Project II

Team ++

Requirements and Specifications Version II

Glossary

General Terminology:		
	Add Button	Displays a pop-up window of available Contacts to add to the current Department or a list of Contacts and Departments to add to a Report. Only visible when "Edit" has been selected for the current Department or Report.
	Administrator	Main user of the GUI.
	Cancel Button	Reverts the changes made to Editable Fields.
	Confirmation Message	The pop-up window displayed when confirming saves, deletions, and sending of Reports.
	Contact	Information within the system pertaining to an individual, such as address, phone number, email address, and other Fields.
	Core Reporting API	A means of accessing and manipulating the data from GA.
	Create Button	A "+" sign on the GUI. Makes a new item in the current List Pane that will be stored in the database.
	Database Error	Any error that may be returned by the database.
	Delete Button	A trash bin on the GUI. Deletes the selected item in the current List Pane.
	Department	A collection of Employee Contacts grouped into departments within the company.
	Department Association	A database table in which each row is a link between a Department and a Contact.
	Details Pane	A section of the GUI for viewing or manipulating the information associated with a single Contact,

		Department, or Report.
	Dimensions*	Breaks down metrics across some common criteria, such as date, city, browser, and operating system.
	Edit Button	Makes the Fields on the current Details Pane Editable Fields. Once selected, this button changes to "Cancel" and "Save" buttons.
	Editable Field	A Field that can be modified by the Administrator.
	Employee	A person working within the company. Employee information is stored as a Contact.
	Field	A single element of information. May be Static or Editable.
	Field Error	An Editable Field rendered with red text as the result of erroneous or invalid user input.
	GA	An abbreviated term for Google Analytics.
	GA Profile	Created for a website within a user account to track the website's metrics.
	GA Query	A request of data from the profile selected in Google Analytics
	Google Analytics	A utility provided by Google to analyze data gathered from a selected website profile.
	GUI	Graphical User Interface
	Input Error	Any error that may be returned as the result of the user attempting to save an Editable Field with a Field Error.
	List Item	An individual Contact, Department, or Report in the List Pane.
	List Pane	A searchable, singularly selectable list containing all of the Contacts', Departments', or Reports' names, depending on the selected Tab.
	Maximum Results	The upper bound of the number of returned elements from the

		GA Query.
	Metrics*	The individual measurements of visitor activity on your site. Options include visitors, number of new visits, and the amount of time a user spends on the site.
	Preview Button	Queries GA servers using the selected Report and displays the Report Results in a pop-up window.
	Remove Button	Removes the selected Contacts from the current Department or the selected Contacts or Departments from a Report. Only visible when "Edit" has been selected for the current Department or Report.
	Report	A collection of Dimensions, Metrics, Specified Recipient(s), and other information used in generating a Report Results.
	Report Association	A database table in which each row is a link between a Department or a Contact and a Report.
	Report Results	The formatted results returned by GA generated from a query using a specific Report's data.
	Revert	Changes settings back to the last saved settings.
	Save Button	Updates the database with changes made to Editable Fields.
	Send Button	Queries GA servers using the selected Report and emails the Specified Recipient(s) the resulting Report.
	Server Error	Any error that may be returned by GA servers or the mail server.
	Settings Pane	A sub-section of the GUI for viewing and editing the preferences.
	Specified Recipient(s)	The Contacts or Departments who will be receiving a Report, saved in the Report Association table.

	Static Field	A Field that is in an immutable state.
	Tab	A sub-section of the GUI containing the List Pane and Details Pane for the current selection or the Settings Pane for the settings.
Dimensions*:		
Dimension Type	Dimension	Definition
Visitor	visitorType	A Boolean indicating if a visitor is new or returning. Possible values: New Visitor, Returning Visitor.
	visitCount	The visit index for a visitor to your website. Each visit from a unique visitor will get its own incremental index starting from 1 for the first visit. Subsequent visits do not change previous visit indices. For example, if a certain visitor has 4 visits to your website, ga:visitCount for that visitor will have 4 distinct values of '1' through '4'.
	daysSinceLastVisit	The number of days elapsed since visitors last visited your website. Used to calculate visitor loyalty.
	userDefinedValue	The value provided when you define custom visitor segments for your website.
Session	visitLength	The length of a visit to your website measured in seconds and reported in second increments. The value returned is a string.
Traffic Sources	referralPath	The path of the referring URL (e.g. document.referrer). If someone places a link to your website on their website, this element contains the path of the page that contains the referring link.
	campaign	When using manual campaign tracking, the value of the

