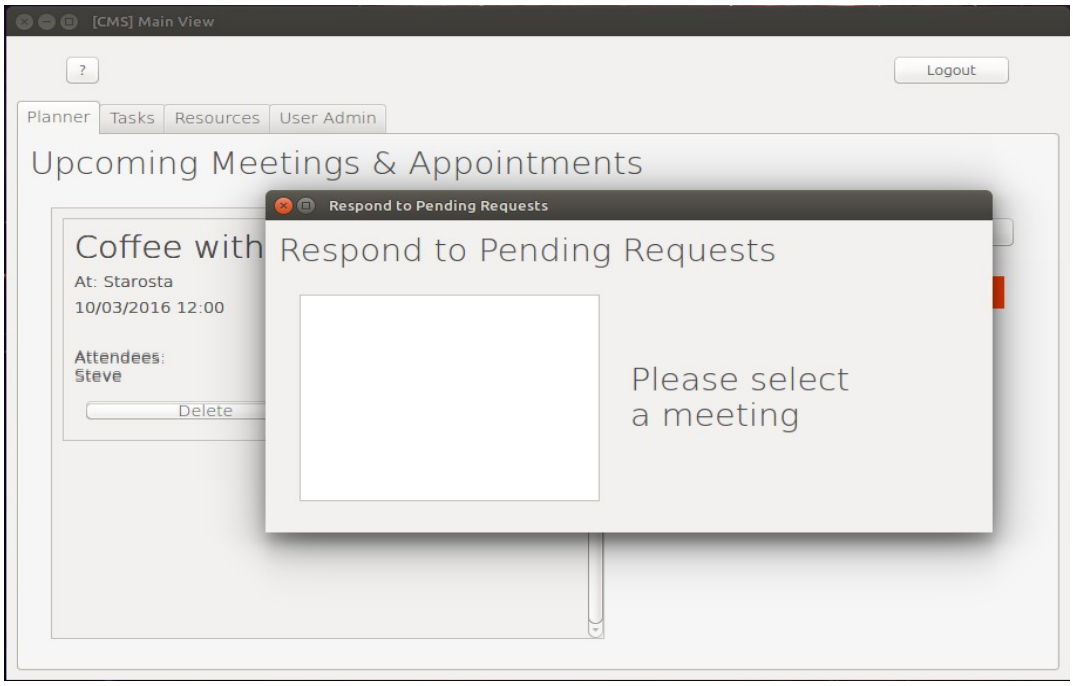


The tab changes when clicked.

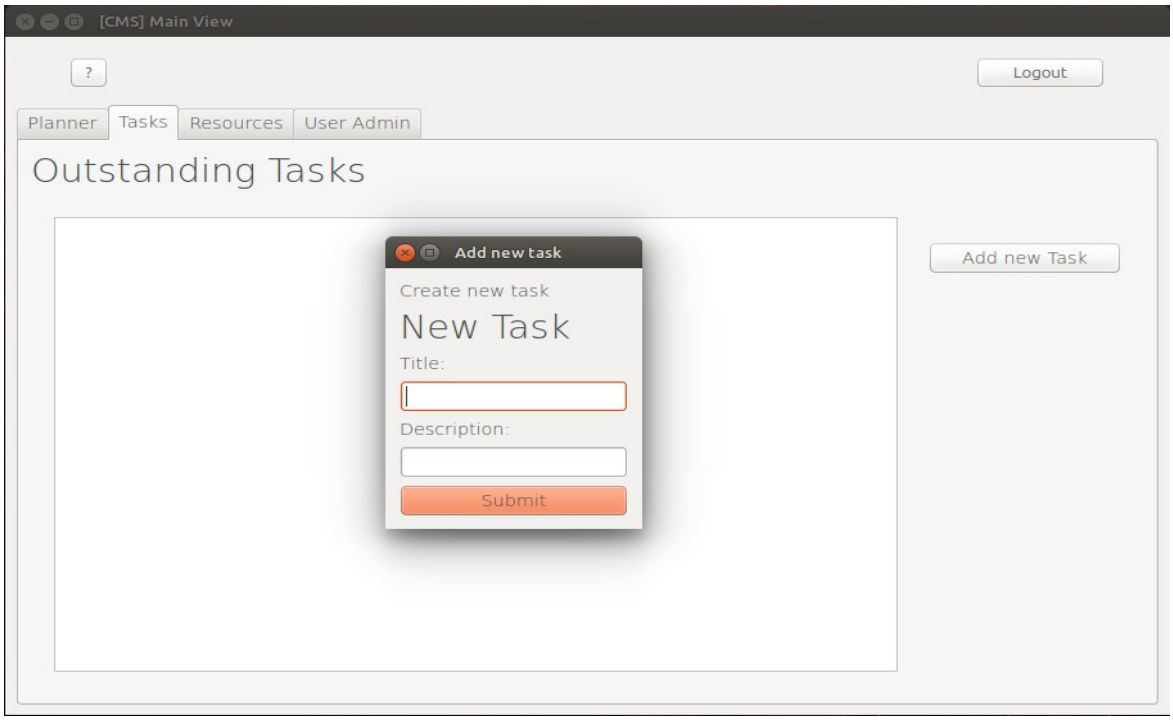
1.2


[CMS] Main View
?
Logout
Planner
Tasks
Resources
User Admin
Upcoming Meetings & Appointments
Coffee with Steve
At: Starosta
10/03/2016 12:00
Attendees:
Steve
Delete
Edit
Add New Meeting
Add New Meeting
Meeting Title:
Attendees:
...
Where
When
10/03/2016 11:15
Save
Cancel
Appointment
nding Appointments
0

1.3


[CMS] Main View
?
Logout
Planner
Tasks
Resources
User Admin
Upcoming Meetings & Appointments
Coffee with
At: Starosta
10/03/2016 12:00
Attendees:
Steve
Delete
Respond to Pending Requests
Respond to Pending Requests
Please select
a meeting

1.4

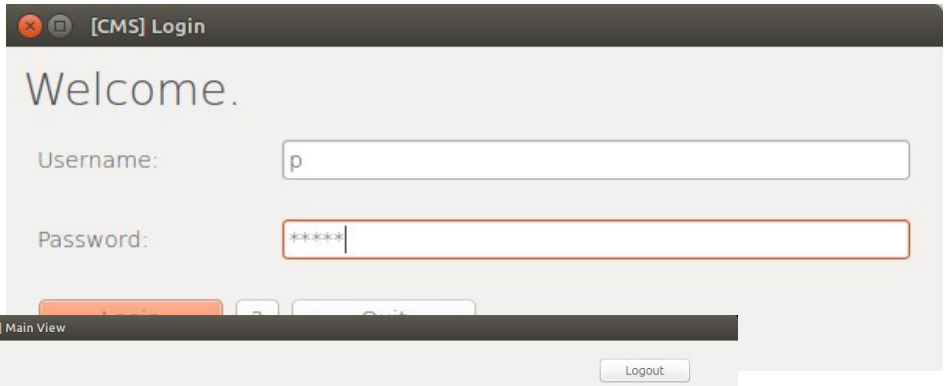


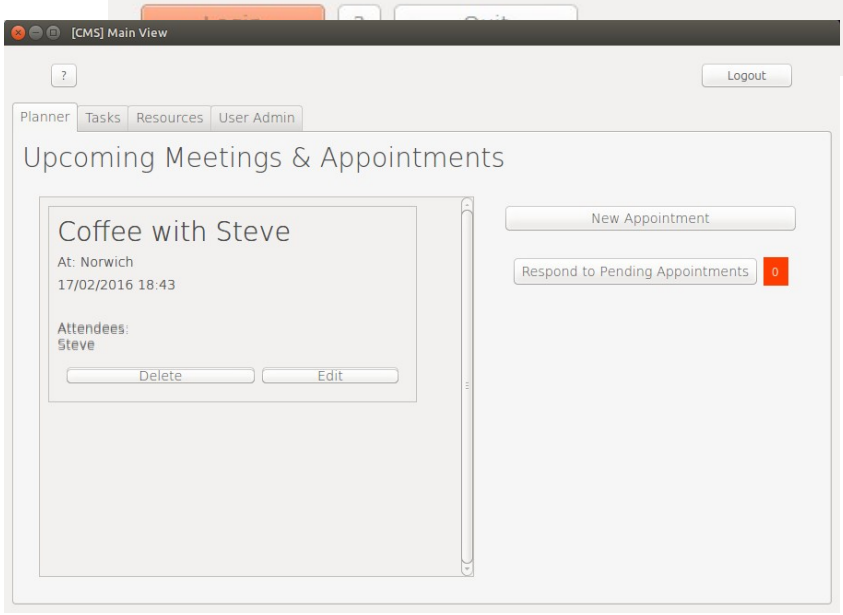
2.1.1

Input text:

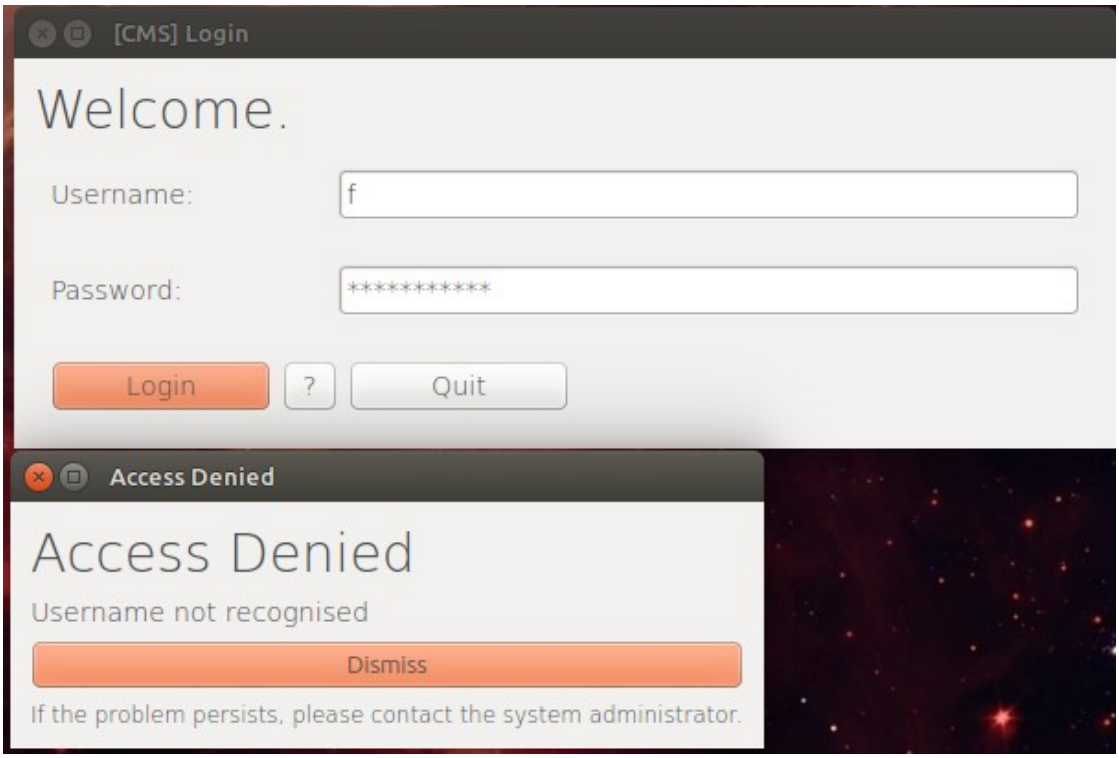
Username: “p”

Password: “hello”

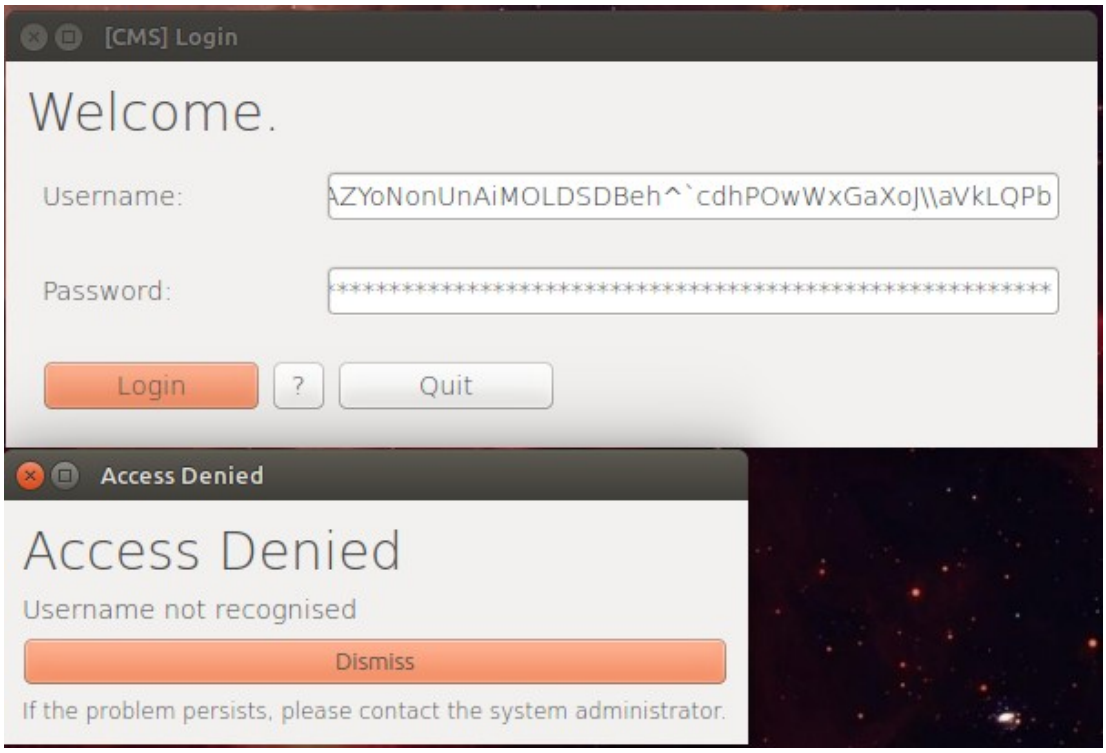




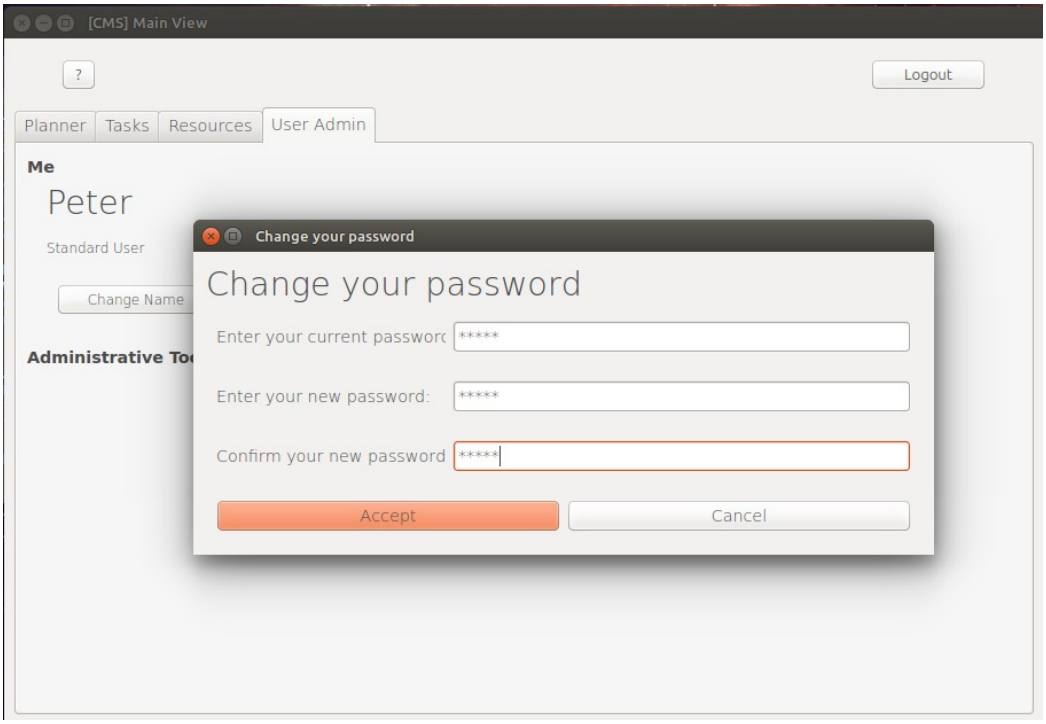
2.1.2

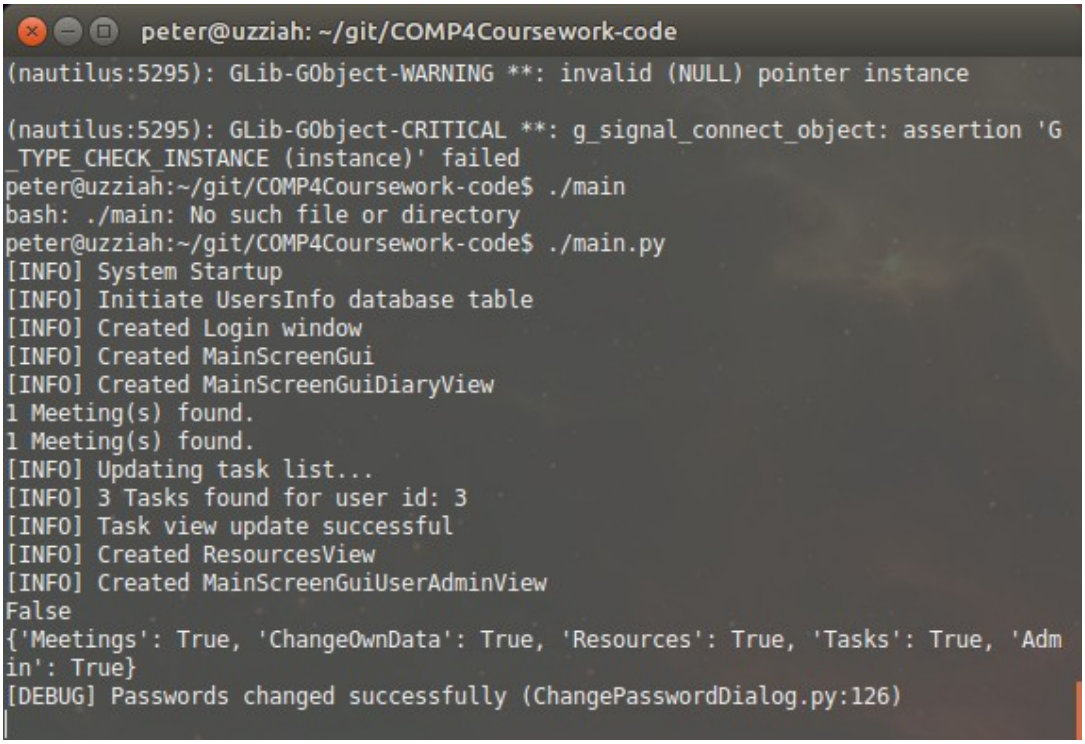

[CMS] Login
Welcome.
Username:
f
Password:
****
Login
?
Quit
Access Denied
Access Denied
Username not recognised
Dismiss
If the problem persists, please contact the system administrator.

2.1.3

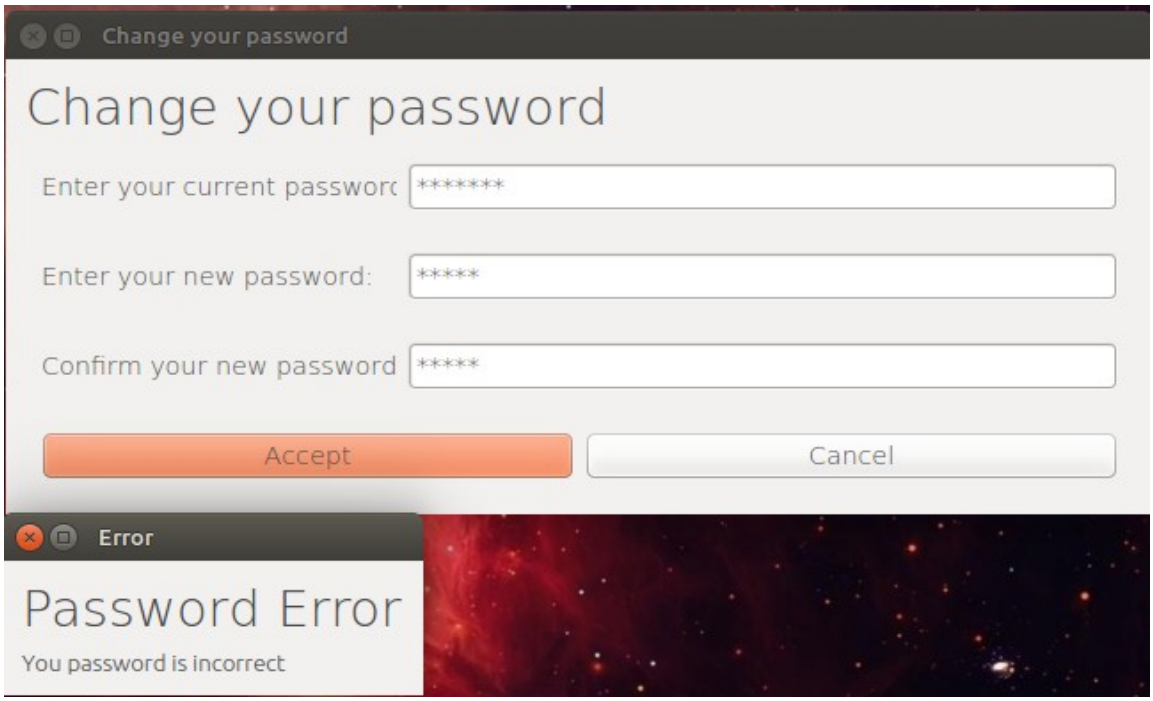

[CMS] Login
Welcome.
Username:
AZYoNonUnAiMOLDSDBeh^`cdhPOwWxGaXoJ\\aVkLQPb
Password:
Login
?
Quit
Access Denied
Access Denied
Username not recognised
Dismiss
If the problem persists, please contact the system administrator.

