

Queens College, CUNY, Department of Computer Science  
**Software Engineering**  
**CSCI 370**  
**Fall 2018**

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## 1 Project 1

### 1.1 General

- The overall project specification is to implement an email project.
- Various details of the project are listed below.
- The basic visualization is that of a client-server application. **See 1.2.**
- **The project must be self-contained.**
  1. It is not permitted to connect to Gmail or Yahoo, etc. servers.
  2. *Else what are you really doing?*
  3. The project must be 100% **your** work.
- **Trademark/copyright.** To avoid problems with trademark and copyright (no matter how minor the possibility), project submissions will be required to implement the following three domain names.
  1. `cq.edu`
  2. `yg.com` (It is available for sale!)
  3. `lnb.gov` (I used to work at Brookhaven National Lab `bnl.gov`.)

## 1.2 Client-server, database & GUI

- Client & Server

1. **The use of a client-server implementation is optional.**
2. The entire application may be “one program” not separate client and server programs.

- GUI

1. **There must be a visual display to users.**
2. This is part of the concept of a “user friendly” interface.
3. However the requirements for a “GUI” are not very strict.
4. Essentially, the term “GUI” means a minimal visual display.
5. *Contact me if you do not know how to write a GUI.*

- Database

1. **The use of a database is optional.**
2. **Use of SQL is optional.**
3. However, the application must be persistent across invocations.
4. Therefore the use of a persistent storage medium is mandatory.
5. It is acceptable if data is stored in text files instead of a database.
  - (a) The format of a text file should be in a way the looks like a database table.
  - (b) There must be a concept of a primary key.
  - (c) **A text file must not contain duplicate rows (violation of primary key).**
6. Two messages with the same sender, recipient, subject and text must be resolved and stored as different messages. (They should have different time stamps.)
  - (a) This requirement applies to storage of messages in either a text file or database.
  - (b) If a “reply” is sent to one of the two above messages, the application must identify which is the correct original message that the reply refers to.

### 1.3 Server

- Details of the server are left to the student.
- **The use of a server is optional.**
- **The items below describe “functionality” but can be implemented without a server.**
- Either a different server for each domain, or one server which supports all the domains.
- If there are multiple servers, the software architecture must explain how they communicate with each other.
- **A server must support client requests to create new email accounts for one of the above domains.**
- The client and server must respond gracefully (not crash or throw an unhandled exception) if an account name has already been registered by another client.
- The accounts must be persistent across invocations, i.e. it must be possible to switch off/shut down the server(s) and restart, and to verify all the email accounts are reloaded upon restart.
- Hence a persistent storage medium to store accounts is required.
- The details of the persistent storage medium (database or text file) are left to the student.

## 1.4 Client/GUI

- **All students/teams are expected to write a GUI, to display results.**
- **It is optional to implement the GUI as a “client” connecting to a server.**
- **The items below describe “functionality” but can be implemented without a server.**
- The messages must be persistent across invocations, i.e. it must be possible to switch off/shut down the client and restart, and to see all the emails upon restart.
- Hence a persistent storage medium to store messages is required.
- The details of the persistent storage medium (database or text file) are left to the student.
- The client must implement (i) an inbox folder, (ii) an outbox folder and (iii) a drafts folder.
  1. Messages in the drafts folder are read/write.
  2. Messages in the inbox and outbox folders are read only.
  3. We shall ignore the “cc” and “bcc” fields, implement “from” and “to” only.
  4. **The “to” field must support contain multiple recipient names.**
- **Suggestion**
  1. It may be a good idea to create a “Name” object, which contains a “nickname” as well as a full address.
  2. A Name object may contain a “nickname” `John` as well as the full address `John@domain`.
  3. Hence the “from” and “to” fields of an email display `John` not the full string `John@domain`.
  4. *This is a suggestion:* implementation details are left to the student.
- The client must implement “reply” and “forward” functions for emails.
- The client must implement a “send” function for an email in the drafts folder.
  1. If the “to” field is blank, an error message should be displayed.
  2. If the “to” field is not blank, a date stamp is inserted into the message (use the system clock) and the message is transferred to the outbox folder (and becomes read only).
  3. **Fraud protection: it must not be possible under any circumstances to edit the date stamp of an email.**
  4. If delivery fails because the “to” field not recognized, an error message should be displayed. (“Graceful handling of errors.”) The client/server should not crash or throw and unhandled exception.

### 1.5 Scalability/extensibility

- It should be perfectly obvious that I will ask students to implement a fourth domain name.
- Students must be able to demonstrate how easy is it to extend their design to accomodate an extra domain name.
- **An important part of the project grade is to demonstrate how flexible is the implementation, to support new/extra requirements.**

## 1.6 Update about user accounts (9/16/2018)

- The password should be **minimum 4 and maximum 12 characters.**
- The userid (including '@' and domain) should be **maximum 20 characters.**

## 1.7 Update (9/25/2018)

- **Make all your screens a reasonable (easily readable) size.**
  1. This means both not too small and also not too big.
  2. Some displays are so big I cannot see all the buttons on screen. I have to resize the screen to see the whole panel on my computer screen.
  3. Some displays are so small I have a hard time reading the text.
- **Login and new accounts (signup/register)**
  1. Implement a pulldown menu with a choice of domains (@cq.edu, @yg.com, @lnb.gov).
  2. It is inconvenient to type “@domain-name” every time.
  3. Also a pulldown menu avoids mistakes in typing (wrong spelling, etc.) and avoids entering non-supported domains.
- **Delete messages**
  1. Inbox/outbox: in addition to reply/forward, also implement a “delete message” function.
  2. Drafts: implement a “delete (or discard) draft” function.
  3. A person may decide not to send a draft and may wish to throw it away.
- **Multiple draft messages**
  1. I will create multiple draft messages, which are all blank (no recipient, no subject, no text) and I will save them (and restart the application and reopen the drafts folder).
  2. I will create multiple draft messages, with identical content (same recipient, same subject, same text) and I will save them (and restart the application and reopen the drafts folder).
  3. In all cases, your project must recognize they are different drafts and must store and reload them correctly.
- **Edit draft message**
  1. I will create a draft message and save and reload it.
  2. Then I will edit the draft and save it again.
  3. Your project must recognize that I have updated an existing message, and must not create a “new draft” message.
  4. When I reload the drafts folder, I should see only my latest edit and not multiple draft messages, i.e. not a “history” of every edit copy that I made.
  5. If I create and save two identical drafts (e.g. both blank) and then edit and save only one of them, your project must update the correct draft message. Do not update both drafts in the database. This should be obvious.

- **Inbox/outbox display of messages**

1. Inbox: the screen display should show “from, subject, time” (all email apps do this).
2. Outbox: the screen display should show “to, subject, time” (all email apps do this).

- **Drafts display of messages**

1. This is harder because a saved message could be blank.
2. Also there can be multiple drafts with identical text, etc.
3. I looked at the QC email app, the drafts display timestamps.
4. **Following the QC email system, the screen display should show “to, subject, time” (the “to” and “subject” will be blank, but the time will be unique).**
5. This can probably serve as a primary key.
6. You can set the timestamp to be the time of saving the draft.
7. This timestamp is updated every time the draft is saved.
8. **However, once the draft is sent, the timestamp becomes permanent and non-editable.**