		utm_campaign campaign tracking parameter. When using AdWords autotagging, the name(s) of the online ad campaign that you use for your website. Otherwise the value (not set) is used.
	source	The source of referrals to your website. When using manual campaign tracking, the value of the utm_source campaign tracking parameter. When using AdWords autotagging, the value is google. Otherwise the domain of the source referring the visitor to your website. (e.g. document.referrer). The value may also contain a port address. If the visitor came to the site without a referrer, the value is (direct)
	medium	The type of referrals to your website. When using manual campaign tracking, the value of the utm_medium campaign tracking parameter. When using AdWords autotagging, the value is ppc. If the user comes from a search engine detected by Google Analytics, the value is organic. If the referrer is not a search engine, the value is referral. If the visitor came directly to the site, and document.referrer is empty, the value is (none).
	keyword	When using manual campaign tracking, the value of the utm_term campaign tracking parameter. When using AdWords autotagging or if a visitor used organic search to reach your website, the keywords used by visitors to reach your website. Otherwise

		the value is (not set).
	adContent	When using manual campaign tracking, the value of the utm_content campaign tracking parameter. When using AdWords autotagging, the first line of the text for your online Ad campaign. If you are using mad libs for your AdWords content, this field displays the keywords you provided for the mad libs keyword match. Otherwise the value is (not set)
	socialNetwork	Name of the social network. This can be related to the referring social network for traffic sources, or to the social network for social data hub activities. E.g. Google+, Blogger, reddit, etc.
	hasSocialSourceReferral	Indicates visits that arrived to the site from a social source (i.e. A social network such as Google+, Facebook, Twitter, etc.). The possible values are Yes or No where the first letter is capitalized.
Platform/Device	browser	The names of browsers used by visitors to your website. For example, Internet Explorer or Firefox.
	browserVersion	The browser versions used by visitors to your website. For example, 2.0.0.14
	operatingSystem	The operating system used by your visitors. For example, Windows, Linux , Macintosh, iPhone, iPod.
	operatingSystemVersion	The version of the operating system used by your visitors, such as XP for Windows or PPC for Macintosh.
	isMobile	Indicates mobile visitors. The possible values are Yes or No where the first letter must be capitalized.

	mobileDeviceBranding	Mobile manufacturer or branded name (e.g: Samsung, HTC, Verizon, T-Mobile).
	mobileDeviceModel	Mobile device model (e.g.: Nexus S)
	mobileInputSelector	Selector used on the mobile device (e.g.: touchscreen, joystick, clickwheel, stylus).
	mobileDeviceInfo	The branding, model, and marketing name used to identify the mobile device.
Geo/Network	continent	The continents of website visitors, derived from IP addresses.
	subContinent	The sub-continent of website visitors, derived from IP addresses. For example, Polynesia or Northern Europe.
	country	The countries of website visitors, derived from IP addresses.
	region	The region of website visitors, derived from IP addresses. In the U.S., a region is a state, such as New York.
	metro	The Designated Market Area (DMA) from where traffic arrived on your site.
	city	The cities of website visitors, derived from IP addresses.
	latitude	The approximate latitude of the visitor's city. Derived from IP address. Locations north of the equator are represented by positive values and locations south of the equator by negative values.
	longitude	The approximate longitude of the visitor's city. Derived from IP address. Locations east of the meridian are represented by positive values and locations west of the meridian by negative values.
	networkDomain	The domain name of the ISPs used by visitors to your website.