2.2.1

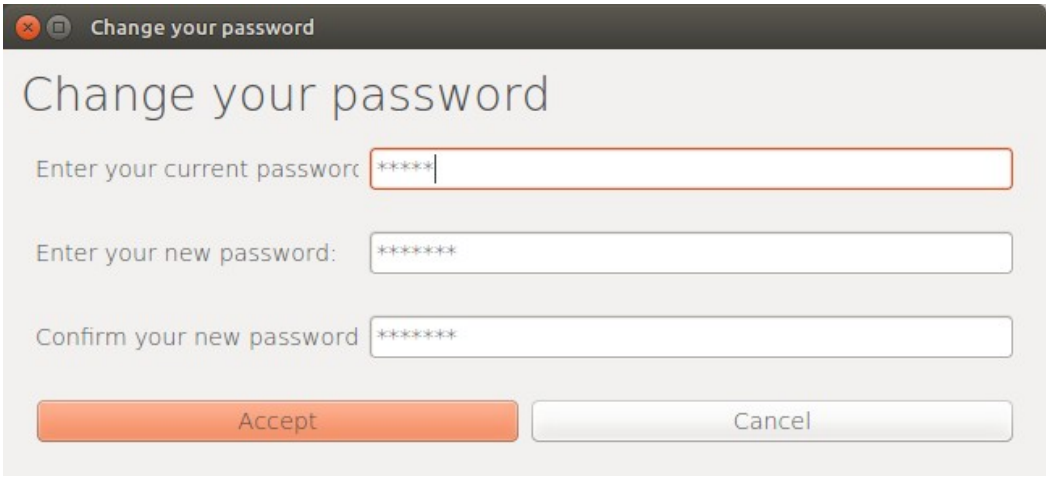

[CMS] Main View
?
Logout
Planner
Tasks
Resources
User Admin
Me
Peter
Standard User
Change Name
Administrative To
Change your password
Change your password
Enter your current passwor
Enter your new password:
Confirm your new password
Accept
Cancel


peter@uzziah: ~/git/COMP4Coursework-code
(nautilus:5295): GLib-GObject-WARNING **: invalid (NULL) pointer instance
(nautilus:5295): GLib-GObject-CRITICAL **: g_signal_connect_object: assertion 'G
_TYPE_CHECK_INSTANCE (instance)' failed
peter@uzziah:~/git/COMP4Coursework-code$ ./main
bash: ./main: No such file or directory
peter@uzziah:~/git/COMP4Coursework-code$ ./main.py
[INFO] System Startup
[INFO] Initiate UsersInfo database table
[INFO] Created Login window
[INFO] Created MainScreenGui
[INFO] Created MainScreenGuiDiaryView
1 Meeting(s) found.
1 Meeting(s) found.
[INFO] Updating task list...
[INFO] 3 Tasks found for user id: 3
[INFO] Task view update successful
[INFO] Created ResourcesView
[INFO] Created MainScreenGuiUserAdminView
False
{'Meetings': True, 'ChangeOwnData': True, 'Resources': True, 'Tasks': True, 'Adm
in': True}
[DEBUG] Passwords changed successfully (ChangePasswordDialog.py:126)

2.2.2

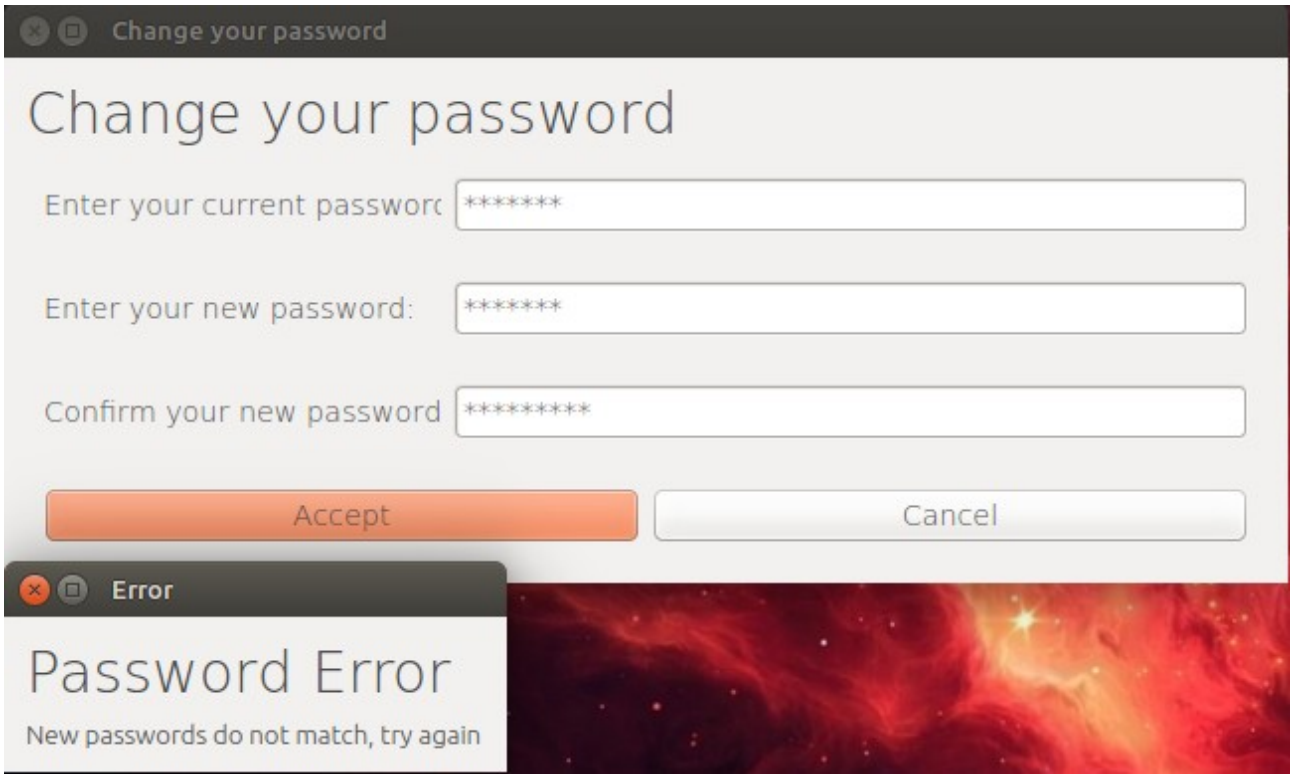

Change your password
Change your password
Enter your current passwor
Enter your new password:
Confirm your new password
Accept
Cancel
Error
Password Error
You password is incorrect

2.3.1




```
1 Meeting(s) found.
[INFO] Updating task list...
[INFO] 3 Tasks found for user id: 3
[INFO] Task view update successful
[INFO] Created ResourcesView
[INFO] Created MainScreenGuiUserAdminView
False
{'Resources': True, 'Meetings': True, 'Tasks': True, 'ChangeOwnData': True, 'Adm
in': True}
[DEBUG] Passwords changed successfully (ChangePasswordDialog.py:126)
```

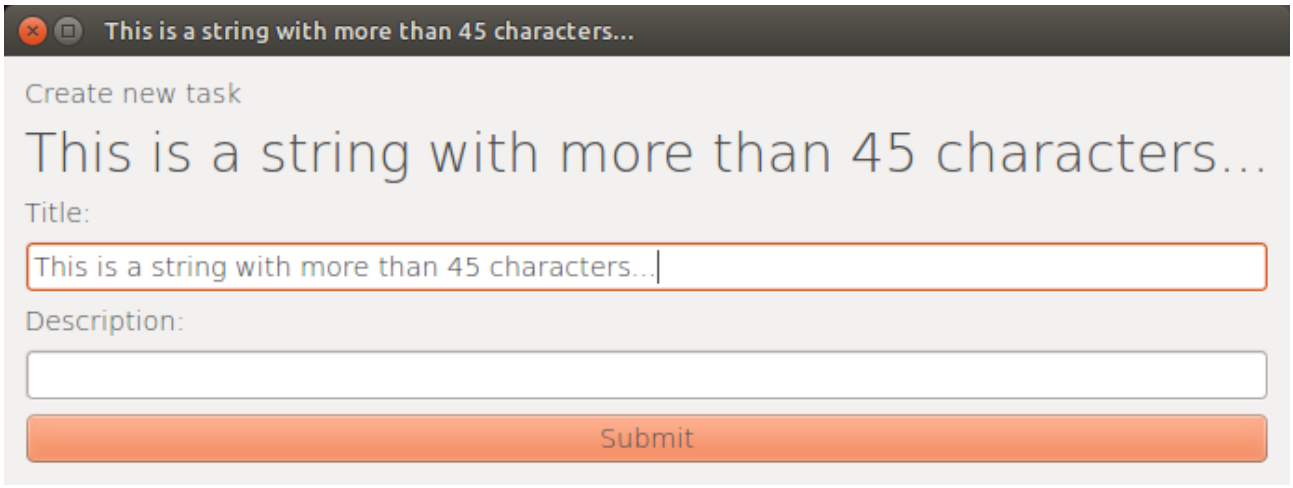
2.3.2


Change your password
Change your password
Enter your current passworc
****
Enter your new password:
****
Confirm your new password
****
Accept
Cancel
Error
Password Error
New passwords do not match, try again

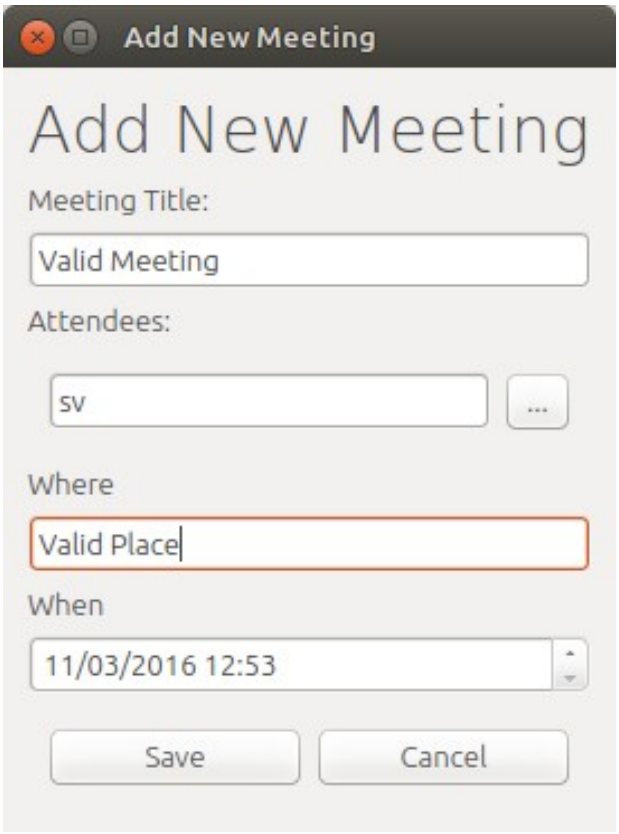
2.4.1

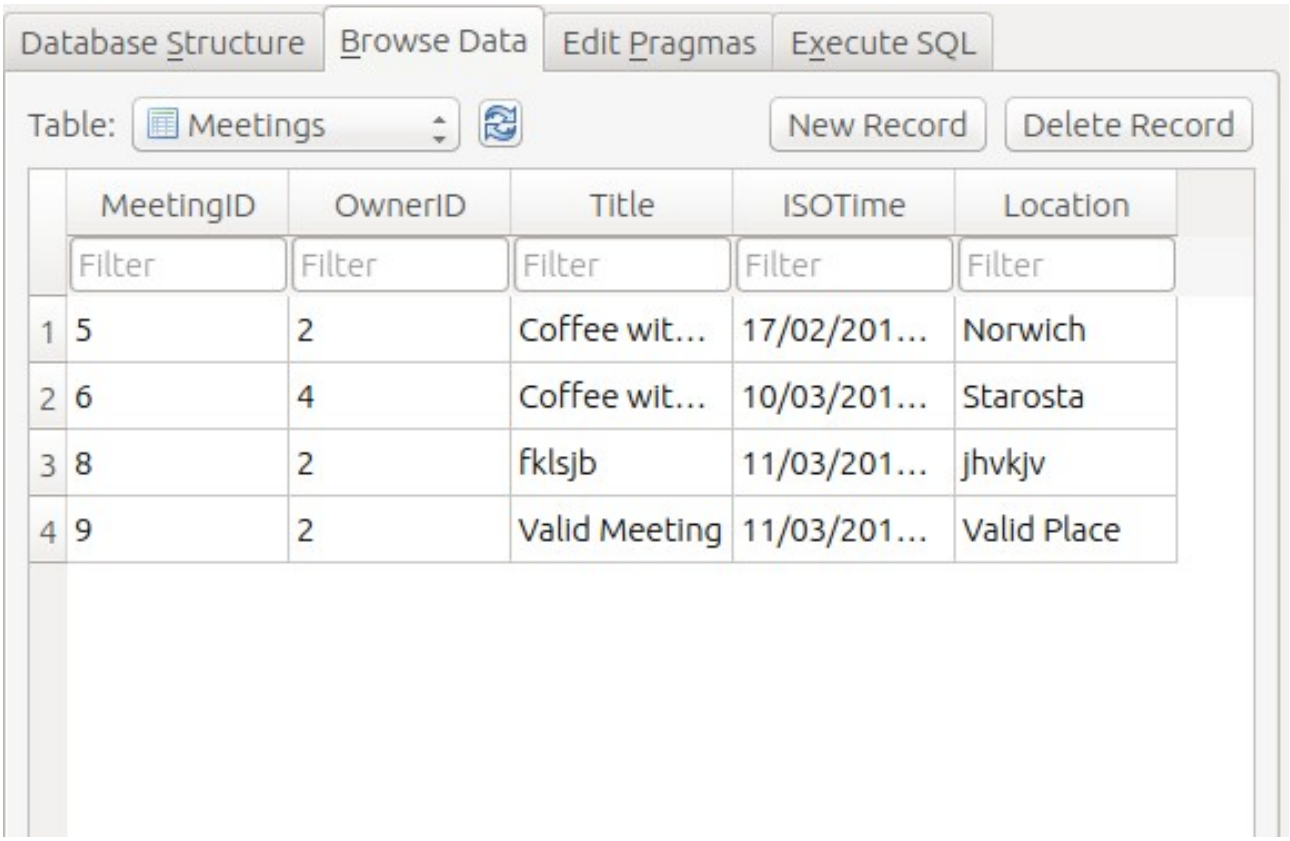

This is a string with less than 45 chars
Create new task
This is a string with less than 45 chars
Title:
This is a string with less than 45 chars
Description:
Submit

2.4.2


This is a string with more than 45 characters...
Create new task
This is a string with more than 45 characters...
Title:
This is a string with more than 45 characters...
Description:
Submit

2.5.1


Add New Meeting
Add New Meeting
Meeting Title:
Valid Meeting
Attendees:
sv
...
Where
Valid Place
When
11/03/2016 12:53
Save
Cancel

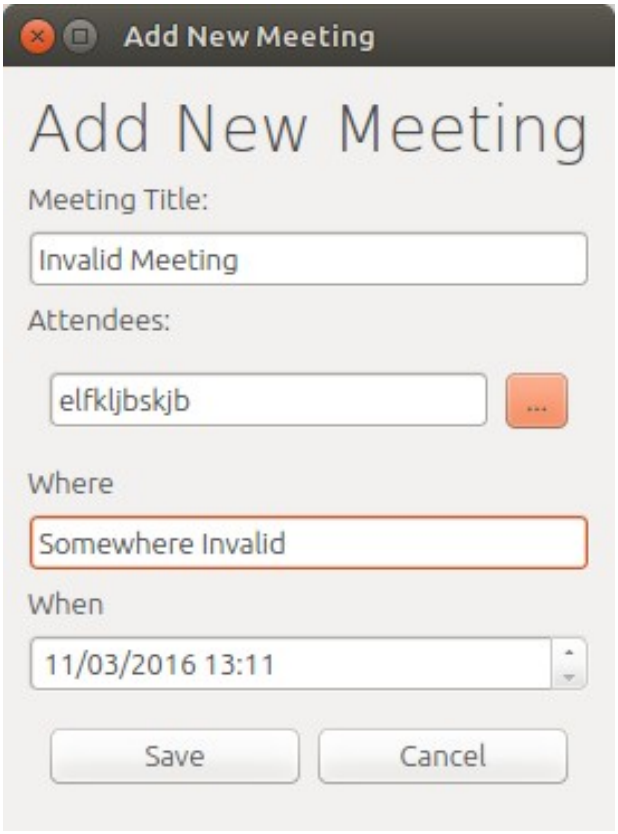


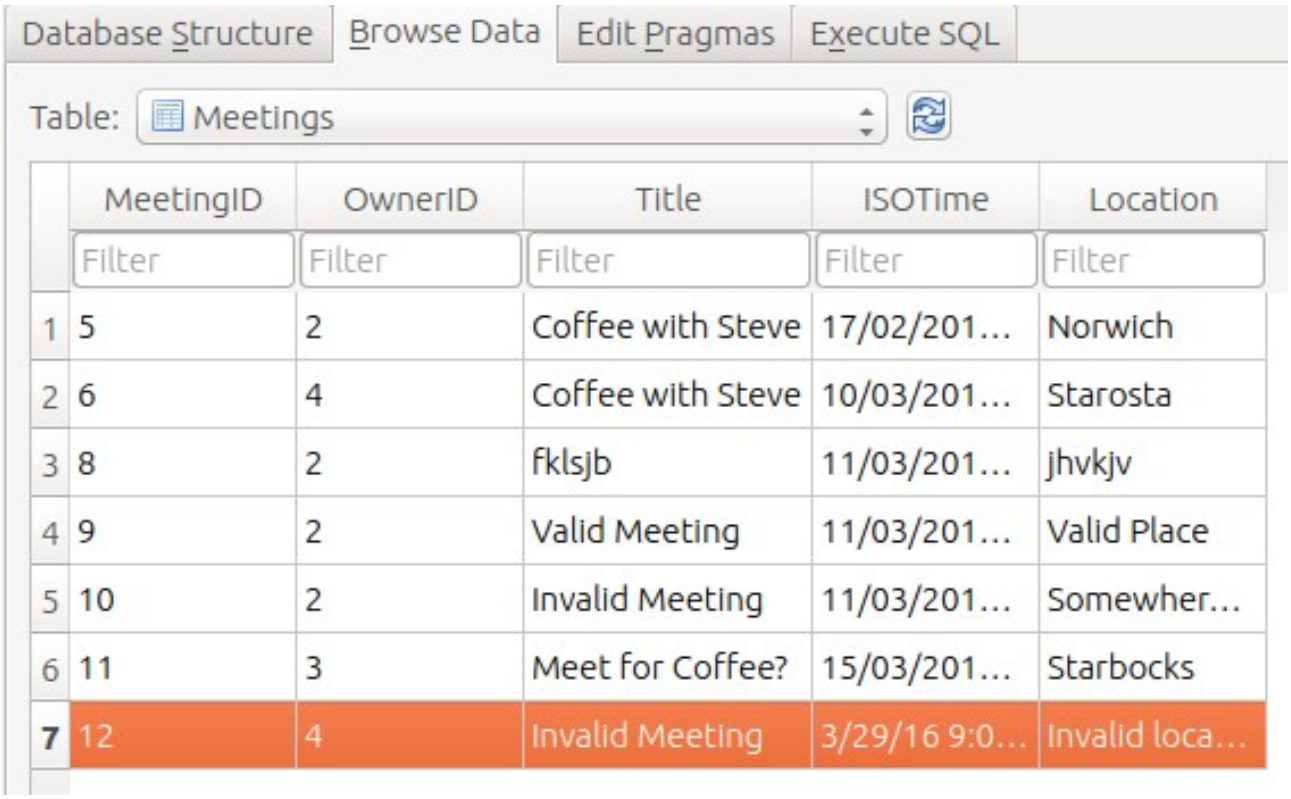
	MeetingID	OwnerID	Title	ISOTime	Location
	Filter	Filter	Filter	Filter	Filter
1	5	2	Coffee wit…	17/02/201…	Norwich
2	6	4	Coffee wit…	10/03/201…	Starosta
3	8	2	fklsjb	11/03/201…	jhvkjv
4	9	2	Valid Meeting	11/03/201…	Valid Place

	MeetingID	UserID	Confirmed
	Filter	Filter	Filter
1	2	2	1
2	5	3	0
3	6	3	0
4	7	3	0
5	9	3	0

(user 'sv' has the userID of 3) This whows that the correct meeting and user are assiciated.

2.5.2


Add New Meeting
Add New Meeting
Meeting Title:
Invalid Meeting
Attendees:
elfkljbskjb
...
Where
Somewhere Invalid
When
11/03/2016 13:11
Save
Cancel



Database Structure | Browse Data | Edit Pragmas | Execute SQL

Table: Meetings

	MeetingID	OwnerID	Title	ISOTime	Location
	Filter	Filter	Filter	Filter	Filter
1	5	2	Coffee with Steve	17/02/201…	Norwich
2	6	4	Coffee with Steve	10/03/201…	Starosta
3	8	2	fklsjb	11/03/201…	jhvkjv
4	9	2	Valid Meeting	11/03/201…	Valid Place
5	10	2	Invalid Meeting	11/03/201…	Somewher…
6	11	3	Meet for Coffee?	15/03/201…	Starbocks
7	12	4	Invalid Meeting	3/29/16 9:0…	Invalid loca…

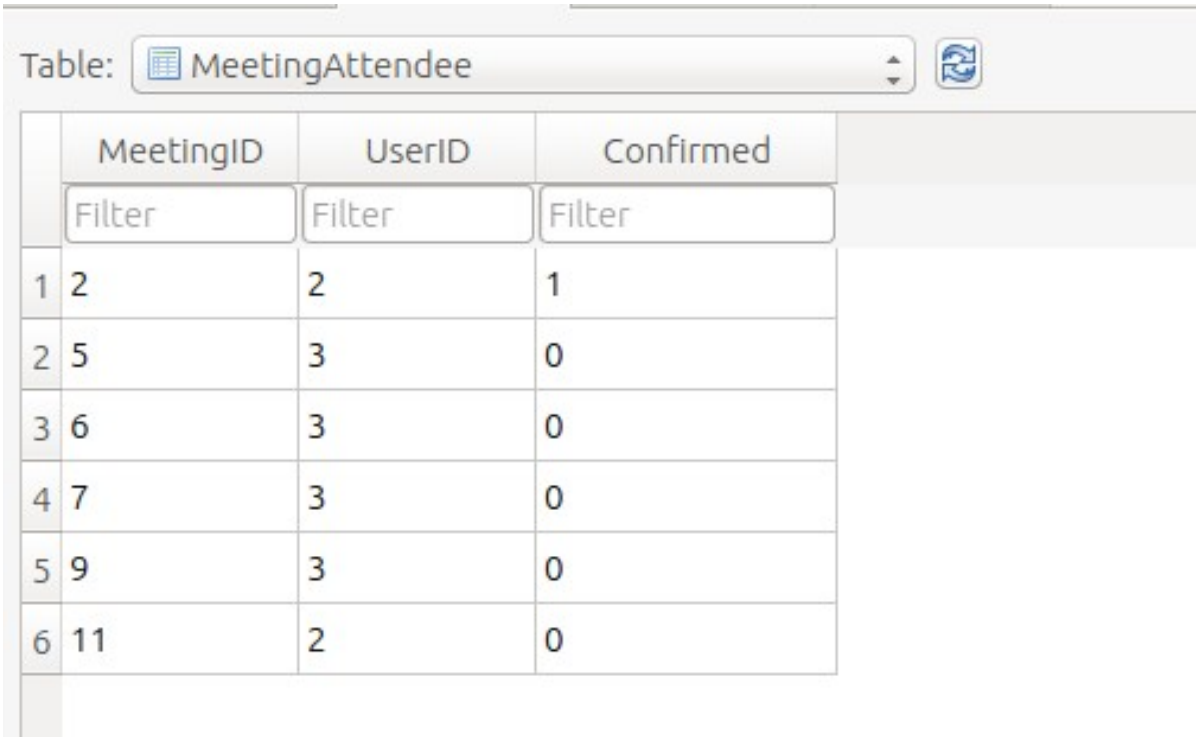


Table: MeetingAttendee

	MeetingID	UserID	Confirmed
	Filter	Filter	Filter
1	2	2	1
2	5	3	0
3	6	3	0
4	7	3	0
5	9	3	0
6	11	2	0

Notice that the meeting with ID=12 was stored, but not added to the list of meeting attendees.