		This is derived from the domain name registered to the IP address.
	networkLocation	The name of service providers used to reach your website. For example, if most visitors to your website come via the major service providers for cable internet, you will see the names of those cable service providers in this element.
System	flashVersion	The versions of Flash supported by visitors' browsers, including minor versions.
	javaEnabled	Indicates Java support for visitors' browsers. The possible values are Yes or No where the first letter must be capitalized.
	language	The language provided by the HTTP Request for the browser. Values are given as an ISO-639 code (e.g. en-gb for British English).
	screenColors	The color depth of visitors' monitors, as retrieved from the DOM of the visitor's browser. For example 4-bit, 8-bit, 24-bit, or undefined-bit.
	screenResolution	The screen resolution of visitors' monitors, as retrieved from the DOM of the visitor's browser. For example: 1024x738.
Page Tracking	hostname	The hostname from which the tracking request was made.
	pagePath	A page on your website specified by path and/or query parameters. Use in conjunction with ga:hostname to get the full URL of the page.
	pagePathLevel1	This dimension rolls up all the page paths in the first hierarchical level in ga:pagePath.
	pagePathLevel2	This dimension rolls up all the page paths in the second hierarchical level in ga:pagePath.

	pagePathLevel3	This dimension rolls up all the page paths in the third hierarchical level in ga:pagePath.
	pagePathLevel4	This dimension rolls up all the page paths in the fourth hierarchical level in ga:pagePath. All additional levels in the ga:pagePath hierarchy are also rolled up in this dimension.
	pageTitle	The title of a page. Keep in mind that multiple pages might have the same page title.
	landingPagePath	The first page in a user's session, or landing page.
	secondPagePath	The second page in a user's session.
	exitPagePath	The last page in a user's session, or exit page.
	previousPagePath	A page on your website that was visited before another page on your website. Typically used with the ga:nextPagePath dimension.
	nextPagePath	A page on your website that was visited after another page on your website. Typically used with the ga:previousPagePath dimension.
	pageDepth	The number of pages visited by visitors during a session (visit). The value is a histogram that counts pageviews across a range of possible values. In this calculation, all visits will have at least one pageview, and some percentage of visits will have more.
Internal Search	searchUsed	A boolean to distinguish whether internal site search was used in a session. Values are Visits With Site Search and Visits Without Site Search.
	searchKeyword	Search terms used by website visitors on your internal site search.

	searchKeywordRefinement	Subsequent keyword search terms or strings entered by users after a given initial string search.
	searchCategory	The categories used for the internal search if you have this enabled for your profile. For example, you might have product categories such as electronics, furniture, or clothing.
	searchStartPage	A page where the user initiated an internal site search.
	searchDestinationPage	A page that the user visited after performing an internal website search.
Time	date	The date of the visit. An integer in the form YYYYMMDD.
	year	The year of the visit. A four-digit year from 2005 to the current year.
	month	The month of the visit. A two digit integer from 01 to 12.
	week	The week of the visit. A two-digit number from 01 to 53. Each week starts on Sunday.
	day	The day of the month. A two-digit number from 01 to 31.
	hour	A two-digit hour of the day ranging from 00-23 in the timezone configured for the account. This value is also corrected for daylight savings time, adhering to all local rules for daylight savings time. If your time zone follows daylight savings time, there will be an apparent bump in the number of visits during the change-over hour (e.g. between 1:00 and 2:00) for the day per year when that hour repeats. A corresponding hour with zero visits will occur at the opposite changeover. (Google Analytics does not track visitor time more precisely than hours.)

	nthMonth	Index for each month in the specified date range. Index for the first month in the date range is 0, 1 for the second month, and so on. The index corresponds to ga:month entries.
	nthWeek	Index for each week in the specified date range. Index for the first week in the date range is 0, 1 for the second week, and so on. The index corresponds to ga:week entries.
	nthDay	Index for each day in the specified date range. Index for the first day (i.e., start-date) in the date range is 0, 1 for the second day, and so on.
	dayOfWeek	The day of the week. A one-digit number from 0 (Sunday) to 6 (Monday).
Metrics*:		
Metric Type	Metric	Definition
Visitor	visitors	Total number of visitors to your website for the requested time period.
	newVisits	The number of visitors whose visit to your website was marked as a first-time visit.
	percentNewVisits	(ga:newVisits / ga:visits) * 100 The percentage of visits by people who had never visited your site before.
Session	visits	Counts the total number of sessions.
	bounces	The total number of single page (or single engagement hit) sessions to your website.
	entranceBounceRate	(ga:bounces / ga:entrances) * 100 The percentage of single-page visits (i.e. visits in which the person left your site from the entrance page).
	visitBounceRate	(ga:bounces / ga:visits) * 100 The percentage of single-page

		visits (i.e., visits in which the person left your site from the first page).
	timeOnSite	The total duration of visitor sessions represented in total seconds.
	avgTimeOnSite	ga:timeOnSite / ga:visits The average duration visitor sessions represented in total seconds.
Traffic Sources	organicSearches	The number of organic searches that happened within a session. This metric is search engine agnostic.
Page Tracking	entrances	The number of entrances to your website measured as the first pageview in a session. Typically used with ga:landingPagePath
	entranceRate	(ga:entrances / ga:pageviews) * 100 The percentage of pageviews in which this page was the entrance.
	pageviews	The total number of pageviews for your website.
	pageviewsPerVisit	ga:pageviews / ga:visits The average number of pages viewed during a visit to your site. Repeated views of a single page are counted.
	uniquePageviews	The number of different (unique) pages within a session. This takes into both the pagePath and pageTitle to determine uniqueness.
	timeOnPage	How long a visitor spent on a particular page in seconds. Calculated by subtracting the initial view time for a particular page from the initial view time for a subsequent page. Thus, this metric does not apply to exit pages for your website.
	avgTimeOnPage	ga:timeOnPage / (ga:pageviews - ga:exits)

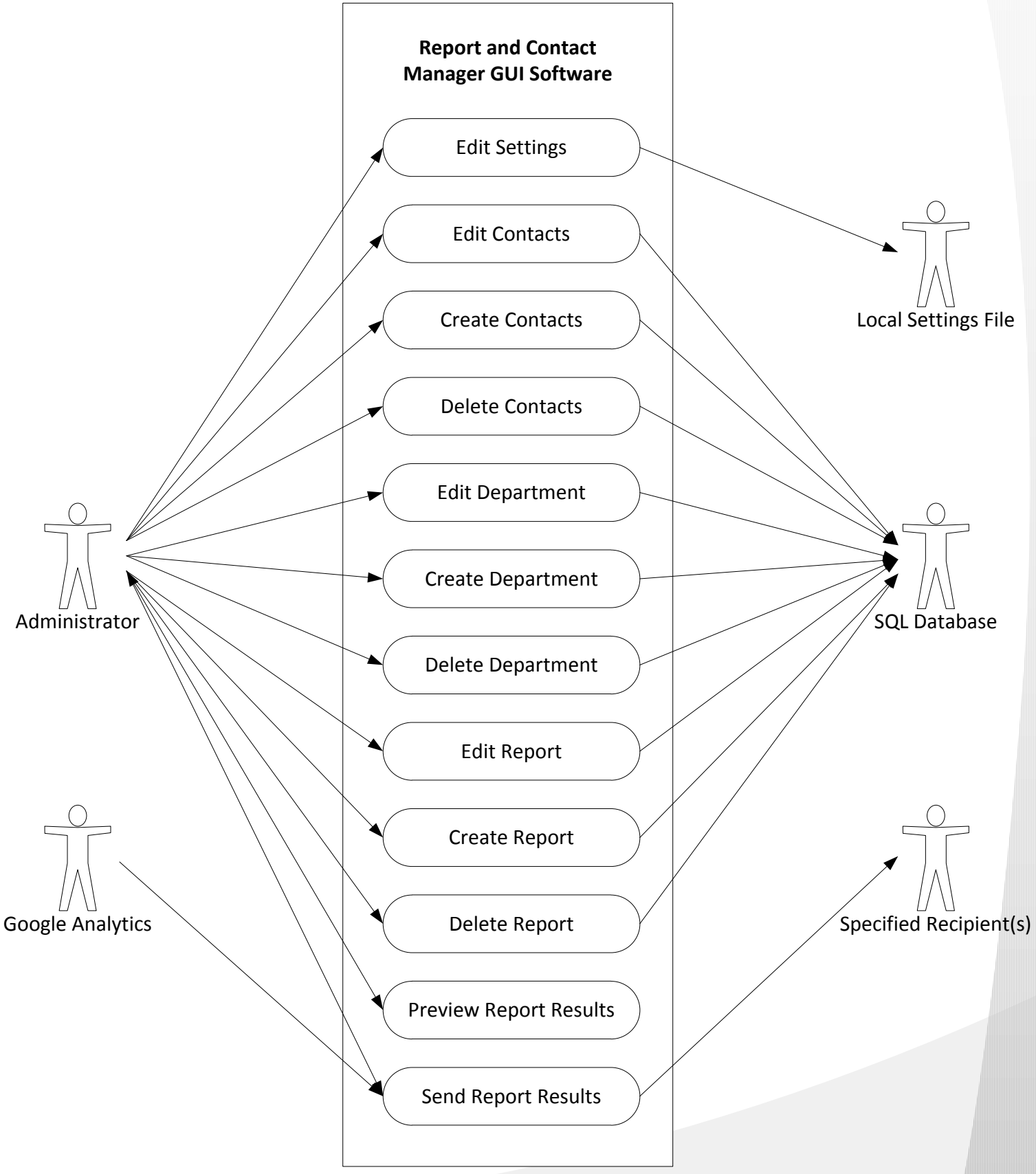
		The average amount of time visitors spent viewing this page or a set of pages.
	exits	The number of exits from your website.
	exitRate	(ga:exits / ga:pageviews) * 100 The percentage of site exits that occurred out of the total page views.
Internal Search	searchResultViews	The number of times a search result page was viewed after performing a search.
	searchUniques	The total number of unique keywords from internal site search within a session. For example if "shoes" was searched for 3 times in a session, it will be only counted once.
	avgSearchResultViews	ga:searchResultViews / ga:searchUniques The average number of times people viewed a search results page after performing a search.
	searchVisits	The total number of sessions that included an internal site search
	percentVisitsWithSearch	(ga:searchVisits / ga:visits) * 100 The percentage of visits with search.
	searchDepth	The average number of subsequent page views made on your site after a use of your internal search feature.
	avgSearchDepth	ga:searchDepth / ga:searchUniques The average number of pages people viewed after performing a search on your site.
	searchRefinements	The total number of times a refinement (transition) occurs between internal site search keywords within a session. For example if the sequence of keywords is: "shoes", "shoes", "pants", "pants", this metric will