2.5.3

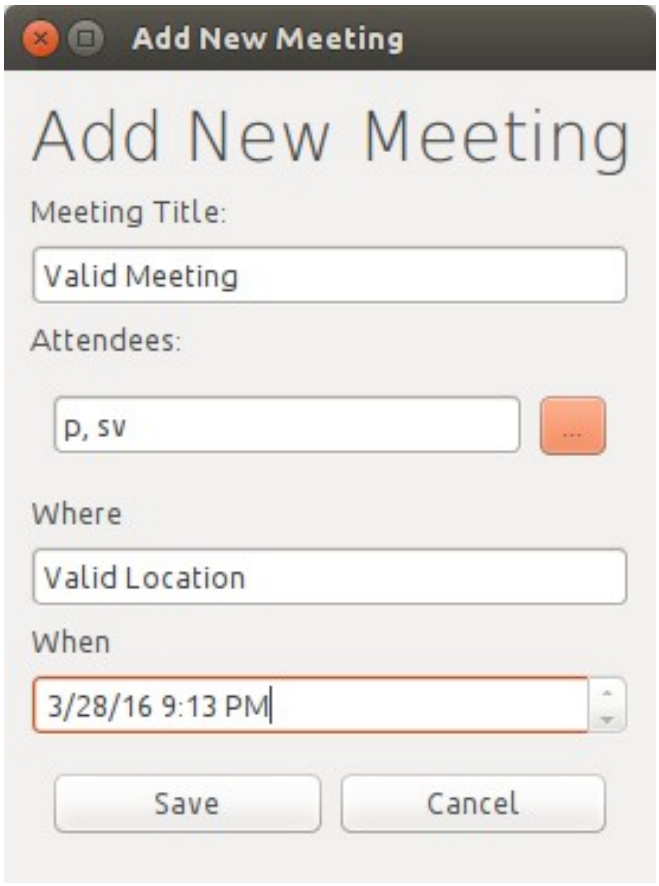

Add New Meeting
Add New Meeting
Meeting Title:
Valid Meeting
Attendees:
p, sv
...
Where
Valid Location
When
3/28/16 9:13 PM
Save
Cancel

Table: Meetings

	MeetingID	OwnerID	Title	ISOTime	Location
	Filter	Filter	Filter	Filter	Filter
1	5	2	Coffee with Steve	17/02/201…	Norwich
2	6	4	Coffee with Steve	10/03/201…	Starosta
3	8	2	fklsjb	11/03/201…	jhvkjv
4	9	2	Valid Meeting	11/03/201…	Valid Place
5	10	2	Invalid Meeting	11/03/201…	Somewher…
6	11	3	Meet for Coffee?	15/03/201…	Starbocks
7	12	4	Invalid Meeting	3/29/16 9:0…	Invalid loca…
8	13	4	Valid Meeting	3/28/16 9:1…	Valid location

Table: MeetingAttendee

	MeetingID	UserID	Confirmed
	Filter	Filter	Filter
1	2	2	1
2	5	3	0
3	6	3	0
4	7	3	0
5	9	3	0
6	11	2	0
7	13	2	0
8	13	3	0

Note the two users listed for the meeting (MeetingID=13)

3.1.0

(Note: the testing user has a UserID of 4)

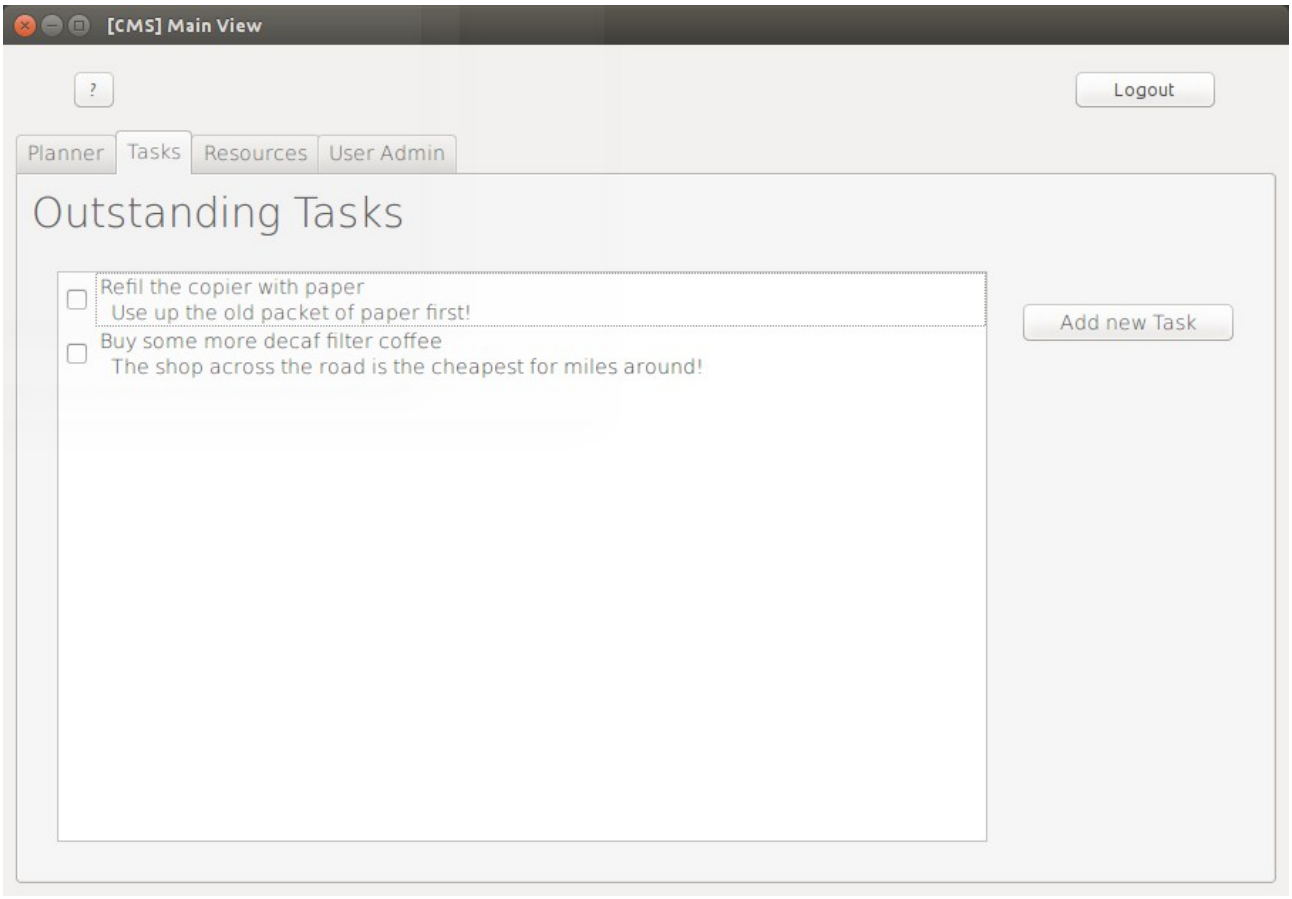
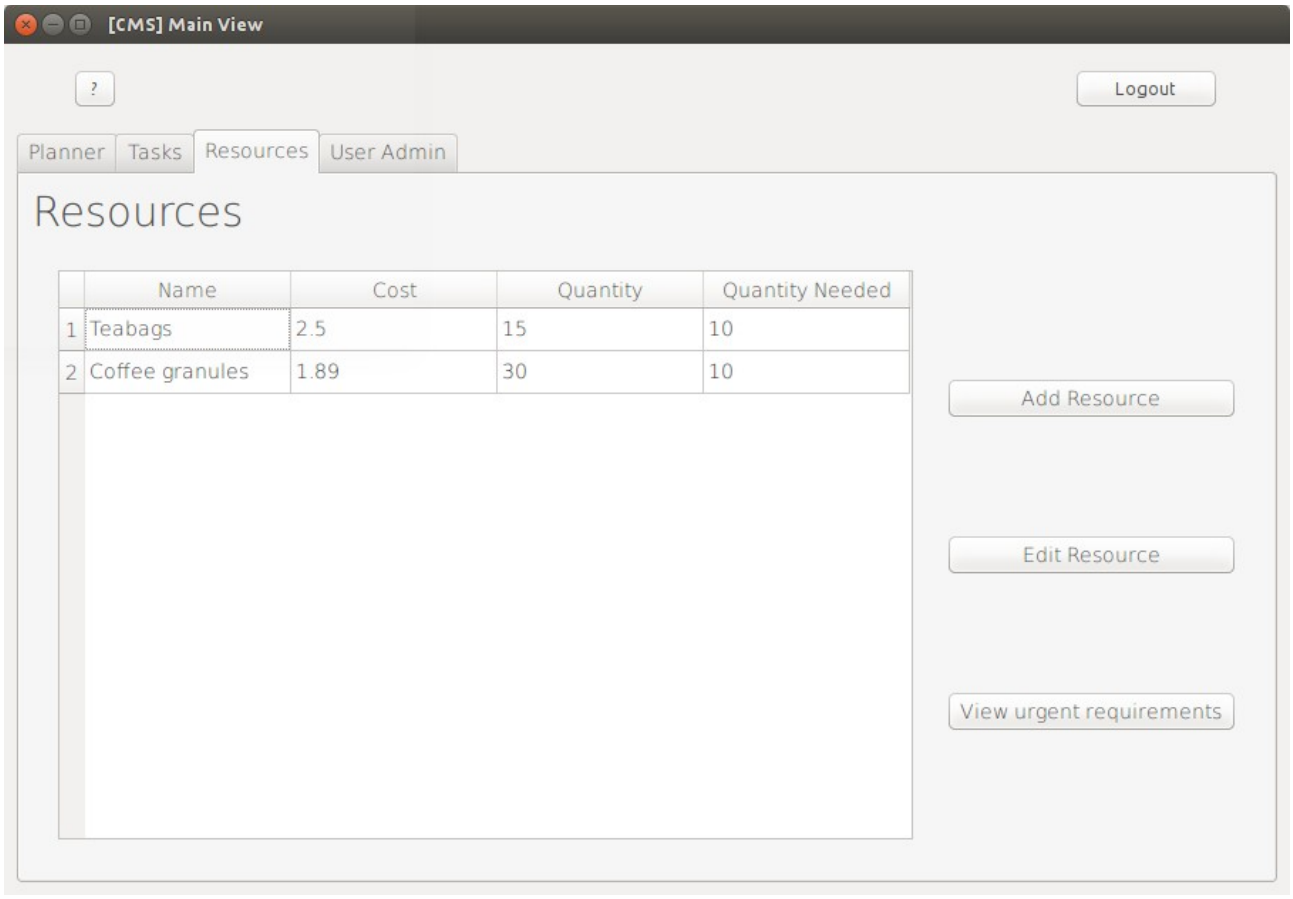


Table: Tasks

	TaskID	Title	Description	Owner
	Filter	Filter	Filter	Filter
1	1	Kjbkk	jb	2
2	2	New Task	hello	2
3	3	This Is A New Task	hellaeafskjsb	2
4	6	Refil the copier with paper	Use up the old packet of paper first!	4
5	7	Buy some more decaf filter coffee	The shop across the road is the cheapest for miles around!	4

3.2


[CMS] Main View
?
Logout
Planner
Tasks
Resources
User Admin
Resources
Name
Cost
Quantity
Quantity Needed
1
Teabags
2.5
15
10
2
Coffee granules
1.89
30
10
Add Resource
Edit Resource
View urgent requirements

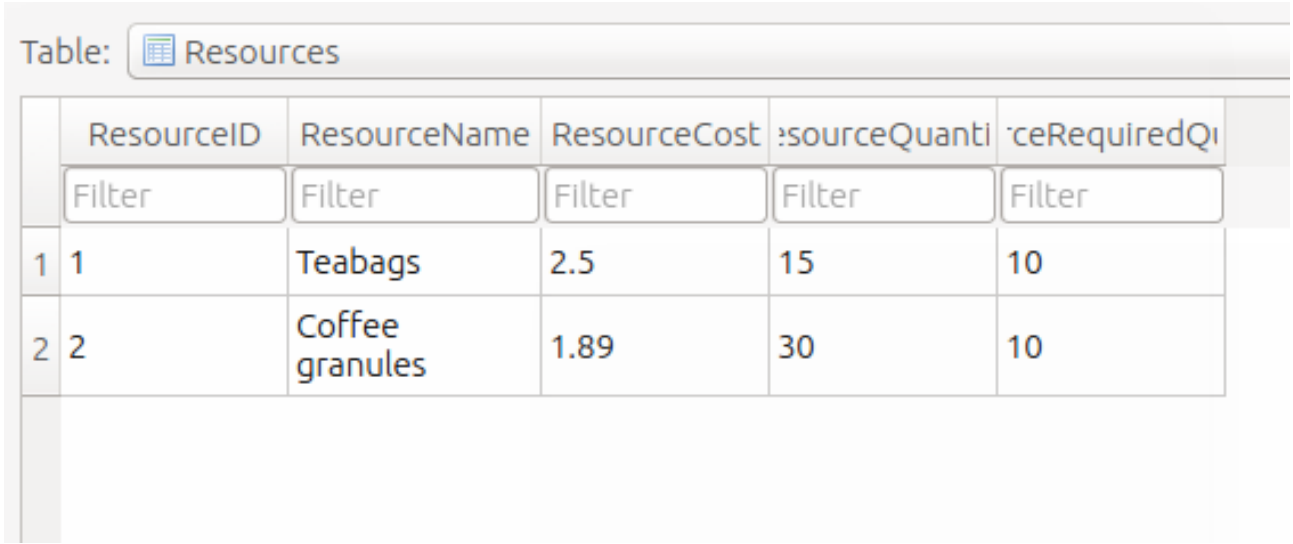


Table:
Resources
ResourceID
ResourceName
ResourceCost
:sourceQuanti
·ceRequiredQı
Filter
Filter
Filter
Filter
Filter
1
1
Teabags
2.5
15
10
2
2
Coffee granules
1.89
30
10

3.3

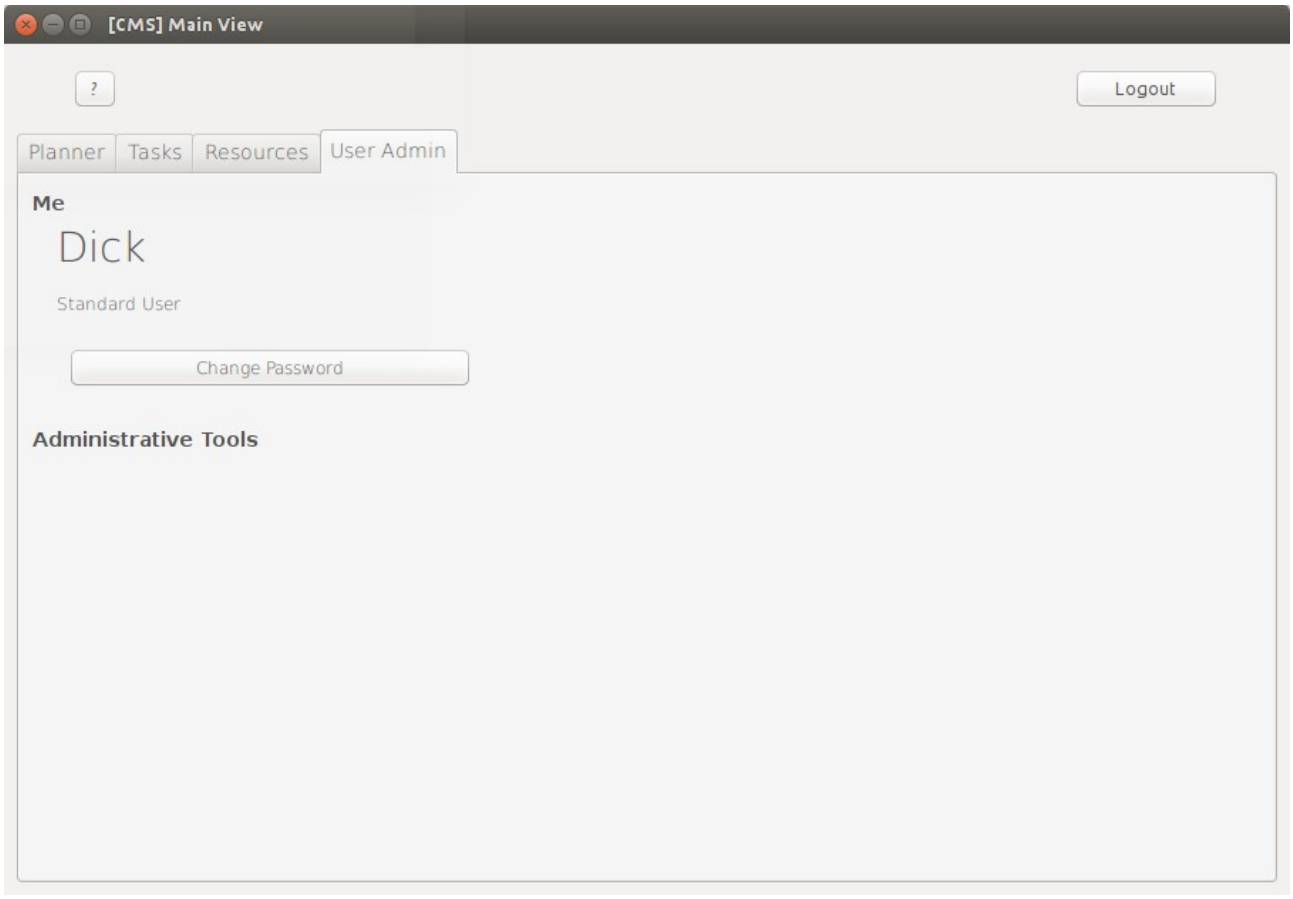
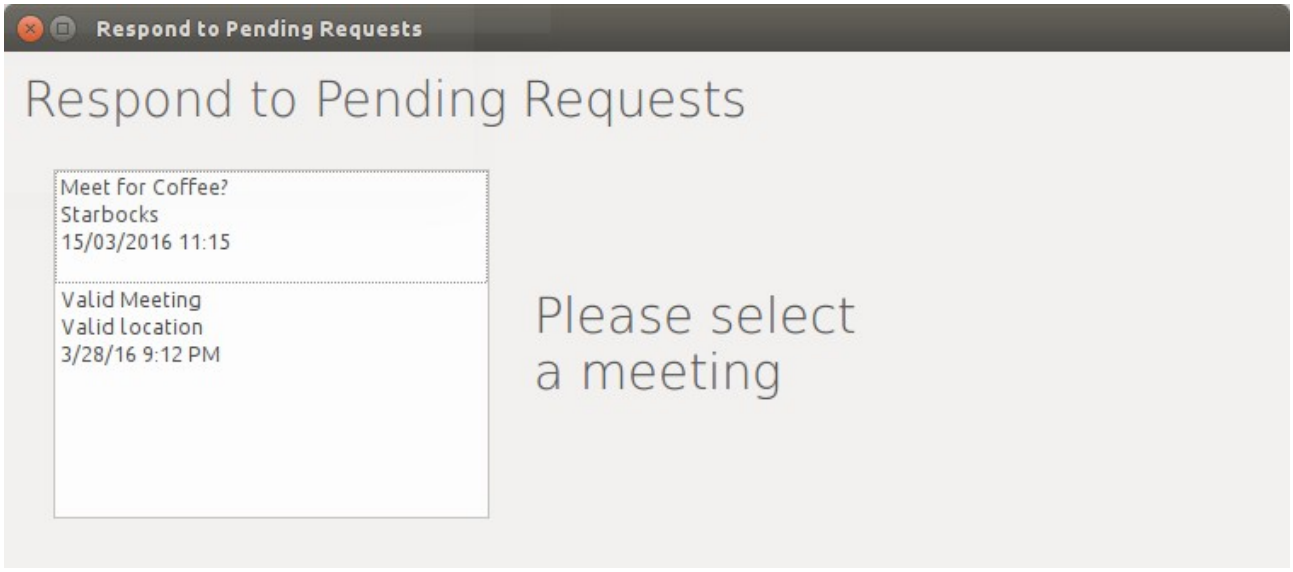


Table: Users

	UserID	Name	Username	Password	Permissions
	Filter	Filter	Filter	Filter	Filter
1	1	ADMIN - TMP	default_ad…	c445e6c3f…	29
2	2	Peter	p	5d41402ab…	31
3	3	Steve	sv	5d41402ab…	31
4	4	Dick	dk	5d41402ab…	31

3.4


Respond to Pending Requests
Respond to Pending Requests
Meet for Coffee?
Starbocks
15/03/2016 11:15
Valid Meeting
Valid location
3/28/16 9:12 PM
Please select
a meeting

4.1

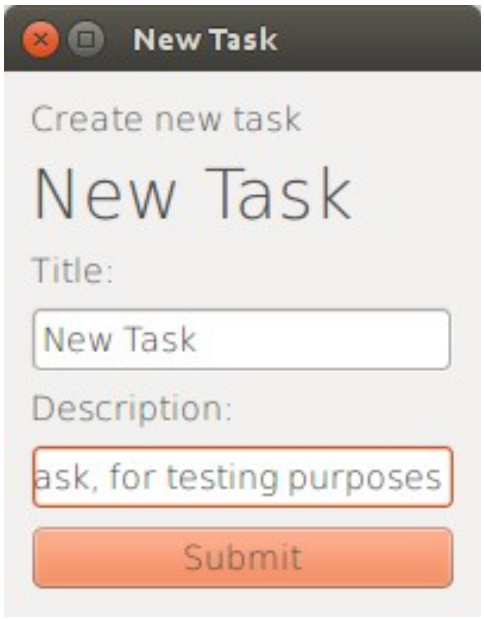


Table: Tasks

	TaskID	Title	Description	Owner
	Filter	Filter	Filter	Filter
1	1	Kjbkk	jb	2
2	2	New Task	hello	2
3	3	This Is A New Task	hellaeafskjsb	2
4	6	Refil the copier w…	Use up the old packet…	4
5	7	Buy some more d…	The shop across the r…	4
6	9	New Task	This is a new task, for …	4

4.2

Before

4	4	Dick	dk	5d41402abc4b2a76b9719d911017c592	31

After changing password:

4	4	Dick	dk	69faab6268350295550de7d587bc323d	31

User Manual

Installation

Windows

This software requires Windows XP, Vista, 7, 8, 8.1 or 10

Download the Python 3.4 installer from

https://www.python.org/downloads/windows/

Download the PyQt framework from https://www.riverbankcomputing.com/software/pyqt/download

Open both of the downloaded files and install the software packages.

Now, access the installation media given to you by your software developer and run "setup.py" by double clicking on it. Follow all the on-screen instructions.