		be one because the transition between "shoes" and "pants" is different.
	searchDuration	The visit duration to your site where a use of your internal search feature occurred.
	avgSearchDuration	ga:searchDuration / ga:searchUniques The average amount of time people spent on your site after searching.
	searchExits	The number of exits on your site that occurred following a search result from your internal search feature.
	searchExitRate	(ga:searchExits / ga:searchUniques) * 100 The percentage of searches that resulted in an immediate exit from your site.
	searchGoal(n)ConversionRate	(ga:goal(n)Completions / ga:searchUniques) * 100 The percentage of search visits (i.e., visits that included at least one search) which resulted in a conversion to the requested goal number
	SearchGoalConversionRateAll	(ga:goalCompletionsAll / ga:searchUniques) * 100 The percentage of search visits (i.e., visits that included at least one search) which resulted in a conversion to at least one of your goals.
	goalValueAllPerSearch	ga:goalValueAll / ga:searchUniques The average goal value of a search on your site.
Site Speed	pageLoadTime	Total Page Load Time is the amount of time (in milliseconds) it takes for pages from the sample set to load, from initiation of the pageview (e.g. click on a page link) to load completion in the browser.

	pageLoadSample	The sample set (or count) of pageviews used to calculate the average page load time.
	avgPageLoadTime	(ga:pageLoadTime / ga:pageLoadSample) * 0.001 The average amount of time (in seconds) it takes for pages from the sample set to load, from initiation of the pageview (e.g. click on a page link) to load completion in the browser.
	domainLookupTime	(ga:domainLookupTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) spent in DNS lookup for this page.
	avgDomainLookupTime	(ga:domainLookupTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) spent in DNS lookup for this page.
	pageDownloadTime	The total amount of time (in milliseconds) to download this page among all samples.
	avgPageDownloadTime	(pageDownloadTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) to download this page.
	redirectionTime	The total amount of time (in milliseconds) spent in redirects before fetching this page among all samples. If there are no redirects, the value for this metric is expected to be 0.
	avgRedirectionTime	(ga:redirectionTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) spent in redirects before fetching this page. If there are no redirects, the value for this metric is expected to be 0.
	serverConnectionTime	The total amount of time (in milliseconds) spent in establishing TCP connection for this page among all samples.