Debian Linux

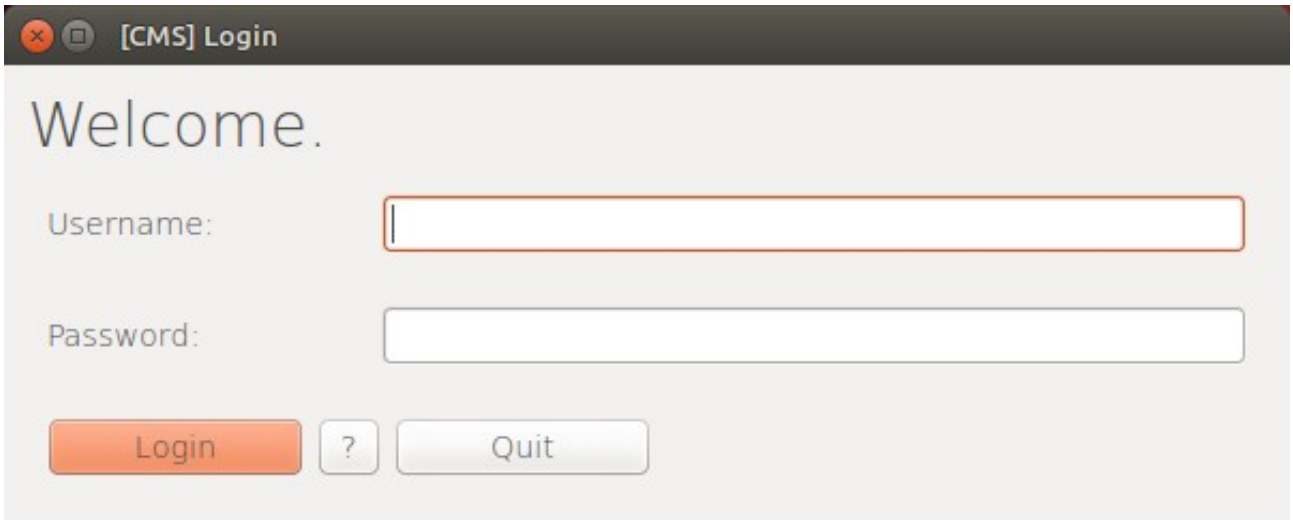
Downloac and install the python3 and the python3-pyqt4 package from the internet using the following command

```
sudo apt-get install python3 python3-pyqt4
```

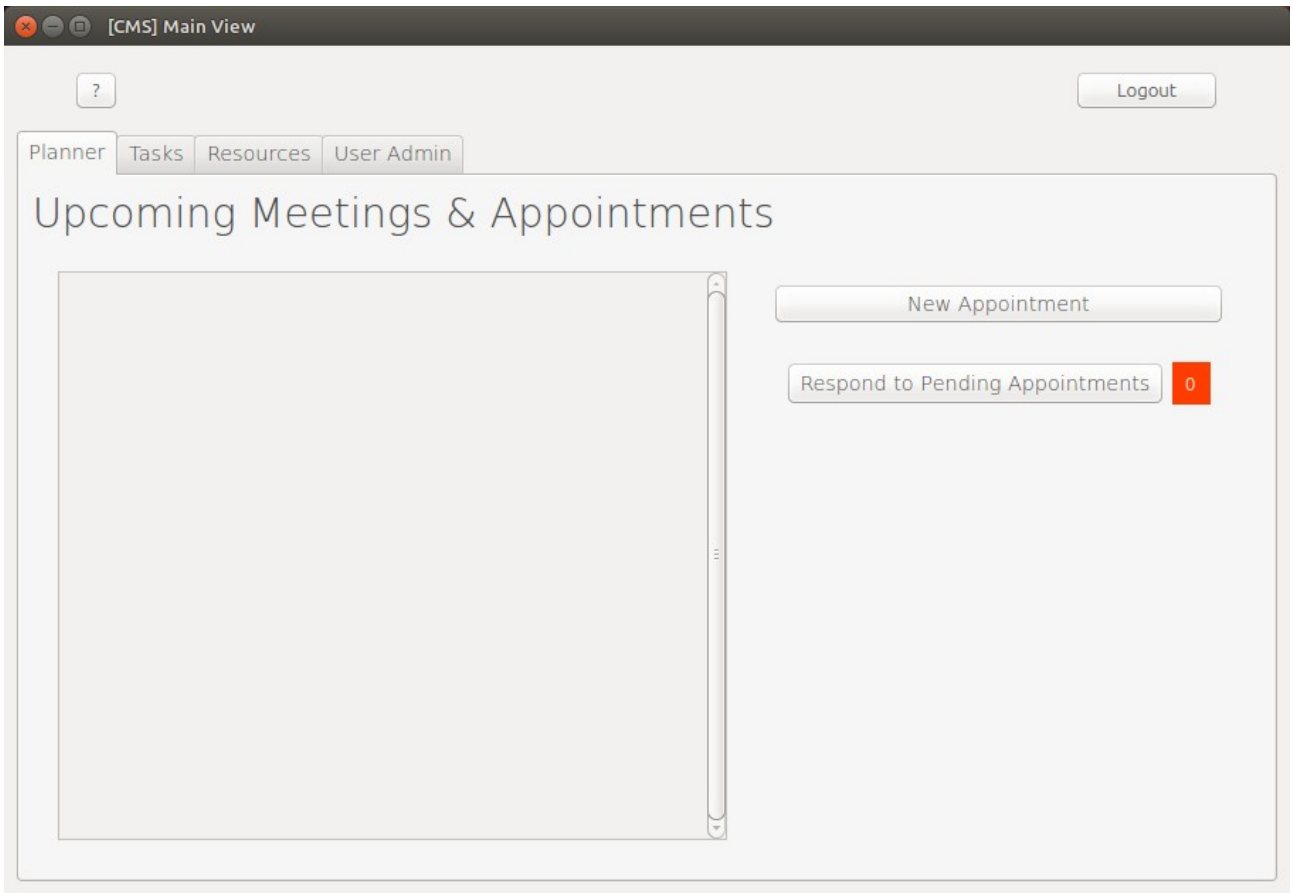
Then access the installation media and extract the file "cms-suite.zip" to the desired location, open that folder and run the `setup.py` file and follow the on-screen instructions

Basic operation

When you run the software, you will be presented with the login screen:

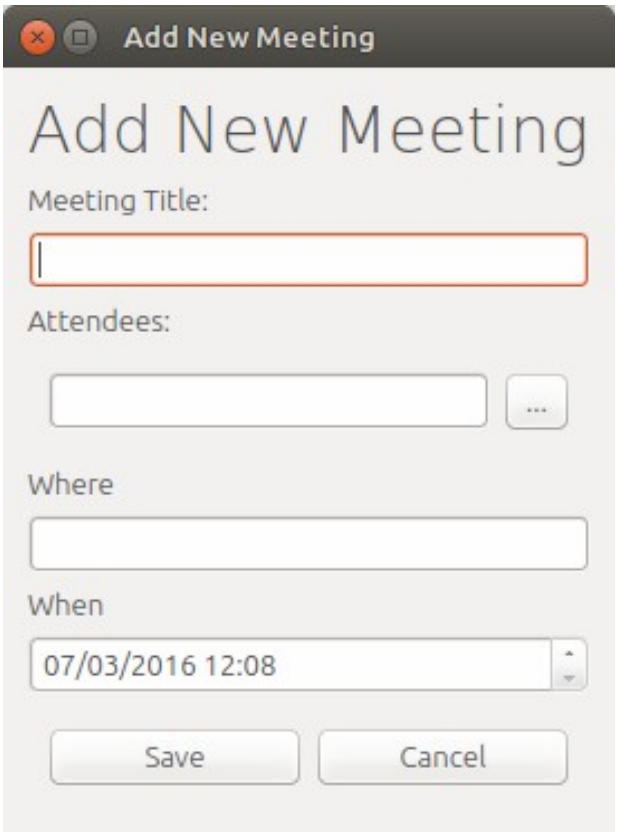


This is where you input the username and password given to you by the administrator. You will then be presented with this screen:



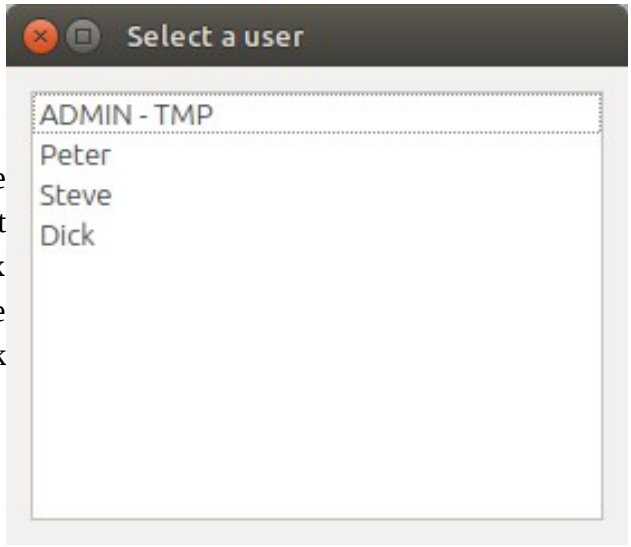
Creating Appointments

From this screen you can add new appointments and respond to pending appointments. To add a new appointment click the button marked “New Appointment”, you will be presented with the following window:



Input the title of the meeting in the field labelled “Meeting Title”, next input a list of usernames separated by either commas or semicolons, for example:

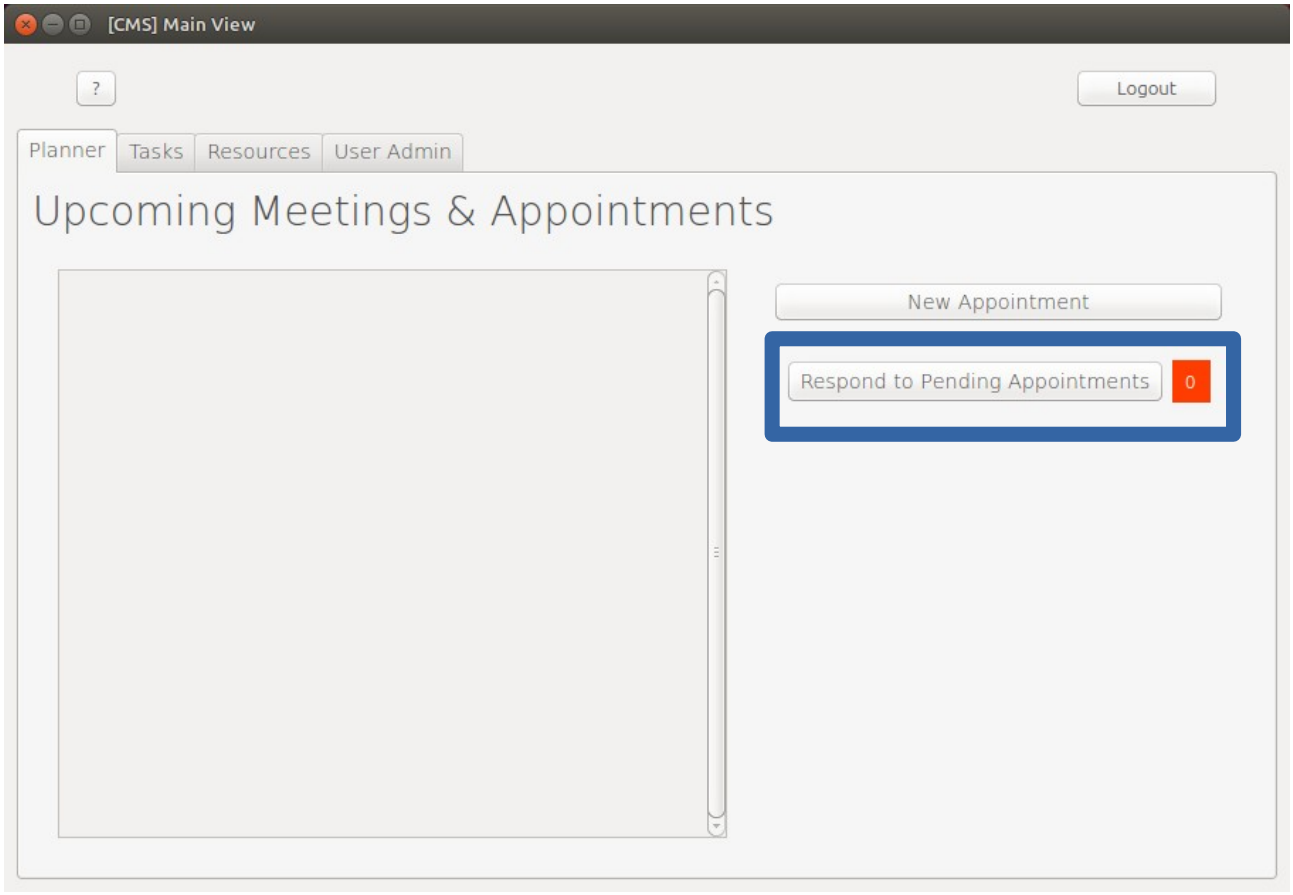
```
bob, john; william
```



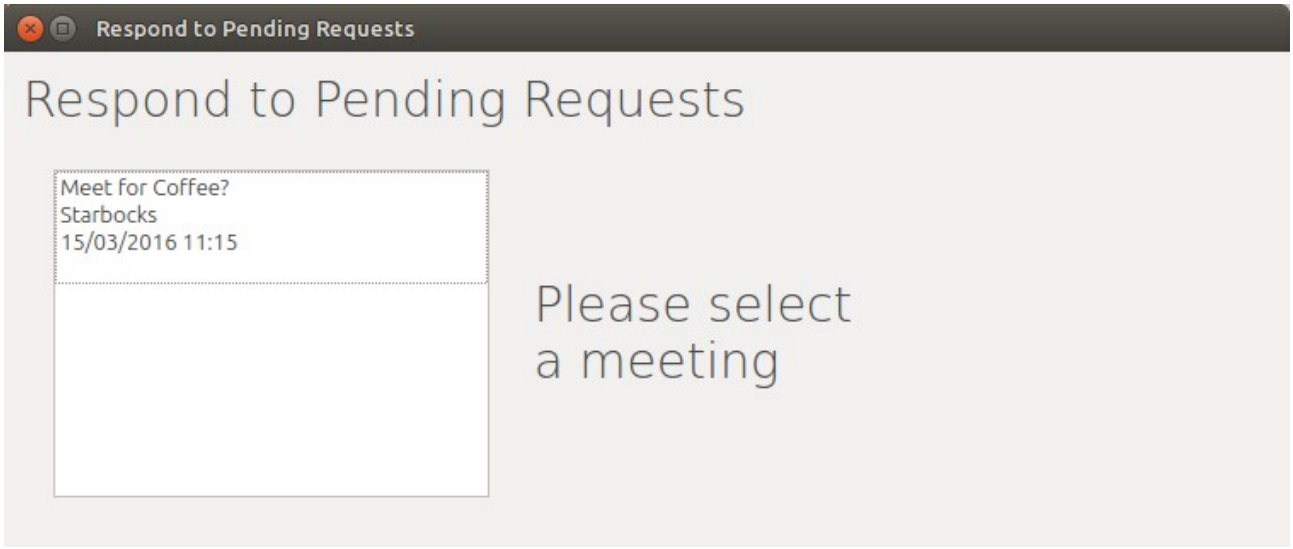
Or you can click on the […] button to select the username from a list of available usernames. Next input the location of the meeting in the input box marked “Where”. Finally select a date & time for the meeting with the field marked “When” and click “[Save]” to store the meeting information.

Responding to a Meeting Request

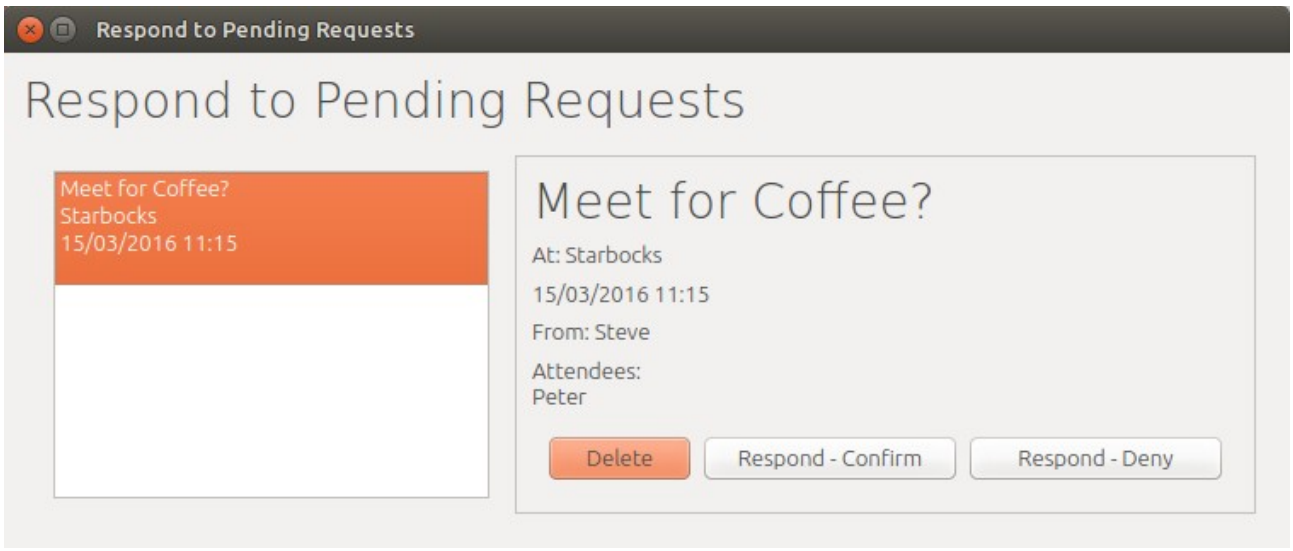
In order to respond to a meeting request (which occurs when someone else adds your username to the *Attendees* field in the *Add New Meeting* form), first click on the "Respond to Pending Appointments"



You will then be presented with the following window:



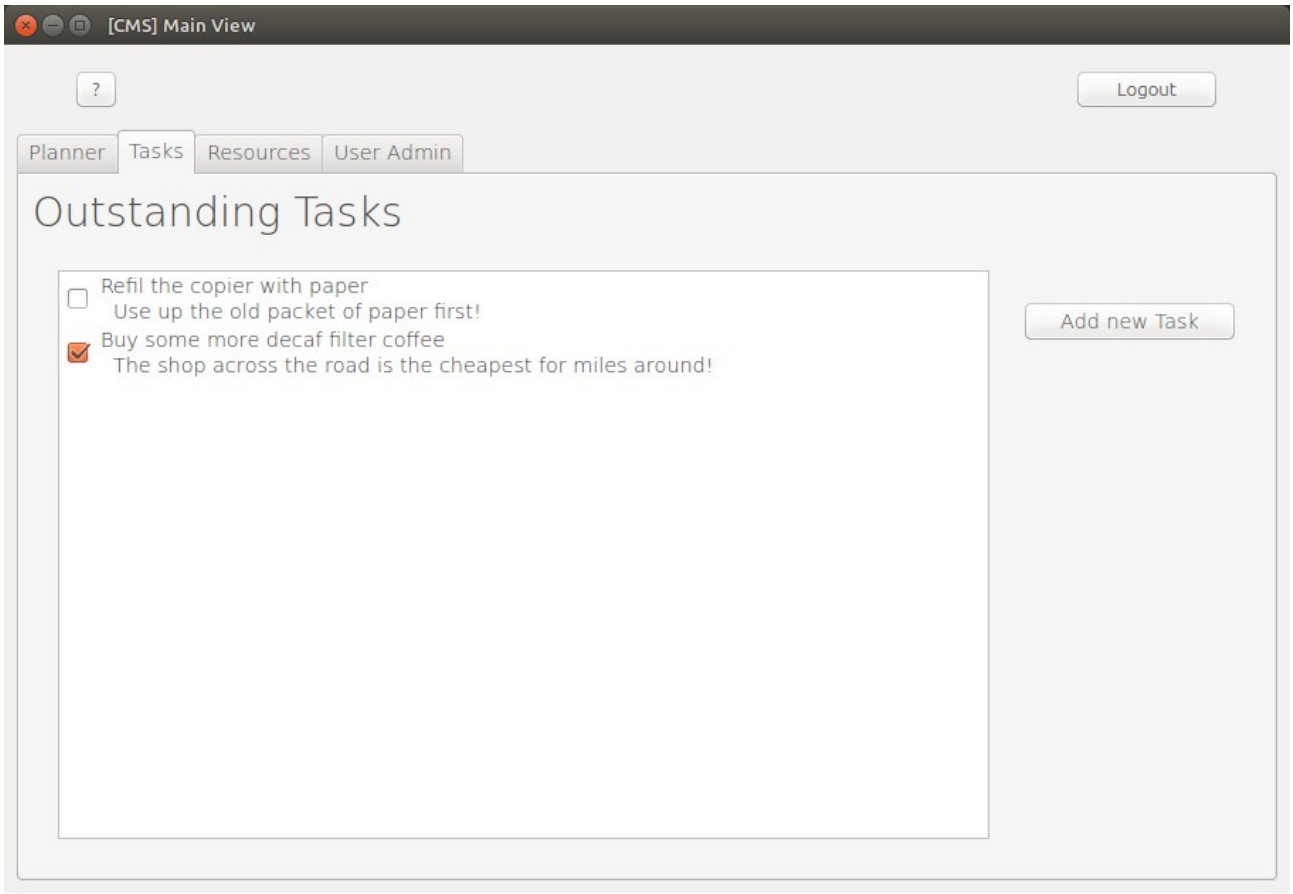
When you select a meeting from the list on the left, further information such as the title, the meeting's 'owner', the location and the date & time for that meeting will appear on the right, like so:



If you want to agree to attending the selected meeting, click the “[Respond – Confirm]” button, if not click the “[Respond – Deny]” or the “[Delete]” buttons.

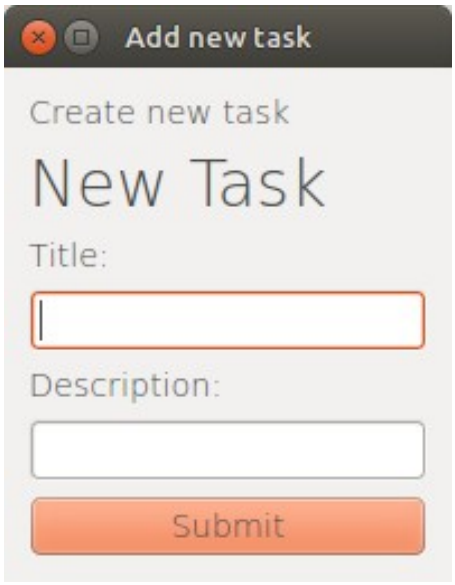
Task View

The task view contains a list of tasks that you can tick as “done” which is useful for keeping track of small things you need to do. This feature is designed to do effectively the same thing as the Meetings functionality but for when there are no other attendees and the time and location are not important.



Creating a New Task

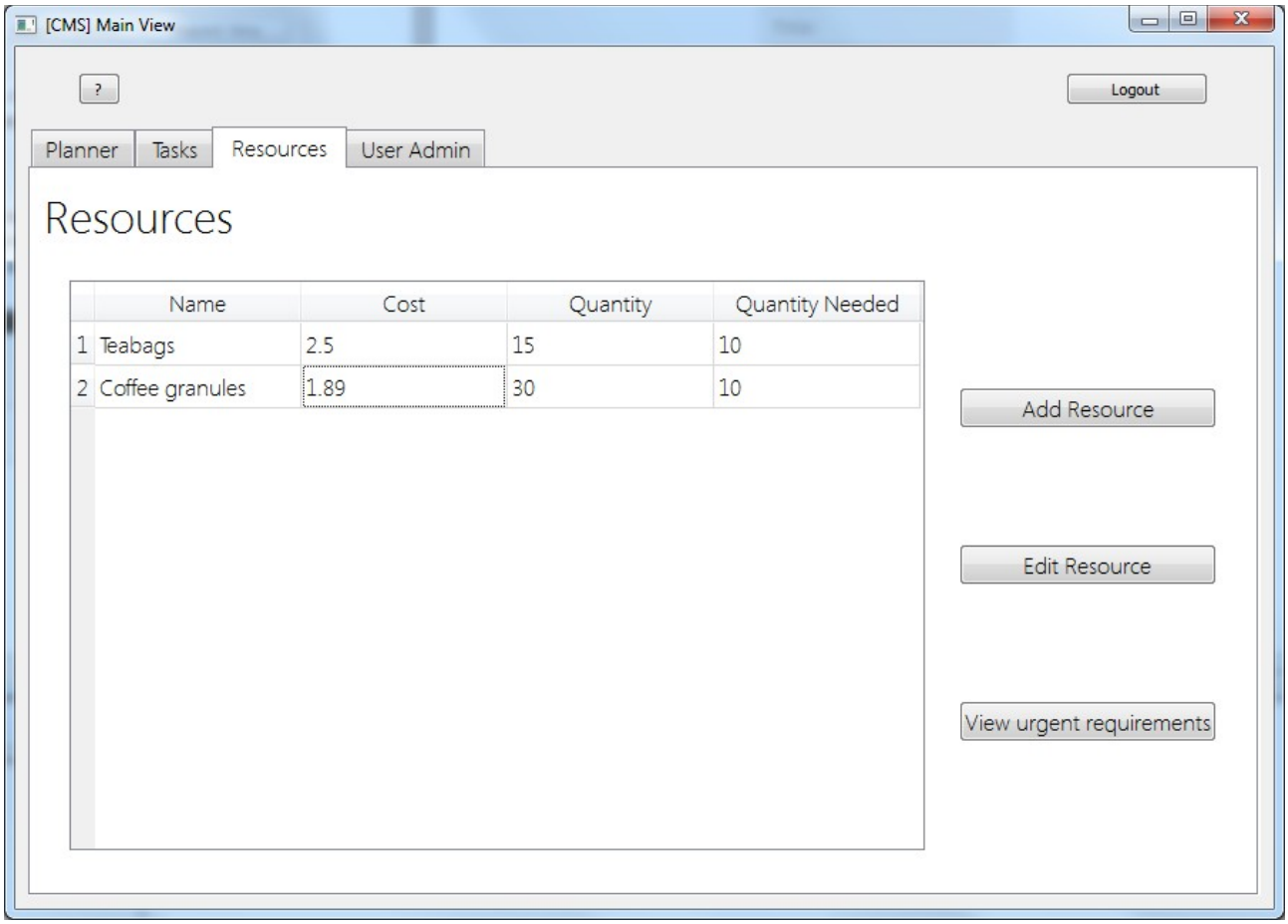
To create a new task, click the “Add New Task” button in the Tasks tab, you will then be presented with the following window:



Enter a title and a description for your task then click “[Submit]” to store that task.

Resources View

This view is shared across all the users with access to it, as predefined within the supplied database of the user's details. It contains a list of the resources and functions to manipulate that list.