	avgServerConnectionTime	(ga:serverConnectionTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) spent in establishing TCP connection for this page.
	serverResponseTime	The total amount of time (in milliseconds) your server takes to respond to a user request among all samples, including the network time from user's location to your server.
	avgServerResponseTime	(ga:serverResponseTime / ga:speedMetricsSample) * 0.001 The average amount of time (in seconds) your server takes to respond to a user request, including the network time from user's location to your server.
	speedMetricsSample	The sample set (or count) of pageviews used to calculate the averages for site speed metrics. This metric is used in all site speed average calculations including ga:avgDomainLookupTime, ga:avgPageDownloadTime, ga:avgRedirectionTime, ga:avgServerConnectionTime, and ga:avgServerResponseTime.
Exception Tracking	exceptions	The number of exceptions that were sent to Google Analytics.
	fatalExceptions	The number of exceptions where isFatal is set to true.
* Google Analytics Query Explorer. Oct. 18 2012. http://ga-dev-tools.appspot.com/explorer/		

Use-Case Diagram



Use-Case Descriptions

Brief Description: The “Edit Settings” use case enables the administrator to change or edit the SQL server, email server, and email account being used.

Step-by-Step Description:

1. Administrator selects the “Settings” tab.
2. GUI displays the settings pane.
3. Administrator enters the appropriate information in each field.
4. Administrator clicks “Save Changes” button at the bottom of the GUI.
5. GUI displays the settings pane with the new settings and updates local settings file.

Possible Alternative:

1. Settings file may not be found.
    a. GUI displays a pop-up window that the settings could not be found.
    b. GUI displays a blank settings pane.
    c. Administrator enter settings.
    d. Administrator clicks “Save Changes” button at the bottom of the GUI.
2. Administrator wishes to cancel changes.
    a. Administrator clicks “Revert Changes” button.
    b. GUI displays the settings pane with the previously saved settings.
3. Administrator does not wish to save changes.
    a. Administrator clicks “No”
    b. GUI displays settings pane with changed settings, but setting may still be reverted.
4. Administrator may change values and exit with saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks “Yes”.
        i. Settings are saved.
        ii. GUI exits.
    c. Administrator left clicks “No”.
        i. Settings are not saved.
        ii. GUI exits.

Brief Description: The "Edit Contact" use case enables an administrator to change all or some of an existing contact information.

Step-by-step Description:

1. Administrator selects "Contacts" tab.
2. GUI displays the contacts' list and contacts' details pane screen.
3. Administrator selects contact to be changed from contacts list.
4. GUI displays the selected contact in the contacts' details pane.
5. Administrator left clicks the "Edit" button.
6. GUI updates "Edit" button to "Cancel" and "Save".
7. The fields are changed to editable fields in the contacts' details pane.
8. Administrator changes the fields that need to be updated.
9. Administrator left clicks the "Save" button to keep changes made.
10. GUI displays confirmation message.
11. Administrator left clicks the "Ok" button.
12. The contact's information becomes static again with the changes.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Administrator searches for contact's name via search bar instead of choosing from list.
3. Administrator may enter an invalid value into a field.
    a. The GUI will display a field error.
    b. Administrator left clicks "Save" button
    c. The GUI displays that there is an input error.
4. Administrator may changes values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks "Yes".
        i. Contact is saved.
        ii. GUI exits.
    c. Administrator left clicks "No".
        i. Contact is not saved.
        ii. GUI exits.
5. Administrator may change values but cancel all changes.
    a. Administrator left clicks "Cancel" button.
    b. The department becomes static again without the changes.

Brief Description: The "Create Contact" use case enables an administrator to add a Contact to the list of existing Contacts.

Step-by-step Description:

1. Administrator selects "Contacts" tab.
2. The GUI displays the contacts' list and contacts' detail pane.
3. Administrator left clicks the create button.
4. The GUI displays an empty editable contact in the contacts' detail pane.
5. Administrator fills in the editable fields with the new contact in appropriate fields.
6. Administrator left clicks "Save" to save new Contact.
7. GUI displays the contacts' list and contacts' detail pane with the newly added contact.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Administrator may fail to enter all necessary fields.
    a. The GUI will display a field error.
    b. Administrator left clicks "Save" button
    c. The GUI displays that there is an input error.
3. Administrator may changes values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks "Yes".
        i. Contact is saved.
        ii. GUI exits.
    c. Administrator left clicks "No".
        i. Contact is not saved.
        ii. GUI exits.
4. Administrator may change values but cancel all changes.
    a. Administrator left clicks "Cancel" button.
    b. The department becomes static again without the changes.

Brief Description: The "Delete Contact" use case enables an administrator to delete all or some of the existing Contact(s).

Step-by-step Description:
1. Administrator selects "Contacts" tab.
2. GUI displays the contacts' list and contacts' details pane.
3. Administrator selects contact to be deleted from contacts' list.
4. GUI displays the selected contact in the contacts' details pane.
5. Administrator left clicks the delete button.
6. GUI displays a pop-up window asking for confirmation of the deletion.
NOTE: This will delete contact from both contacts' list and departments' list and is irreversible!
7. Administrator left clicks the "Yes" button to delete contact.
10. GUI displays updated contacts' list and blank contacts' detail pane.

Possible Alternative:
1. Program may fail to connect to database will display database error.
2. Administrator searches for contact's name via search bar instead of choosing from list.
3. Administrator may cancel deletion.
    a. Administrator left clicks the "Cancel" button.
    b. GUI displays the contact in the contacts' details pane.
4. Administrator exits before clicking "Cancel" or "Yes" buttons.
    a. Contacts is not deleted and exit is not completed.

Brief Description: The "Edit Department" use case enables an administrator to change all or some of an existing departments' information.

Step-by-step Description:

1. Administrator selects "Departments" tab.
2. GUI displays the departments' list and departments' details pane.
3. Administrator selects department to be changed from departments' list.
4. GUI displays the selected department in the departments' details pane.
5. Administrator left clicks the "Edit" button.
6. GUI updates "Edit" button to "Cancel" and "Save".
7. The fields are changed to editable fields in the departments' details pane.
8. Administrator changes the fields that need to be updated.
9. Administrator left clicks the "Save" button to keep changes made.
10. GUI displays a confirmation message.
11. Administrator left clicks "Ok" button.
12. GUI displays the department with static fields in the departments' detail pane.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Administrator searches for department by name via search bar instead of choosing from list.
3. Administrator wishes to add contacts to department.
    a. Administrator left clicks "Add" button while editing the department.
    b. A pop-up window opens in the GUI that displays the contacts' list.
    c. Administrator selects contact(s) from contacts' list.
    d. Administrator left clicks "Ok".
    e. The pop-up window closes and GUI displays the editable department screen with contact(s) added to contacts field for the selected department.
4. Administrator wishes to remove contacts from department.
    a. Administrator selects contact to be removed from department's contacts' list while editing the department.
    b. Administrator left clicks "Remove" button.
    c. GUI displays the the editable department in the departments' detail pane with the contact removed from the department's contacts' list.
5. Administrator may fail to enter all necessary fields.
    a. The GUI will display a field error.
    b. Administrator left clicks "Save" button
    c. The GUI displays that there is an input error.
6. Administrator may change values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks "Yes".
        i. Department is saved.
        ii. GUI exits.
    c. Administrator left clicks "No".
        i. Department is not saved.
        ii. GUI exits.
7. Administrator may change values but cancel all changes.
    a. Administrator left clicks "Cancel" button.
    b. The department becomes static again without the changes

Brief Description: The "Create Department" use case enables an administrator to add a department to the list existing departments

Step-by-step Description:

1. Administrator selects "Departments" tab.
2. GUI displays the departments' list and departments' details pane.
3. Administrator left clicks the create button.
4. GUI displays a empty editable department in the departments' detail pane.
5. Administrator fills in department's information in correct fields.
6. Administrator left clicks "Add" button.
7. A popup window opens up in the GUI with the contacts' list.
8. Administrator selects contact(s) to be added from contacts' list and clicks "Ok".
9. The popup window closes and the GUI displays the department with editable fields and department's contacts' list is updated with newly added contact(s)
NOTE: Department must have at least one Contact to be saved.
10. Administrator left clicks "Save" button to create the department.
11. GUI displays the departments' list with the newly created department and departments' detail pane with the newly created department with static fields.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Administrator searches for department by name via search bar instead of choosing from list.
3. Administrator may fail to enter all necessary fields.
    a. The GUI will display a field error.
    b. Administrator left clicks "Save" button
    c. The GUI displays that there is an input error.
4. Administrator may changes values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks "Yes".
        i. Department is saved.
        ii. GUI exits.
    c. Administrator left clicks "No".
        i. Department is not saved.
        ii. GUI exits.
5. Administrator may change values but cancel all changes.
    a. Administrator left the "Cancel" button.
    b. The GUI displays the departments' list and blank departments' detail pane.