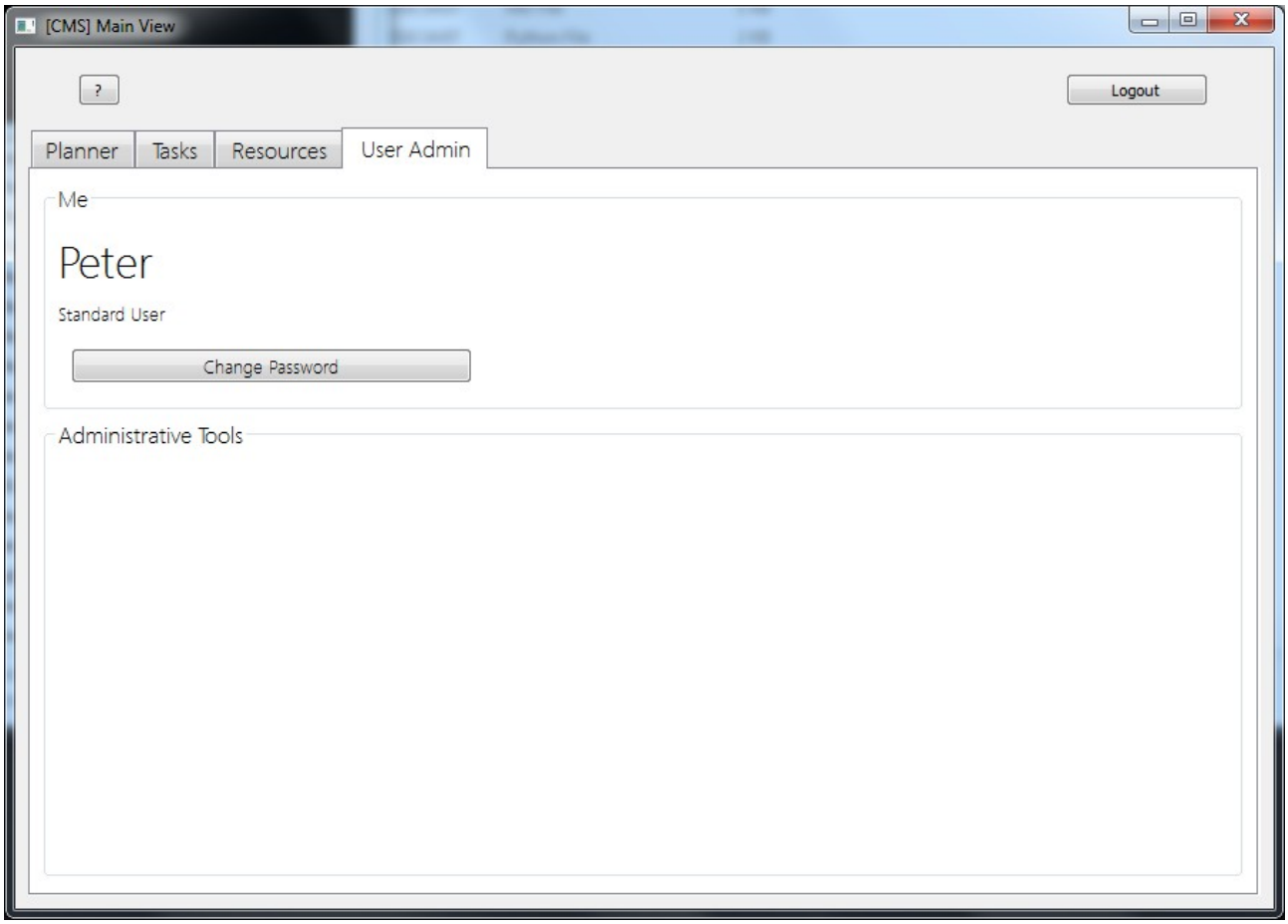
Click on the button [Add Resource], you will be presented with a form with which you add the details for a new resource.

If you need to edit a resource, such as updating the current quantity available, the cost of the object or the required quantity, click on the [Edit Resource] button.

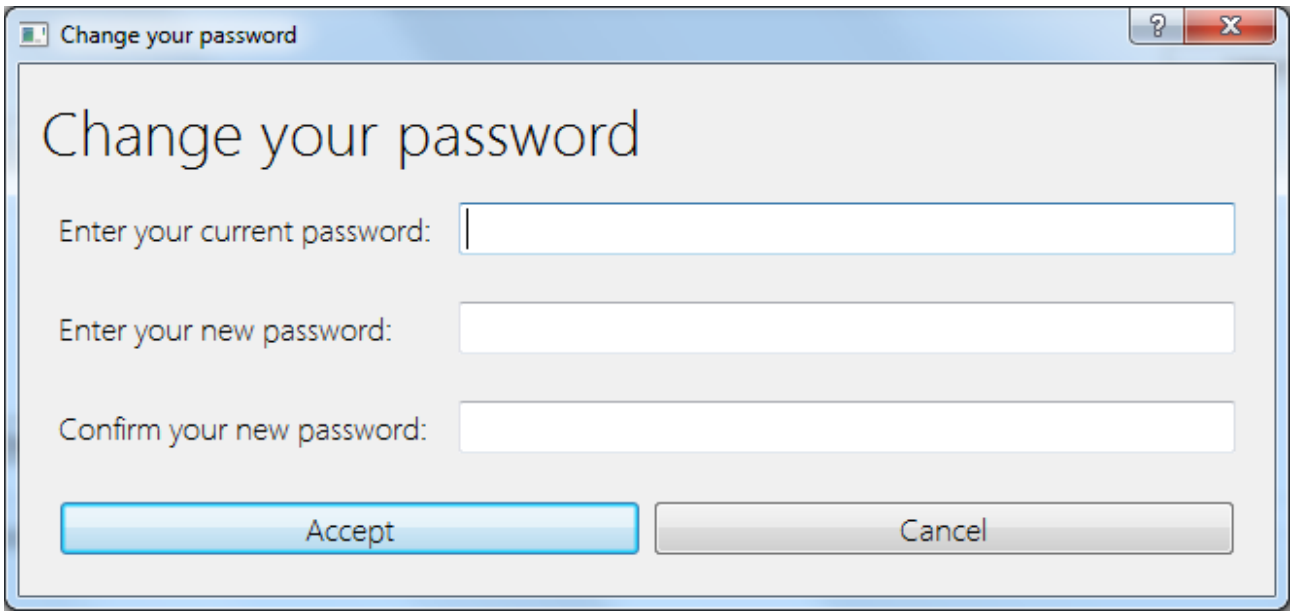
To quickly check if there are any resources which are below the required quantities, click [View urgent requirements] to see a list of the resources which are below the required quantity as defined in the “Quantity Needed” field.

User Admin Area

This section is designed to give the user an overview of their person user account, and to change their password.



To change your password, click the [Change Password] button, you will be presented with the following form:



Enter your current password, and then your new password in the fields marked “Enter your new password” and “Confirm your new password”. Once you click [Accept], your changes will be permanent and to get your old password back, you will have to repeat the password change process

System Maintenance

Environment

Software

During the development of this system I used various software tools to create the system, the names and versions of these are listed below:

- Python 3.4
- Atom 1.4.1
- PyQt 4
- Sqlite 3
- DB Browser for SQLite
- git 2.5.0 & GitHub
- LibreOffice 5.0.5.2

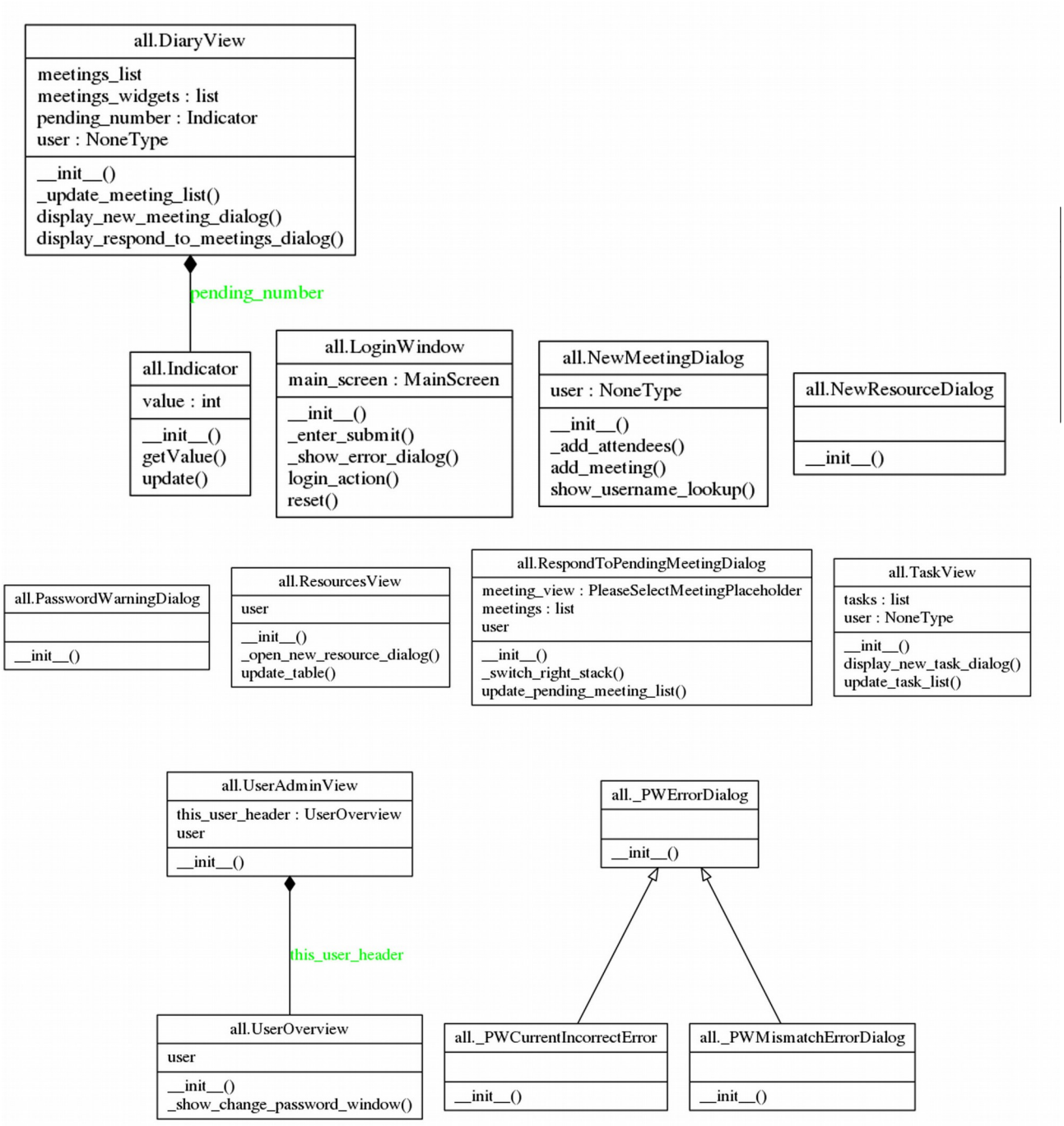
Usage Explanation

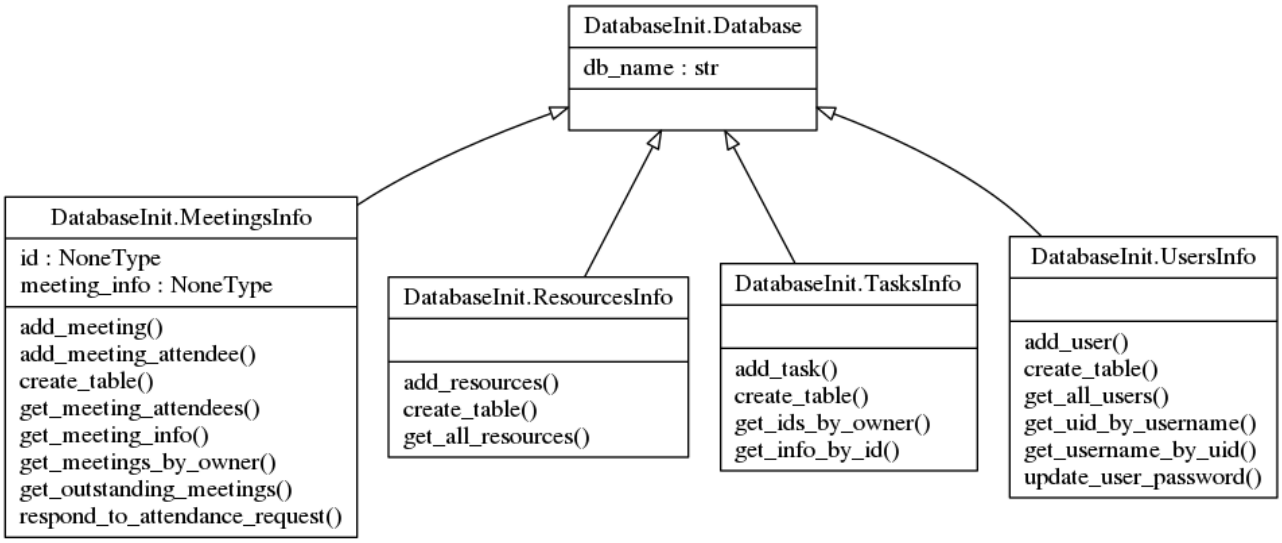
Below are the explanations for the software I have used, all of the software I have used is either open sourced and/or freely available at no cost for developer or client.

Software	**Usage**
Python 3.4	Python is the underlying language that the software is written in. Version 3.4 is the latest stable version and contains the best balance of security, features and stability of all currently available versions.
Atom 1.4.1	Atom by GitHub is the text editor that I chose to use throughout the project because of it's customizable syntax highlighting and the various extensions that it includes to make writing code easier.
PyQt 4	The software library for defining graphical user interfaces and converting python into an event driven language.
Sqlite 3	Support for this standard is included with the python language and is used for all the database interactions in this project.
DB Browser for SQLite	This is not required for the client's system but it is required for testing the validity of the data held in the database.
Git 2.5.0 & GitHub	These are not strictly required by the user, I use them for version control and synchronisation of code and resources however they could be used as a way to distribute updates.
LibreOffice 5.0.5.2	For the production of the documentation

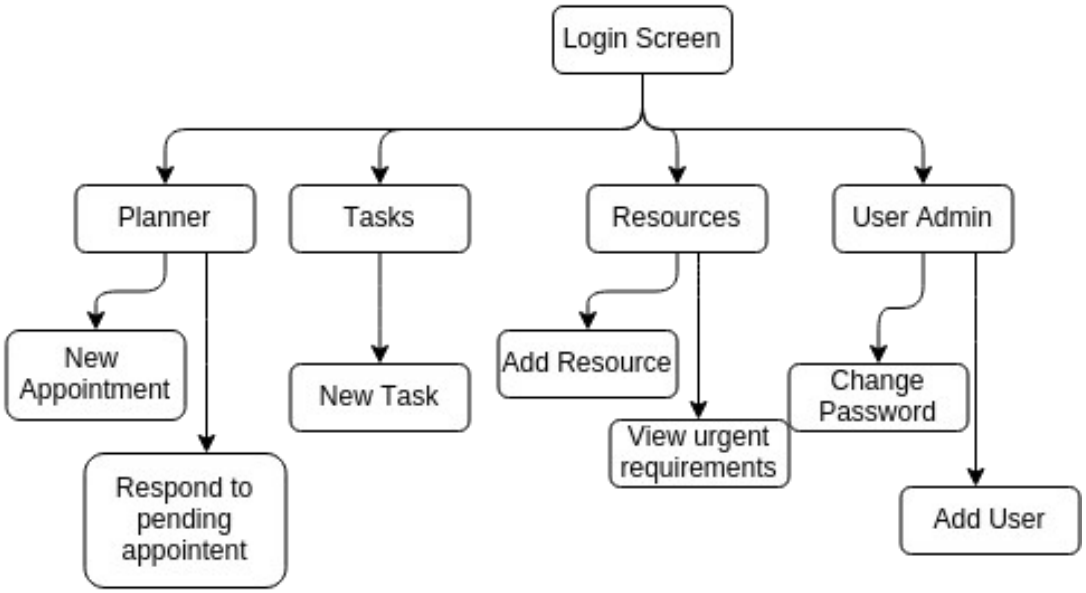
System Overview

Class Diagrams




DatabaseInit.Database
db_name : str
DatabaseInit.MeetingsInfo
id : NoneType
meeting_info : NoneType
add_meeting()
add_meeting_attendee()
create_table()
get_meeting_attendees()
get_meeting_info()
get_meetings_by_owner()
get_outstanding_meetings()
respond_to_attendance_request()
DatabaseInit.ResourcesInfo
add_resources()
create_table()
get_all_resources()
DatabaseInit.TasksInfo
add_task()
create_table()
get_ids_by_owner()
get_info_by_id()
DatabaseInit.UsersInfo
add_user()
create_table()
get_all_users()
get_uid_by_username()
get_username_by_uid()
update_user_password()

System Navigation



Code Structure

The class shown below is the 'Database' class which is the derivative class for all the database interactions from the file “DatabaseInit.py”.

```
#This tidies all of the SQL queries into another name space.
import SqlDictionary
import random
import hashlib
import sqlite3

def gen_pw_hash(password):
    phash = hashlib.md5()
    phash.update(bytes(password, "UTF-8"))
    return phash.hexdigest()

class Database:
    """This is the general database wrapper that I'll use throughout the system"""
    def __init__(self, child, database_name="cmsdb.db"):
        #print("[INFO] Created database object")

        self.db_name = database_name

    def _connect_and_execute(self, sql="", database_name=None):
        #print(sql)
        if database_name == None:
            database_name = self.db_name

        with sqlite3.connect(self.db_name) as dbcon:
            cursor = dbcon.cursor()
            cursor.execute(sql)
            results = cursor.fetchall()
        return results
```

This code is structured as a class so the more specific classes within the code can inherit it's properties. This prevents the duplication of code across the classes as well as reduces the risk of errors. This code provides all of it's child classes with a routine to access the database.

Below is the code for the interaction with the table 'Users' within the database:

```
class UsersInfo(Database):
    def __init__(self, uid = 0):
        super().__init__(self)
        self.create_table()

    # NB: all input MUST be sanitized at this point.
    def create_table(self):
        self._connect_and_execute(SqlDictionary.CREATE_USERS)
        self._create_initial_admin_user()

    def _create_initial_admin_user(self):
        # This is to create an initial administrative user in case something happens to the database
        pwd = "".join([chr(random.choice(range(ord('A'), ord('z')))) for c in range(10)])

        new_user_info = {"Name":"ADMIN - TMP", "Username":"default_admin", "Password": gen_pw_hash(pwd), "Permissions": 29}

        if len(self.get_all_users("WHERE(Username = 'default_admin')")) == 0:
            print("[INFO] Empty users table detected, adding default user...")
            self.add_user(new_user_info)
            print("[INFO] Default user added,\n\tUsername: 'default_admin'\n\tPassword: '{0}'".format(pwd))

    def get_all_users(self, condition = ""): # Add a SQL condition? maybe? TODO: refactor this bit
        return self._connect_and_execute(SqlDictionary.GET_ALL_USERS.format(condition))

    def get_uid_by_username(self, username=""):
        return self._connect_and_execute((SqlDictionary.GET_USER_ID.format(username)))[0][0]

    def get_username_by_uid(self, uid=None):
        return self._connect_and_execute(SqlDictionary.GET_USERNAME_BY_UID.format(uid))[0][0]

    def add_user(self, info):
        #info follows the format {"SQL value":Data value}
        values = "'{0}', '{1}', '{2}', {3}".format(info["Name"], info["Username"], info["Password"], info["Permissions"])

        return self._connect_and_execute(SqlDictionary.ADD_USER.format(values))

    def update_user_password(self, password, uid):
        sql = SqlDictionary.UPDATE_PASSWORD.format("'{0}'".format(password), uid)
        return self._connect_and_execute(sql)
```

I wrote this code as a class so it could inherit properties from a parent class, in this case, “Database”. This class contains all the functions required for passing data in and out of the table “Users” in the database, as well as some of the management and administrative functions such as '*create_table*' and '*_create_initial_admin_user*'.

System Structure

Log in

This part of the system controls overall access to the system and prevents unauthorised users from accessing some or all of the system. When the user inputs a username and password combination, a hash is generated of the entered password and the user name is used to lookup the hash of the password stored in the database, the two hashes are compared. If the hashes match then the system prepares the GUI based on the permissions associated with the user.

Graphical User Interface

This part of the system provides the user with a graphical way of interacting with the software. It is designed to be easy and intuitive for users to use without or with minimal training. Command buttons and the various input components and positioned around the interface in an appropriately logical structure. The interface also includes various labels and hints to provide guidance to the user and to assist in their operation of the system.

Meetings Overview

The meetings overview tab contains all the controls and output regarding the meetings subsystem. It contains the functionality to add meetings, respond to attendance requests and, of course, view a list of meetings

Add Meeting

This dialogue box contains the functionality for adding meetings, this is where the user will add all of the information to be input into the database. The data that the user inputs will also be validated before it is committed to the database.

Respond

This dialogue box contains a list of meeting requests on the left-side, when the user clicks on one of the meeting requests, more information about that meeting is shown on the right-side, along with controls to delete, confirm or reject the request for meeting.

Tasks Overview

The tasks overview tab contains the functionality for dealing with the tasks section of the database, it contains a list of tasks taken from the database and the option to add a new task.

New Task

This dialogue box contains the form to add a new task to the tasks section of the database, it includes all the code for validating the tasks information before that information is committed to the database.

Resources Overview

The resources overview contains a 2-dimensional grid containing a direct copy of the resources table in the database. There is also the button to open the 'new resource' dialogue box.

New Resource

This window contains the form for adding a new resource to the database table 'Resources'

Admin Area

This area is designed to contain all the miscellaneous tools for administration of the 'users' database table. It includes a button which launches the 'change password' dialogue box.

change password

This dialogue box contains one place to enter the user's current password, which is then hashed and checked against the database and then two places to enter the new password, which are then hashed and checked that they match eachother.

Variable Listing

Class *Meeting* (does not inherit)

Variable Name	Purpose
self.title	Attribute for the meeting title taken from the database
self.place	Attribute for the meeting location taken from the database
self.attendees	Contains a python list of attendees' usernames
self.when	Attribute to contain the data and time of the meeting, as fetched from the database.

Class *NewMeetingDialog* (Inherits from Qdialog)

Variable Name	**Purpose**
Self.user	Contains the user information passed to this class from the parent window

Variable Name	Purpose
Self.main_layout	Contains the Qt layout used for organising the components of the window
Self.meeting_title_label	Contains the Qlabel widget that is used as a title for the window
Self.meeting_title_entry	Contains the QlineEdit into which the user inputs the meeting title.
Self.attendees_label	Contains a Qlabel to identify the entry point for attendees information
Self.attendees_container	Contains a Qwidget for logically organising the customized input structure for attendees
Self.attendees_layout	The layout used for organising the above container
Self.attendees_entry	Contains the manual entry box for usernames to be added as attendees
Self.username_lookup_button	Contains a button which provide functionality to the username lookup feature
Self.attendees_info_label	Contains a small piece of text to explain the process of entering usernames as attendees to this meeting
Self.where_label	Contains a Qlabel to distinguish the entry point of the meeting's location
Self.where_entry	Contains a QlineEdit for the meeting's location
Self.button_container_widget	Contains a customized Qwidget for organising the control buttons in a logical format.
Self.button_container_layout	The layout used for organising the above container
Self.save_button	Provides a button for the user to save the completed meeting to the database.
Self.cancel_button	Provides a button for the user to discard the information they input and to close the dialogue
Info	Contains a python dictionary containing all the information associated with the meeting
Meeting	Contains a *MeetingsInfo* object to interact with the database
Valid	Keeps track of if the attendee is valid or not
raw_attendee_list	Contains the text from Self.attendees_entry
Pattern	Provides a python regex object for dealing with regular expressions

Class *DiaryView* (inherits from Qwidget)

Variable Name	Purpose
Self.main_layour	Contains the layout for organising the highest level elements of the page
Self.title	Shows a large title text at the top of the 'page'
Self.middle_widget	Provides a container for the central elements of the pagr
Self.middle_layout	Organises the central elements of the 'page'
Self.left_side_widget	Provides a container for all the left-side elements
Self.left_side_layout	Organises the elements in the above container
Self.meetings_widget	Provides a container for all the meetings objects
Self.meetings_layout	Organises the elements in the above container
Self.meetings_widgets_container	Provides a scrollable area for all the meetings objects
Self.right_side_widget	Provides a container for all the right-side elements
Self.right_side_layout	Organises the elements in the above container
Self.button_container	Provides a container for the command buttons
Self.button_layout	Organises the elements in the above container
Self.new_appointment_button	Provides a button to open the 'New Meeting' dialogue.
Self.response_container	Provides a container for all the response options
Self.response_layout	Organises the elements In the above container
self.respond_to_pending_appointments_button	Provides a button to open the 'Respond to pending appointments' dialogue
Self.pending_number	Shows the number of pending appointments the user has

Class *PasswordWarningDialog* (inherits Qdialog)

Variable Name	Purpose
Self.main_layout	Contains the Qt layout used for organising the components of the window
Self.title	Shows some text as the title to the page
Self.text	Shows the error message for this dialogue
Self.dismiss_button	Provides a button to get rid of the dialogue box
Self.subtext	Shows a little information message at the bottom of the window

Class *LoginWindow* (inherits Qdialog)

Variable Name	Purpose
Self.main_title	Shows the text “Welcome” at the top of the page
Self.username_item	A container for the username entry set of widgets
Self.username_layout	The layout used for organising the above container
Self.username_label	Shows short descriptive text for the username entry field.
Self.username_input	Provides a place for the users to input their username
Self.password_item	Provides a container for the various elements associated with password entry
Self.password_layout	The layout used for organising the above container
Self.password_label	Shows a short descriptive text for the password entry box
Self.password_input	Provides a place for the user to enter their password
Self.button_layout	Organises the control buttons for this section
Self.submit_button	Submits the data the user entered into the entry points and begins the login subroutine
Self.help_button	Provides the users with help when clicked
Self.quit_button	Provides the user with a button that will exit the software immediately

(note: do the variable listing of more classes)

Explanation of detailed Algorithms

LoginAction.py

```
import hashlib

from DatabaseInit import *
import SqlDictionary

class User:
    def __init__(self, uid=0):
        self.info = {} # info to be retrieved from the database
        self.permissions = {}
        self.user_id = uid

        self.dbinterface = UsersInfo()

        self.update_user_info()
```

```
    def gen_pw_hash(self, password):
        # Create a md5 hash of the password
        phash = hashlib.md5()
        # (Encode the password – the python md5 implementation only accepts
binary data.)
        phash.update(bytes(password, "UTF-8"))
        # return a hexadecimal representation of the md5 hash.
        return phash.hexdigest()

    def password_hash_cmp(self, password_input):
        currenthash = self.info["Password"]
        return currenthash == self.gen_pw_hash(password_input)
```

In this code I have used Python's builtin hashing library to secure the passwords with one-way encryption so that if the user or someone else accesses the database containing the user names and passwords, they will not be able to use that information to gain access to the system. In this instance, I have used the md5 algorithm.

Permissions Array

```
def gen_permissions(self):
        # Get the denary integer value for the user's permissions
        perm = self.info["Permissions"]

        # Create a list of the default values for the user's permissions
        blist = [False, False, False, False, False]

        # For each item in a list of the individual binary digits
        # The python `bin` function outputs a string in the format '0b10101'
        # which is why we need to get rid of the first two characters
        for index, digit in enumerate(bin(int(perm))[2:]):
            # set each item in the b(inary)list as a python Bool so it can easily
            # be used in selection statements
            blist[index] = (bool(int(digit)))
        permissions = {}
        permissions["Meetings"] = blist[0]
        permissions["Tasks"] = blist[1]
        permissions["Resources"] = blist[2]
        permissions["ChangeOwnData"] = blist[3]
        permissions["Admin"] = blist[4]

        # Overwrite the existing permissions number with a dictionary.
        self.permissions = permissions
        return permissions
```

For this code I have used the python integer-to-binary conversion as well as python dictionaries[1] (a basic key-value database system that is stored in memory). This algorithm converts an integer value taken from the global database into a binary string (taking the format *0b10101*) and then converting that into a list of boolean data (taking the format *[True, False, True, False, True]*) which can then easily be used elsewhere in the system.

1 https://docs.python.org/3.4/library/stdtypes.html?highlight=dict#dict

User name Parsing

```
def _add_attendees(self, meeting):
        valid = True
        raw_attendee_list = self.attendees_entry.text()
        #Parse this into a list of attendees, separated by either semicolons or
commas.
        pattern = re.compile("([a-zA-Z]+;?)")
        # Iterate through the list of attendees
        print(pattern.findall(raw_attendee_list))

        for string in pattern.findall(raw_attendee_list):

            if string[-1] == ";":
                string = string[0:-1]
            try:
                attendeeID = UsersInfo().get_uid_by_username(string)
            except IndexError:
                print("[WARN] Username '{0}' not recognised".format(string))
                attendeeID = 0
                valid = False
                # Show a warning dialog and prevent the form from completing.
            if attendeeID:
                meeting.add_meeting_attendee(attendeeID)
        return valid
```

From the file "*NewMeetingDialog.py*" in the class "*NewMeetingDialog*". I used python's built in support for regular expressions, in this instance, I wanted the user names input as text and separated by any non-alphabet character, for this I used the regex *([a-zA-Z]+;?)* which is designed to separate strings based on any characters which are not in the alphabet (a-Z) and are either upper or lower case. It then checks each of the strings it finds against the database. Because of the way the database code is written, if it can't find a user with a matching username, it raises an *IndexError*, which is caught by the "***except** IndexError*" and processed appropriately.

Evaluation

Customer Requirements

In this section I will compare the final project to the original specification outlined by my client in the analysis section and evaluate the final project in it's effectiveness in fulfilling those objectives, and should it fail to fulfil one or more objective, I will explain why not.

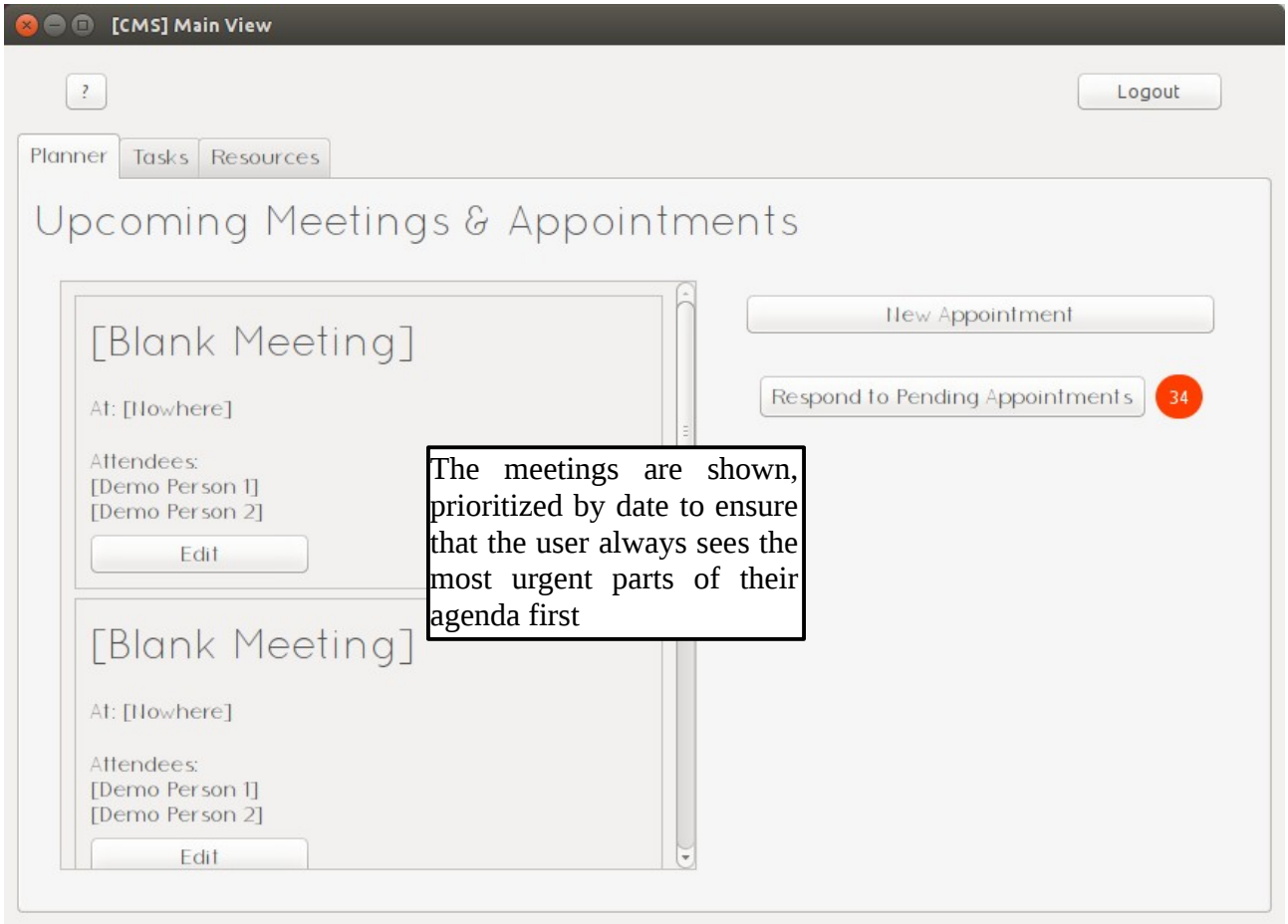
General Objectives

1 – A simple and clear layout for viewing recorded meetings

Fulfilled?

Yes, as is evident from my communications with the user after they completed a one-week trial use of the system, the user found that the planner section was organised in a way that is logical and easy to use, even without training.

Evidence

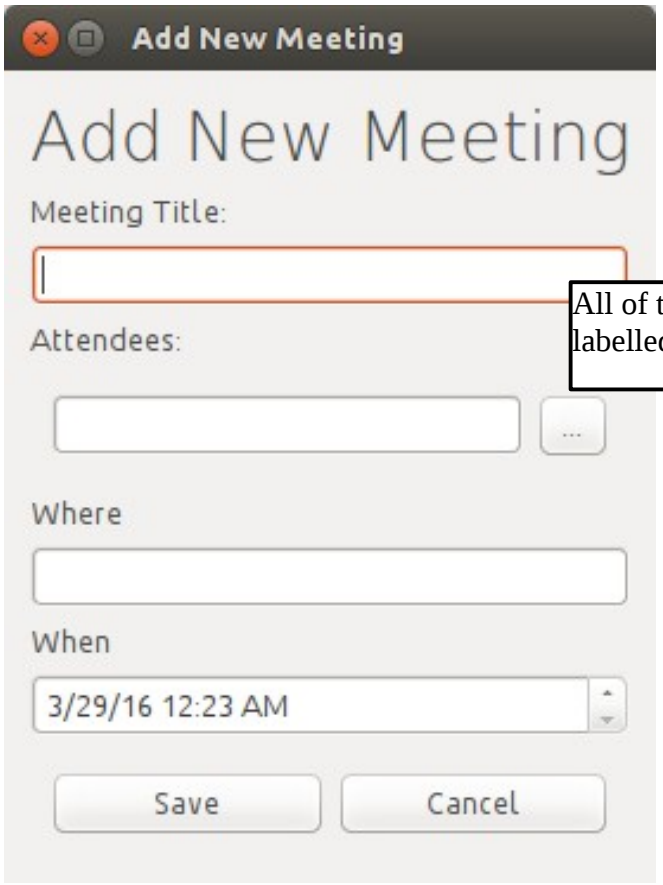


2 – A simple and clear layout for adding new meetings

Fulfilled?

Yes, when designing this part of the interface, I ensured there was no uncertainty in what each part of the system does, I made sure the design was simple, yet effective. All the entry points are clearly labelled in a way which cannot be misinterpreted. I chose to model the UI similarly to mobile interfaces, with which all of the staff team is familiar.

Evidence

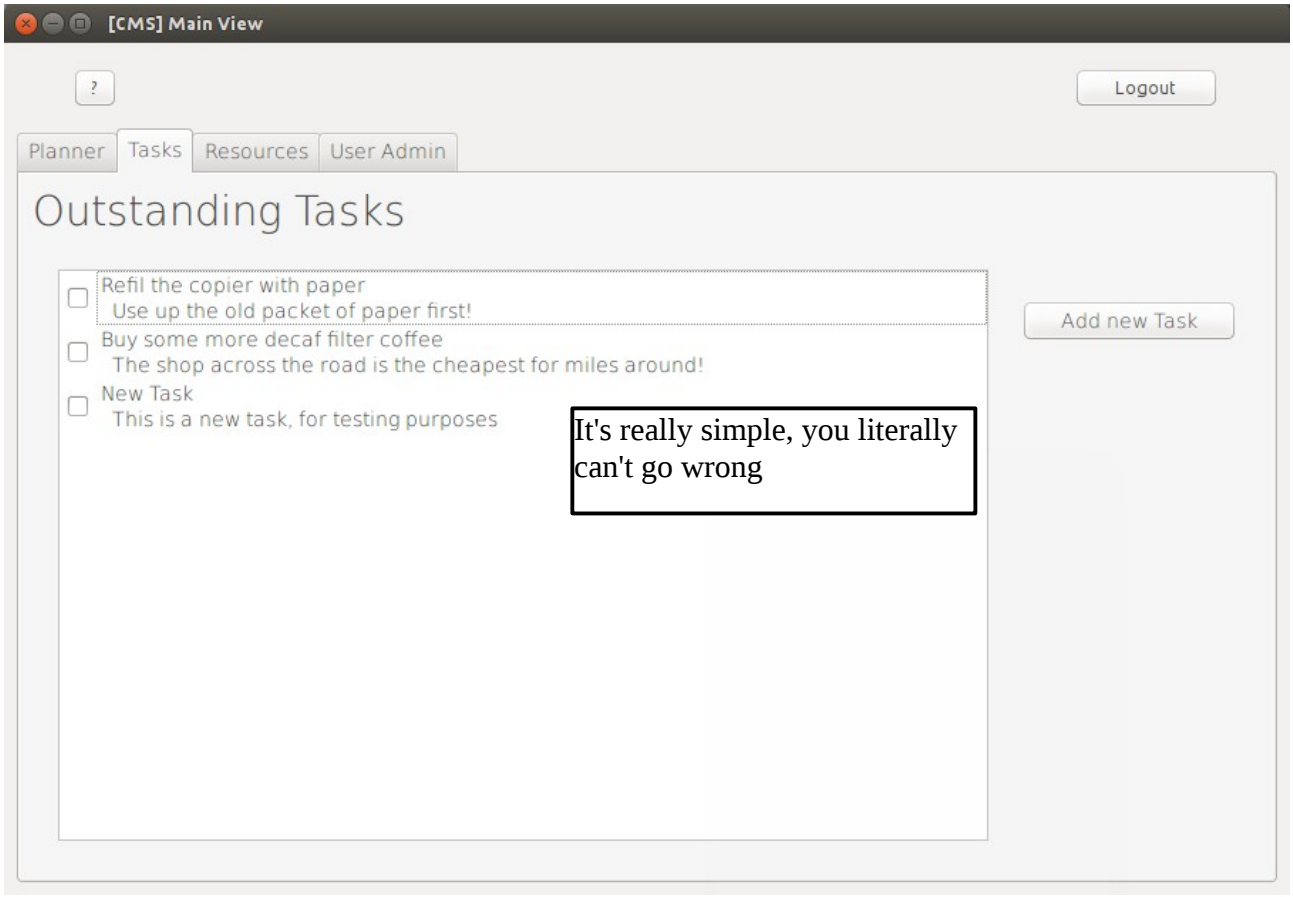


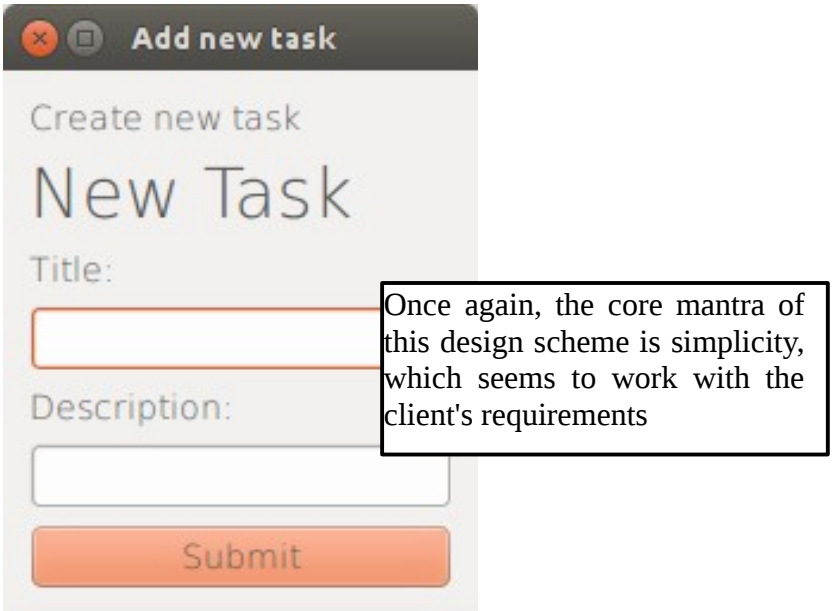
3 – A simple and clear layout for adding and viewing a to-do list of tasks

Fulfilled?

Yes, the list interface is designed to mirror a traditional paper checklist (which is something the client commented on in the appraisal), each task can be ticked as done and new tasks can be added using a simple form following the same principles as the forms for adding meetings

Evidence



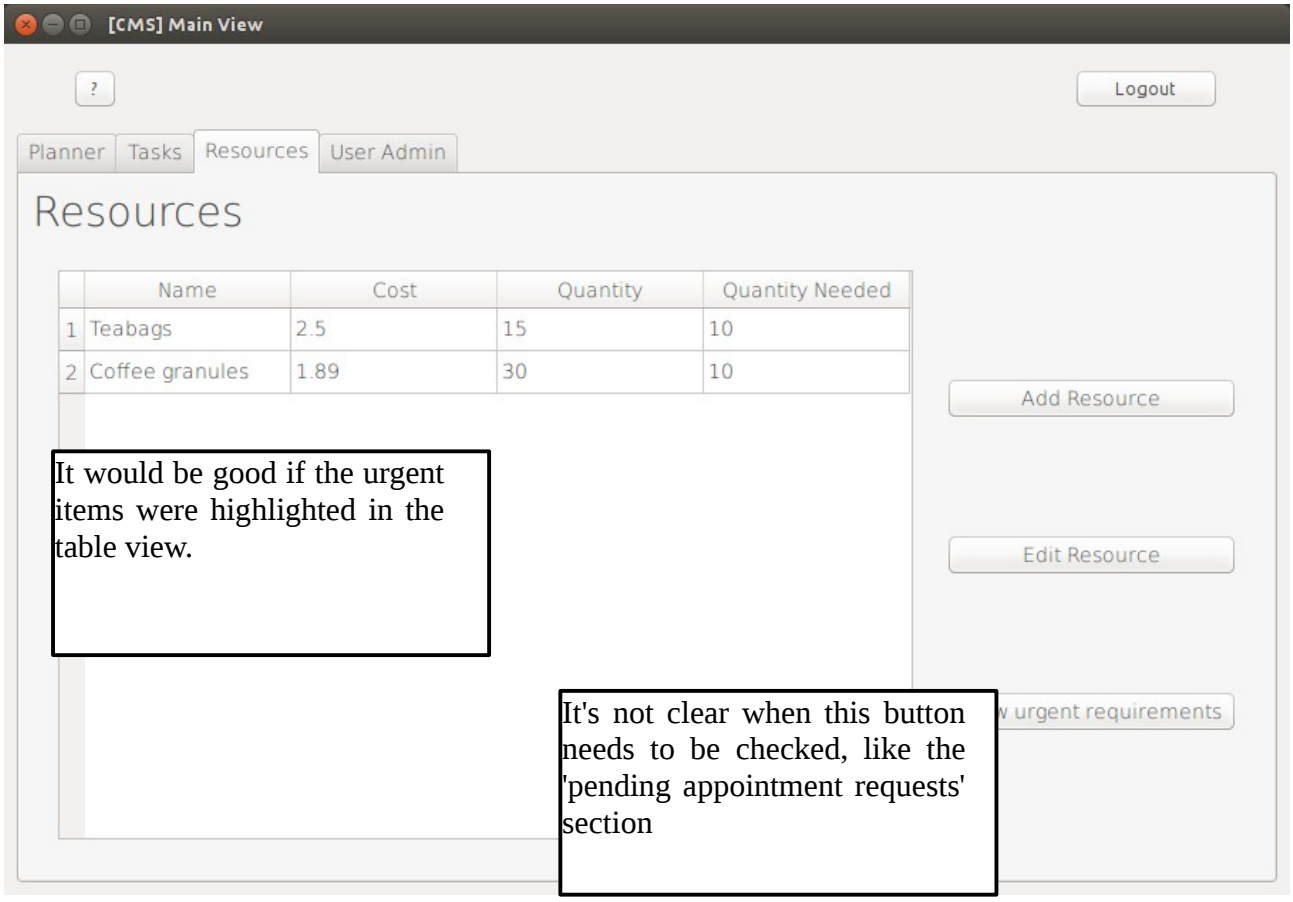


4 – A Clear and effective way of monitoring stock levels of various resources

Fulfilled?

Partially, initially, the user was unsure of how to use this part of the system at first, but with the aid of the supplied manual they managed to work around the difficulties. The client also commented that there was no notification of when there was a resource running low, so they did not know when to click on the “View urgent requirements” button. However, the user commented later on that once they had added a few resources, and familiarised themselves with this part of the system they found they became more accustomed to it.

Evidence:

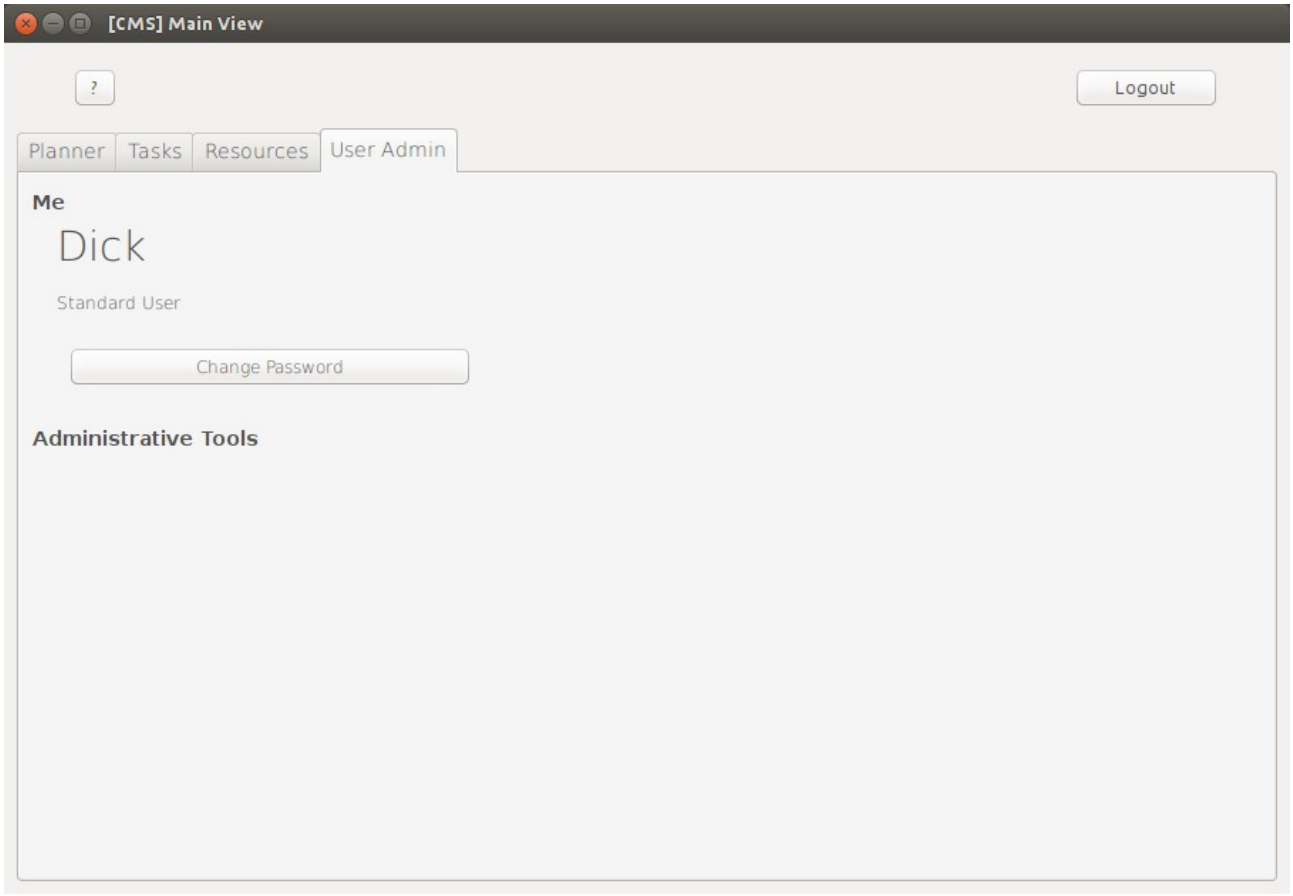


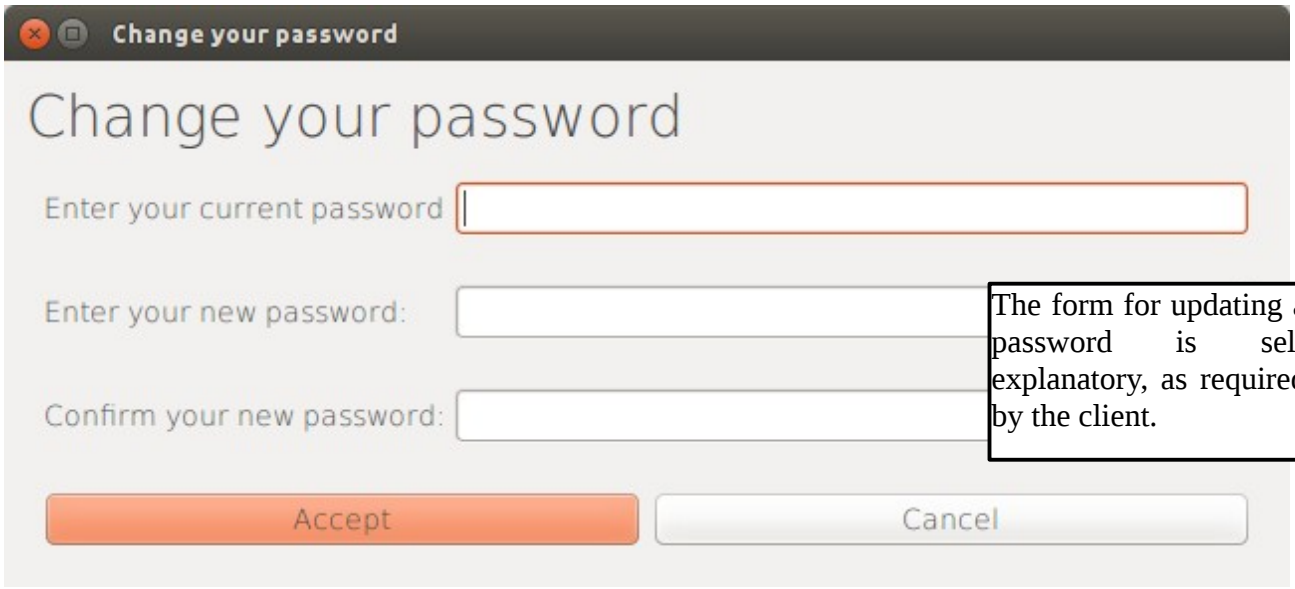
5 – A way to edit the user information

Fulfilled?

Partially, after liaisons with the client, we decided that it was only necessary for the user to be able to change their password, and no other information. So, with the updated objective, *A way for users to change their passwords*, is fulfilled.

Evidence:





The form for updating a password is self explanatory, as required by the client.

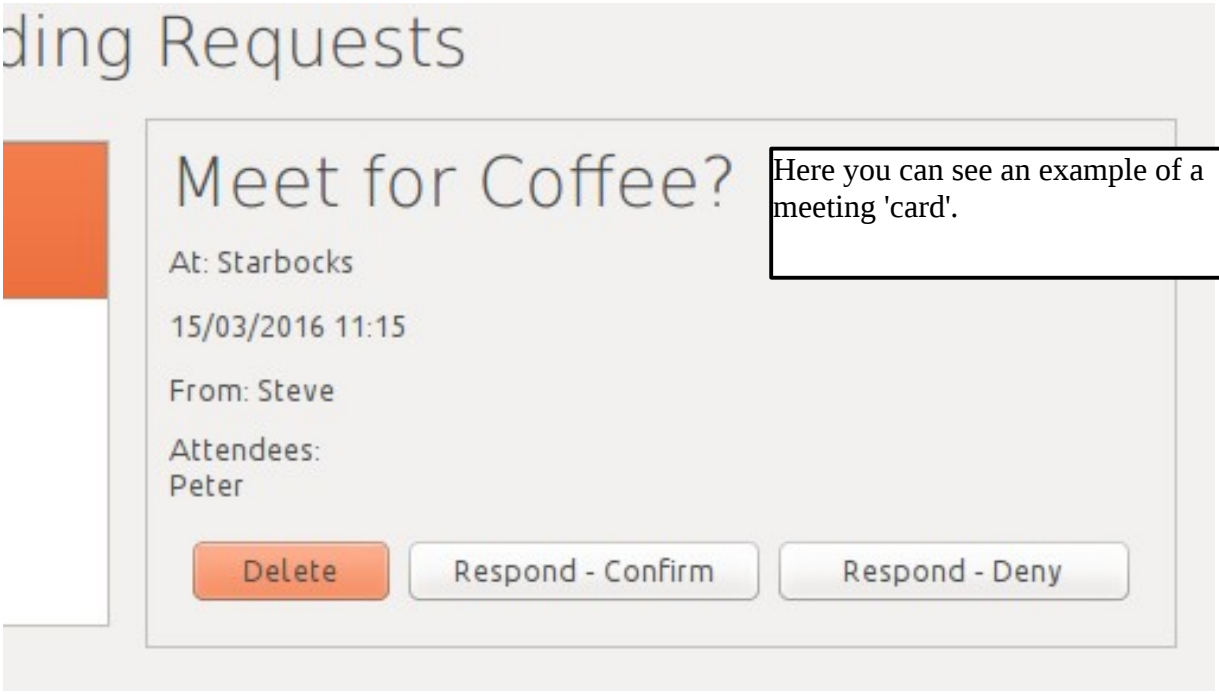
Specific Objectives

1.1 – A clear and consistent structure used for displaying meeting objects

Fulfilled?

Yes, I created a customized Qt widget in the style of a business card, or a diary entry to use for displaying meetings throughout the system. The client commented on how helpful the consistency was in clarifying and distinguishing the various elements of the system.

Evidence:



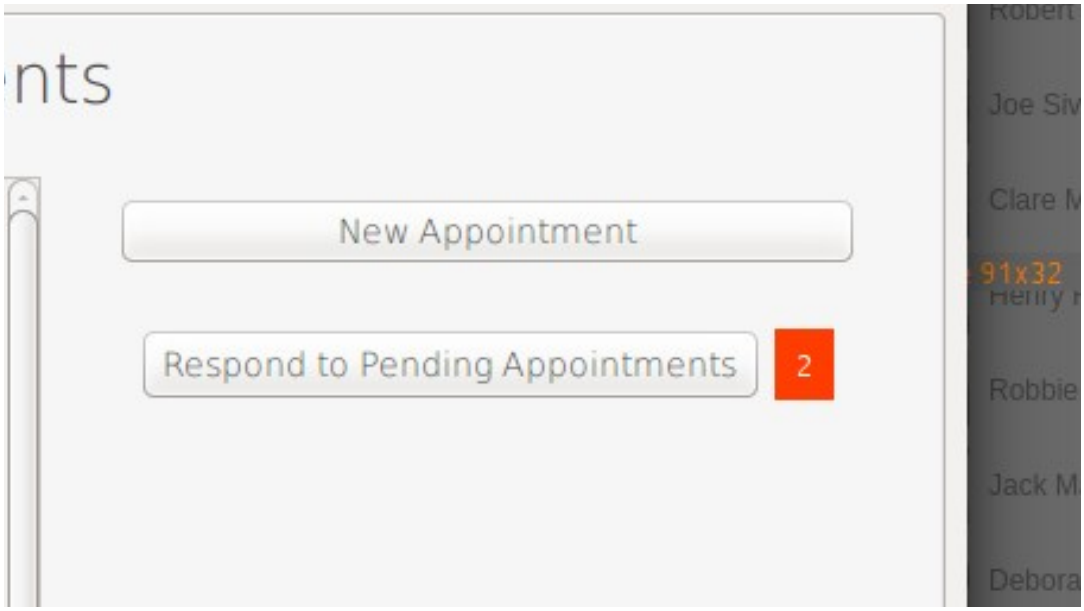
Here you can see an example of a meeting 'card'.

1.2 - Minimal controls to ensure accessibility and to reduce the necessity for training.

Fulfilled?

Yes, throughout the interface design process, I made sure that the controls were kept to a minimum and there were no unnecessary buttons so the interface can be as simple as possible to make it easy to learn. I also made sure the labels for the controls were both descriptive and to-the-point so that the interface is self-explanatory.

Evidence

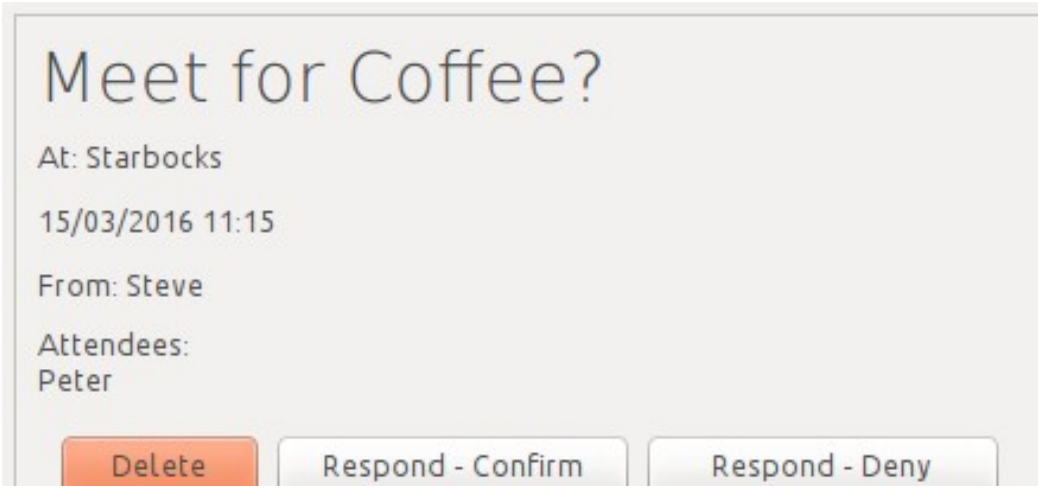


1.3 - Only essential information shown

Fulfilled?

Yes, my client and I decided what would constitute essential information and we concluded that a brief title, the date and time, the location and a list of other attendees was all the information that is strictly needed to record a meeting. Which is why in this system, that is the only information that's stored about the meetings, and that's the only information that is shown about the meetings.

Evidence

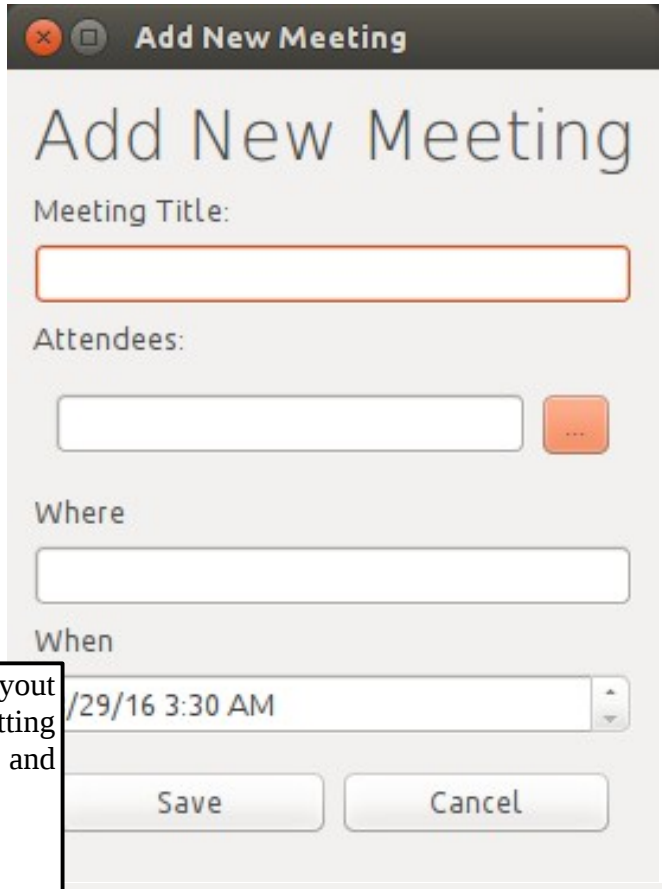


2.1 - An input structure that follows a pattern similar to how the meetings are displayed.

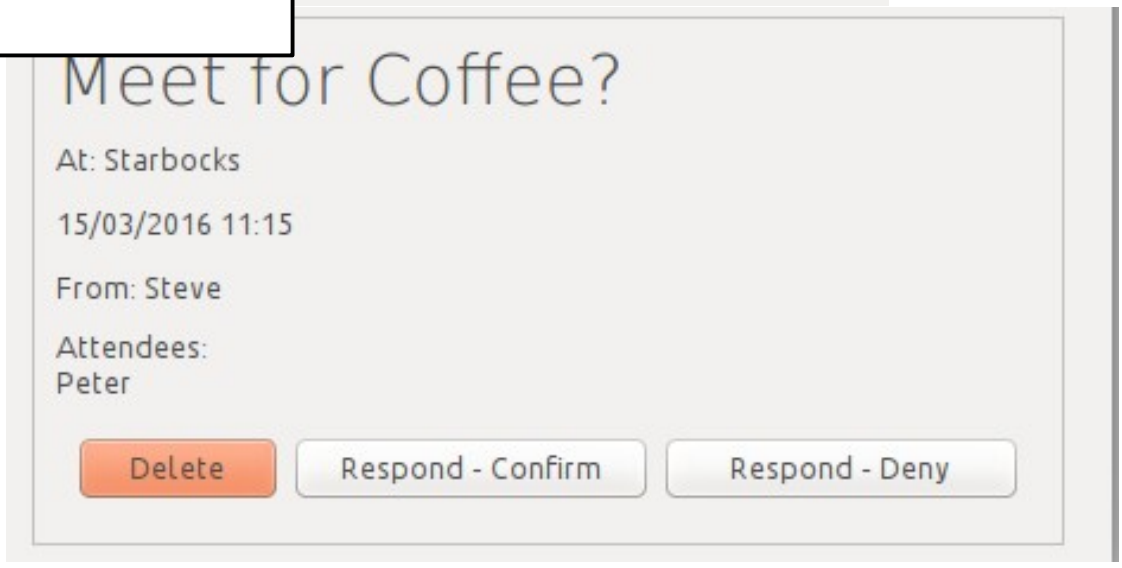
Fulfilled?

Yes, this is fulfilled, by the meetings input structure following a simple, clutter-free order, in the same way that the meetings are displayed.

Evidence



Notice the same, vertical layout used for displaying and inputting information in both the input and output parts of the system

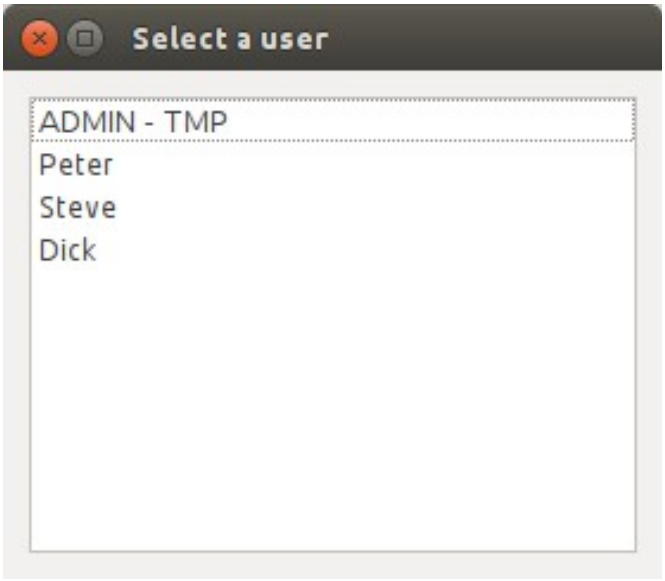


2.2 - Easy selection of attendees from a pool of available users.

Fulfilled?

Yes, I included a 'select' username function in the 'add meeting' window, it performs this task.

Evidence



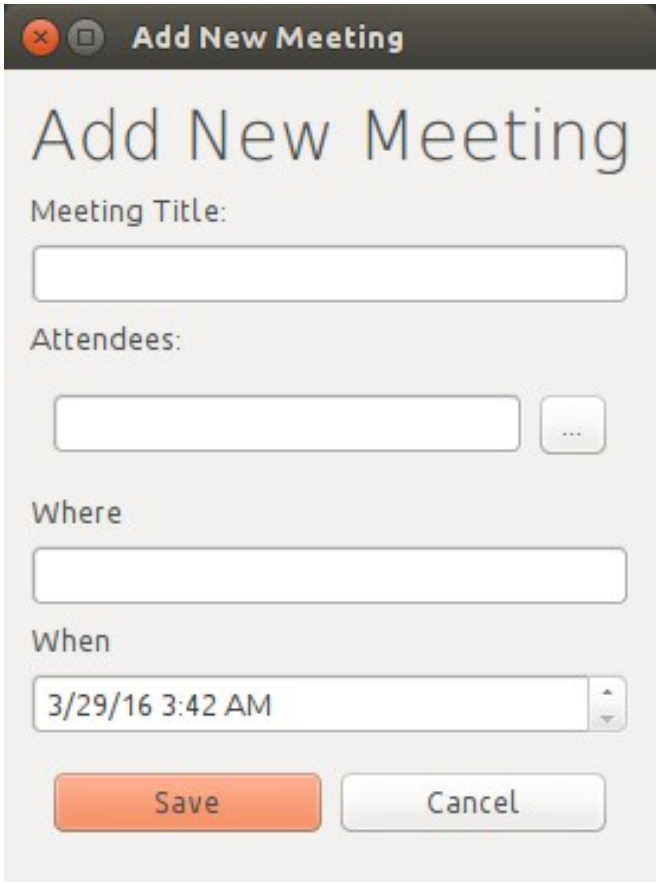
2.3 - Validation of the user's input

Fulfilled?

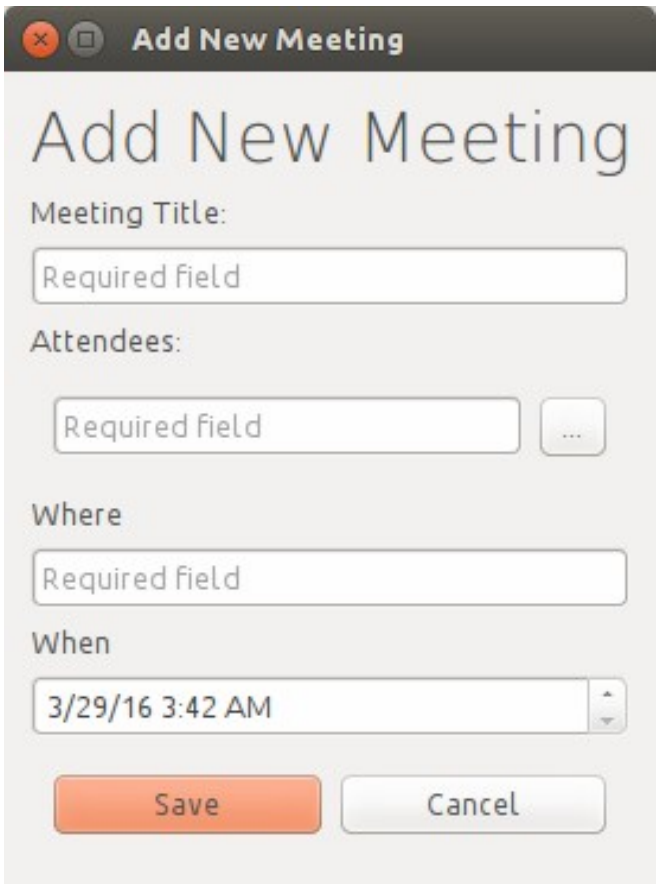
Yes, the user's input is validated to the standards defined in the system design section

Evidence

Before



(after)

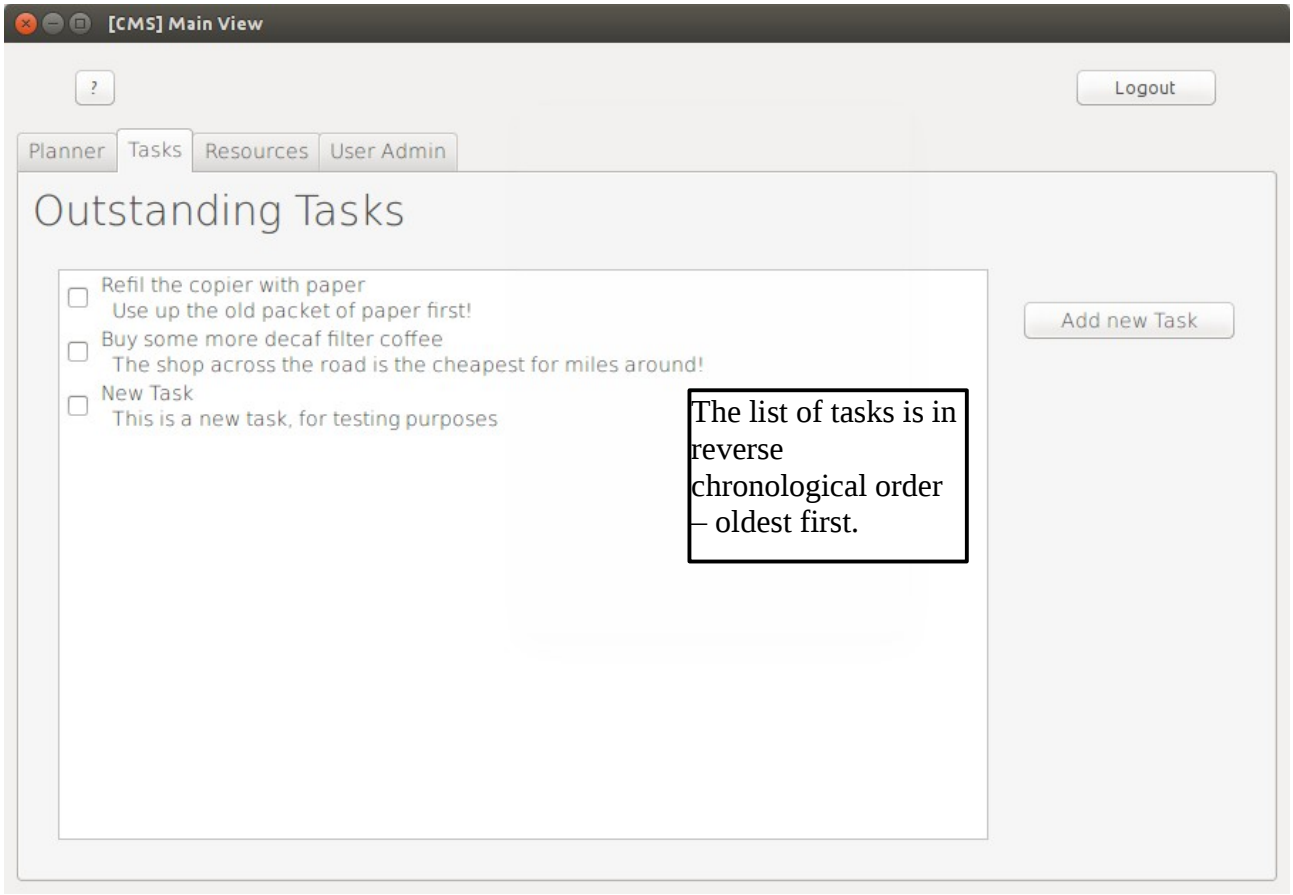

Add New Meeting
Add New Meeting
Meeting Title:
Required field
Attendees:
Required field
...
Where
Required field
When
3/29/16 3:42 AM
Save
Cancel

3.1 - A clear, prioritized list of tasks

Fulfilled?

Partially, the list of tasks is not prioritized as the individual tasks to not have a time, or due date associated with them. However, there is a clear list of tasks, which is the main part of what the client wanted.

Evidence

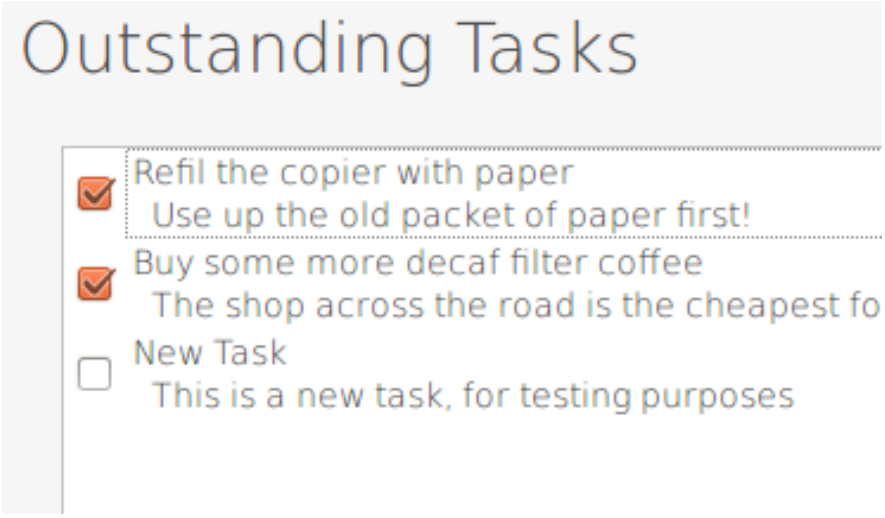


3.2 - The option to mark tasks as “Done”

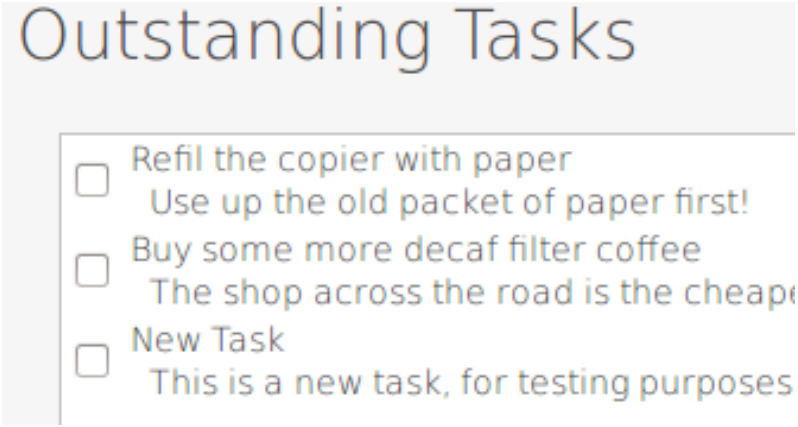
Fulfilled?

Partially, the user has the ability to mark a task as done, but this is not stored in the database. So a user can mark a task as completed but when they logout of that session, the tasks are all reset.

Evidence



After restarting the software…

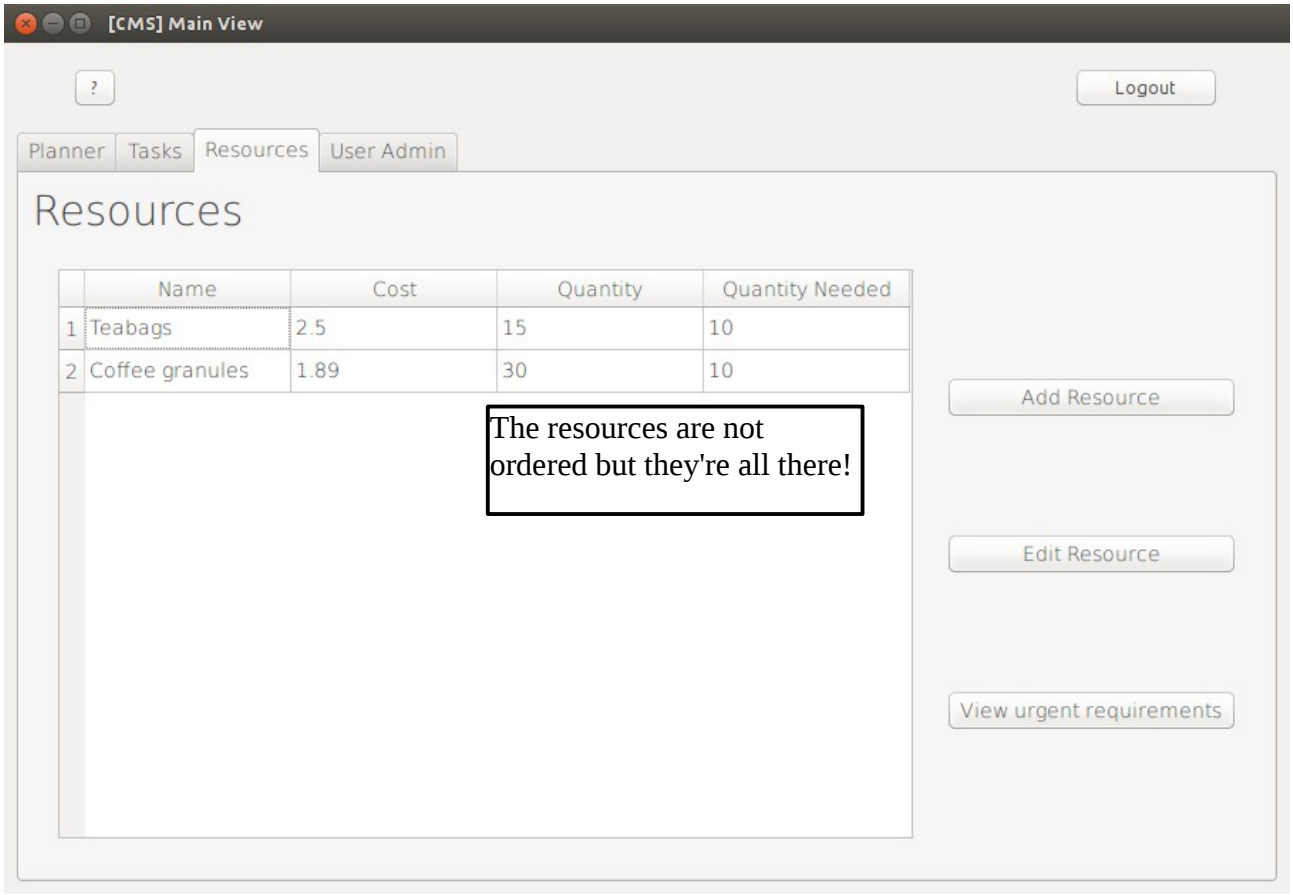


4.1 - An ordered table of information for all the recorded resources

Fulfilled?

Partially, the table is not ordered, but it is complete, so the essential functions of the table operate. During the original brief, the client stated that the resources management subsystem was not as important as the meetings or the tasks subsystems.

Evidence



4.2 – The ability to add additional resources at any time

Fulfilled?

No, I ran out of time, so I was not able to fully develop the forms and database interactions for this part of the subsystem.

4.3 - The ability to update the quantity of resources available.

Fulfilled?

As with section 4.2, I did not have sufficient time to complete this part of the subsystem.

4.4 - A way to quickly view a list of resources that are below the required level.

Fulfilled?

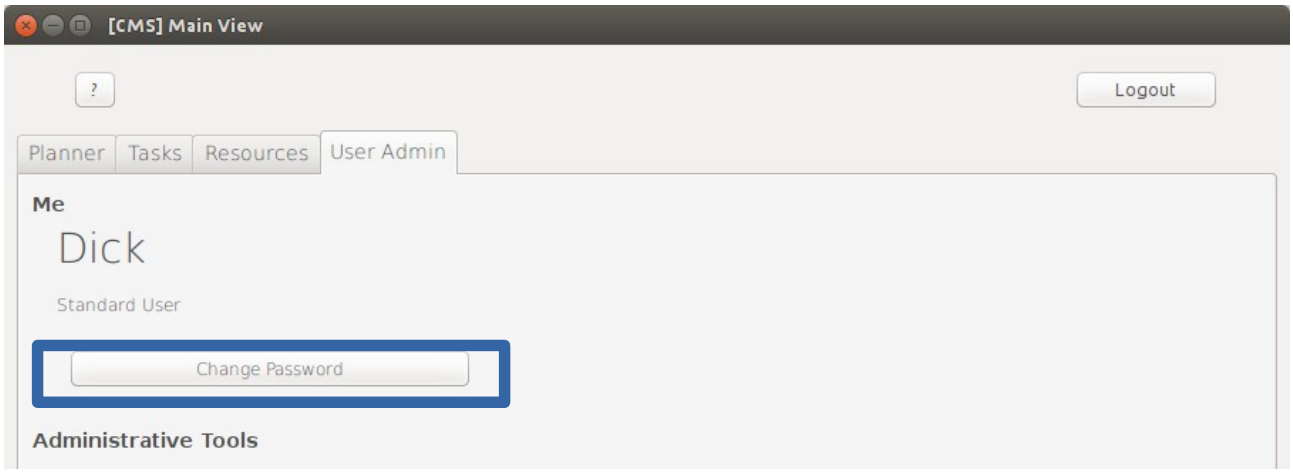
As with sections 4.2 and 4.3, there was insufficient time for me to implement this part of the subsystem.

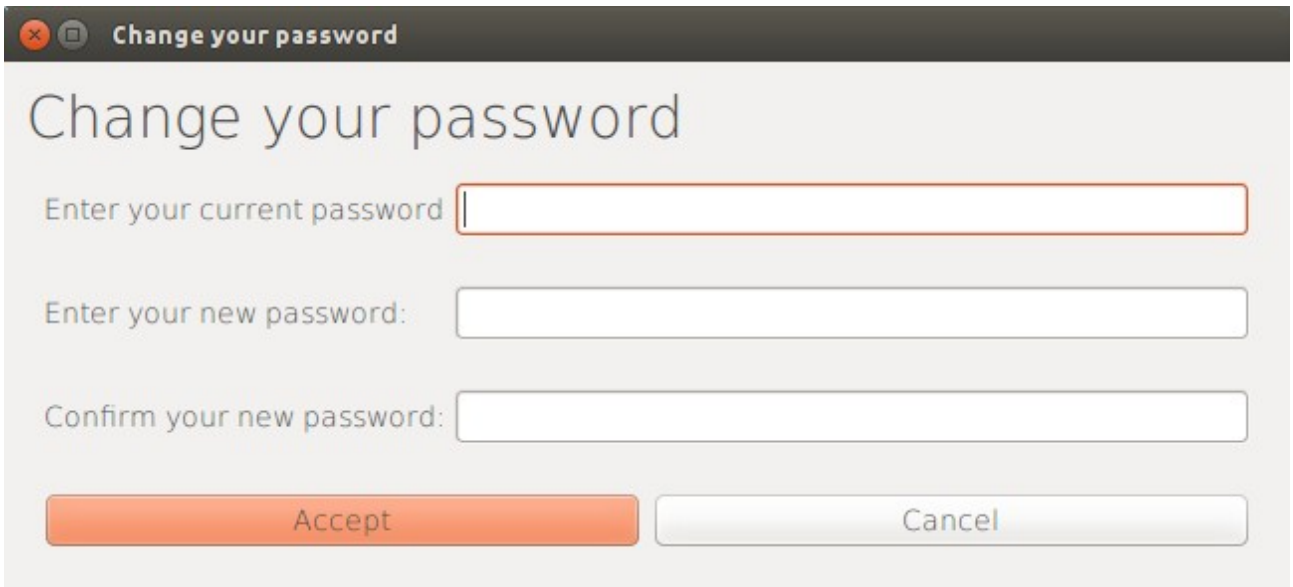
5.1 - A way to change the user's password

Fulfilled?

Yes, there is support for password changing.

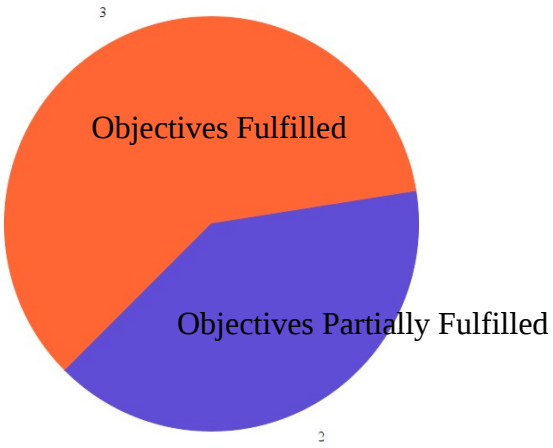
Evidence



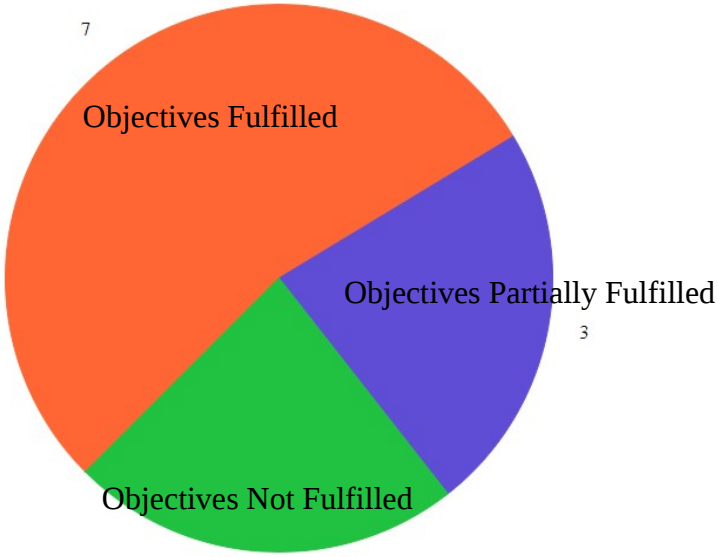


Effectiveness Summary

Out of 5 general objectives, the system I produced 3 fully and 2 partially. Of the 13 specific objectives, this system fulfils 7, partially fulfils 3 and fails to fulfil 3.



General objectives



Specific Objectives

From this data and these charts, it is clear to see that the majority of the objectives have been met to some extent, however a significant proportion of objectives have not been met fully. During development of the system, I prioritized the subsystems that the client prioritizes in their daily operations (as defined in the initial discussion with them about which objectives are most important to them) therefore I can conclude that the system is effective in achieving it's general objectives.

Learn-ability

One of the key parts of the organisation that I developed this system for is that the structure of the staff team changes at least twice per year, so it's important that the system is easy to learn so no time is wasted in training. Because of the range of ages of the people who will be using this system, it is fair to assume no knowledge of computers.

Because of this, I ensured the following was in place as part of my system:

- First I ensured the layouts were similar to the only point of reference many of the users would have – mobile and tablet interfaces. This is to give the system a familiar feel and to use logical ways of interacting with an interface which have already been practised.
- Next I carefully chose simple, descriptive and clear words and phrases to label the various control elements throughout the system.

- Finally, I provided a complete user manual for each and every function within the system, in case the interface isn't self explanatory enough.

Usability

This section is to determine and evaluate the technical effectiveness of the user interface, this will be evaluate by several areas of the code:

- Clarity of the UI elements – basically how long it takes the user to notice where a button or a link is
- Efficiency of rendering – basically how long it takes for the computer to draw the GUI components onto the screen.
- Readability – how clear all the text is and how easy it is to read
- Navigability – if all the buttons and links work!

First of all, all of the UI elements are slightly larger than the operating system's standard size, this aids in differentiating between the various buttons and controls for navigating between the various screens and windows that make up the system. Also all of the screens and layouts follow a common design principle of information on the left and controls on the right, this uniformity throughout the system helps the users to anticipate where the various controls are going to be.

Because the GUI doesn't use any elements which require additional rendering, the drawing of the GUI is practically instantaneous, even on the lowest spec computer that was used for testing so the system is very usable in this respect.

Due to the fact that one of the main things that the client wanted was for everything to be clear and concise, there is not an occasion where there's a huge amount of text, however this doesn't make readability any less important, to ensure readability, I used a clear and regular sans-serif font that was designed specifically with readability in mind. For any dialogue boxes, windows or sections which have a 'key message', this is put as a title in a large font to emphasise that message. This also means that the user can understand exactly what's going on at a glance.

During the first part of the system testing (see testing section 1), I tested the navigation between sections, windows and dialogue boxes, and the system passed all of the tests.

In summary, I will conclude that my system is very usable, as it has passed the four tests of usability. I think the most important factors in usability are that everything works (navigability) and that everything is obvious (clarity of UI elements), the system I produced is successful in both of these, as well as having good standards of readability and efficient rendering, hence the system has a good level of usability.

Maintainability

Fixing Bugs

Although the testing phase of the system did not reveal any bugs, it is possible that a bug may arise during normal usage of the software, if this happens, it is possible for another developer to maintain

the code and fix the bug for the following reasons:

- Most of the code is self-documented so it should be easy to identify and rectify errors in the code (See the section on system maintenance)
- All of the data from the database is converted into python objects and then key-value python dictionaries so it should be easy to isolate the processing of erroneous data.
- Complicated sections of code are well documented in the System Maintenance section
- Explanations of the SQL queries can be found as part of the Design sections

Responding to New Requirements

The system is designed to be modular (as necessitated by the support for user permissions) so new modules can be written and added without much programming effort. The various factors involved with adding new features are listed below:

- The software is built on top of Python's object orientated programming (OOP) model, which allows for elements to be defined as classes, which means it'll be easy to find the various parts of the code, as well as making it possible to add large amounts of code without changing existing code.
- The majority of the code is self-documenting, with logically chosen variable, method and class names to further clarify the purpose of each variable.

Overall, I feel as though I have designed and implemented the system in such a way that it is easy to extend and maintain. However there are a few potential problems, as the documentation for the code is not fully exhaustive, for an experienced programmer, it shouldn't prove too much of a challenge.

Suggestions for Improvement

As part of their appraisal, the client mentioned several parts of the system which were not quite to the specification they had defined, for example, the resources management section is currently incomplete and does not meet some of the objectives.

Complete the Resources section

It's obvious that completing the system, as per specified in the original brief should be the first stage of improving the system, this would make the system the complete package that the client requested.

Complete the Tasks Section

Ensuring that the parts of the tasks section which do not fully meet the objectives specified in the analysis are completed to meet those objectives should also be a priority for future updates to the system.

Add Availability Cross-Referencing to the Meetings bookings

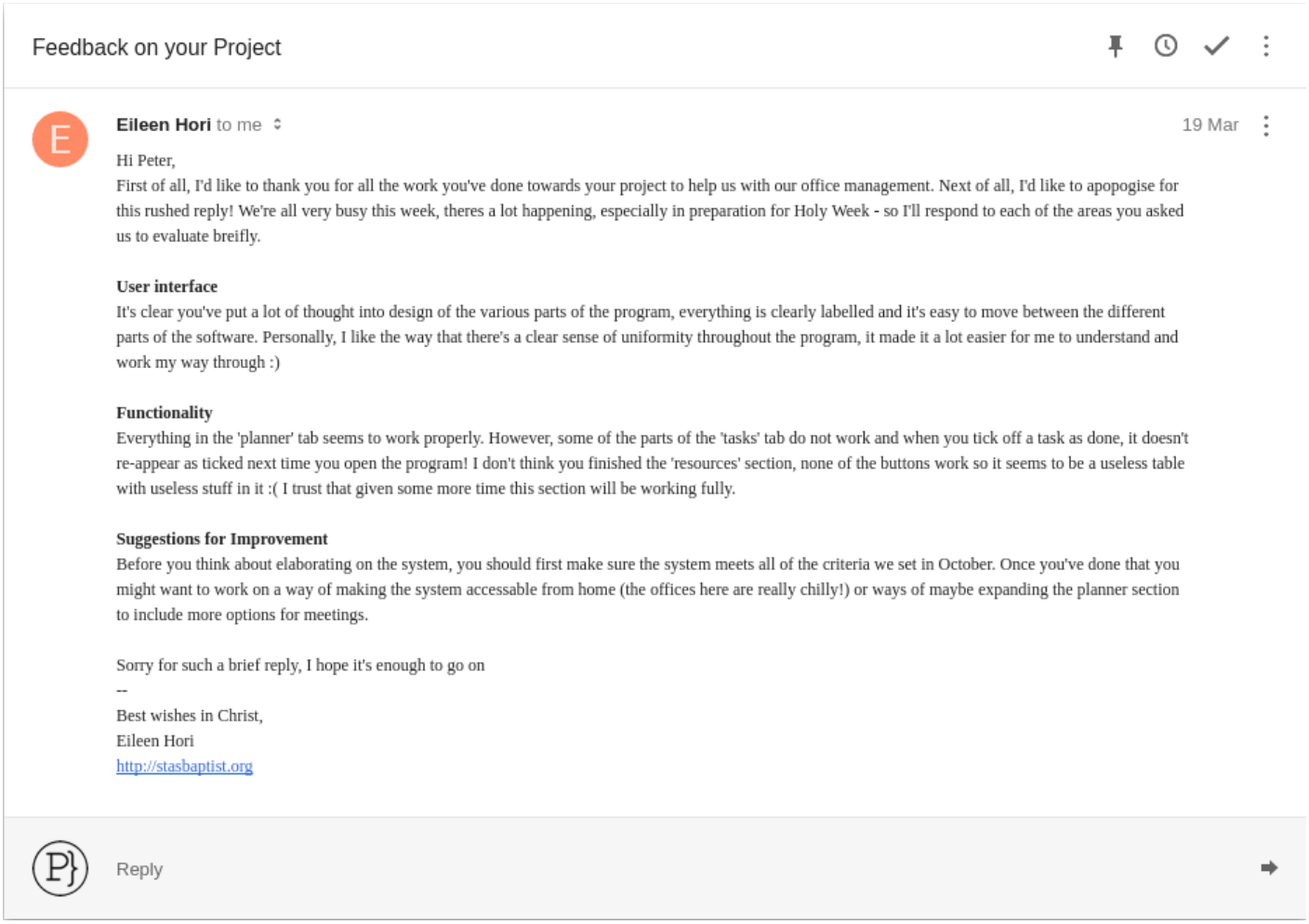
In the current rendition of the system, there is no mechanism to check if users are available for meeting at a particular time, and there is currently no way to keep track of how long a meeting is planned to be, which would be a logical next step.

Cloud storage

Services such as Microsoft Azure or AmazonWebServices offer hosted MySQL databases on remote servers which would mean that the system would be more secure, have all the benefits of a multimillion dollar datacentre such as daily backups, 99.99% uptime and the ability to access the database from anywhere in the world. The system would use all the same SQL queries, all the same GUI code, all apart from the code to execute the SQL queries.

End User Appendix

Here is part of an email conversation between me and my client



Feedback on your Project

Eileen Hori to me 19 Mar

Hi Peter,
First of all, I'd like to thank you for all the work you've done towards your project to help us with our office management. Next of all, I'd like to apopogise for this rushed reply! We're all very busy this week, theres a lot happening, especially in preparation for Holy Week - so I'll respond to each of the areas you asked us to evaluate breifly.

User interface
It's clear you've put a lot of thought into design of the various parts of the program, everything is clearly labelled and it's easy to move between the different parts of the software. Personally, I like the way that there's a clear sense of uniformity throughout the program, it made it a lot easier for me to understand and work my way through :)

Functionality
Everything in the 'planner' tab seems to work properly. However, some of the parts of the 'tasks' tab do not work and when you tick off a task as done, it doesn't re-appear as ticked next time you open the program! I don't think you finished the 'resources' section, none of the buttons work so it seems to be a useless table with useless stuff in it :(I trust that given some more time this section will be working fully.

Suggestions for Improvement
Before you think about elaborating on the system, you should first make sure the system meets all of the criteria we set in October. Once you've done that you might want to work on a way of making the system accessable from home (the offices here are really chilly!) or ways of maybe expanding the planner section to include more options for meetings.

Sorry for such a brief reply, I hope it's enough to go on
--
Best wishes in Christ,
Eileen Hori
http://stasbaptist.org

Reply