Brief Description: The "Delete Department" use case enables an administrator to delete department from the list of existing departments

Step-by-step Description:
1. Administrator selects "Departments" tab
2. GUI displays the departments' list and departments' details pane.
3. Administrator selects department to be deleted from the departments' list.
4. GUI displays the selected department in the departments' details pane.
5. Administrator left clicks delete button.
6. GUI displays a pop-up window asking for confirmation of the deletion.
7. Administrator left clicks "Yes" button to delete department.

NOTE: Contacts will be removed from department, but will not be deleted. The deletion of a department is irreversible.

8. GUI displays the departments' list without the deleted department and a blank departments' details pane.

Possible Alternative:
1. Program may fail to connect to database will display database error.
2. Administrator searches for department by name via search bar instead of choosing from list.
3. Administrator may changes values and attempt to exit without saving changes.
   a. Department is not deleted and exit is completed.
4. Administrator may want to cancel the delete.
   a. Administrator left clicks the "Cancel" button.
   b. The GUI will display the departments' list and departments' details pane with the department selected.

Brief Description: The “Edit Report” use case documents the user flow required to edit an existing report.

Step-by-step Description:

1. Administrator selects “Reports” Tab.
2. GUI displays the reports’ list and the reports’ details pane.
3. Administrator selects the desired report from the reports’ List.
4. GUI displays the selected report in the reports’ details pane.
5. Administrator left clicks the "Edit" button.
6. GUI updates “Edit” button to “Cancel” and “Save”.
7. The fields are changed to editable fields in the reports’ details pane.
8. Administrator changes the fields that need to be updated.
9. Administrator left clicks the "Save" button to keep changes made.
10. GUI displays confirmation message.
11. Administrator left clicks the “Ok” button.
12. The report’s fields becomes static again with the changes.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Administrator searches for report by name via search bar instead of choosing from list.
3. Administrator wishes to add recipients.
    a. Administrator left clicks "Add" button next to recipients field while editing the report.
    b. A pop-up window opens in the GUI that displays the contacts’ and departments’ lists.
    c. Administrator selects contact(s) or department(s) from contacts’ list.
    d. Administrator left clicks "Ok".
    e. The pop-up window closes and GUI displays the editable report screen with recipients added to recipients field for the selected report.
4. Administrator wishes to remove recipients.
    a. Administrator selects contact(s) or department(s) to be removed from report’s recipients field while editing the report.
    b. Administrator left clicks "Remove" button.
    c. GUI displays the the editable report in the reports’ detail pane with the contact(s) or department(s) removed from the recipients field.
5. Administrator may fail to enter all necessary fields.
    a. The GUI will display a field error.
    b. Administrator left clicks “Save” button
    c. The GUI displays that there is an input error.
6. Administrator may change values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks “Yes”.
        i. Report is saved.
        ii. GUI exits.
    c. Administrator left clicks “No”.
        i. Report is not saved.
        ii. GUI exits.
7. Administrator may change values but cancel all changes.
    a. Administrator left clicks “Cancel” button.
    b. The department becomes static again without the changes

Brief Description: The "Create Report" use case enables an administrator to create a new report and save the report to Reports.

Step-by-step Description:
1. Administrator selects "Reports" tab.
2. GUI displays the reports' list and the reports' details pane
4. Administrator left clicks create button.
5. GUI displays an empty report with editable fields in the reports' detail pane.
6. Administrator inputs the report in the appropriate editable fields.
NOTE: Reports require at least one metric.
NOTE: Reports are not required to have specified recipients. They may be added when sending report results.
7. Administrator left clicks "Save" button.
NOTE: Reports are saved in database.
8. GUI displays a confirmation message.
9. Administrator left clicks "Ok".
10. GUI displays the reports' list with the newly added report and reports' detail pane with the newly added report with static fields.

Possible Alternative:
1. Program may fail to connect to database will display database error.
2. Administrator wishes to add recipients.
    a. Administrator left clicks "Add" button next to the recipients field.
    b. A pop-up window opens in the GUI that displays the contacts' and departments' lists.
    c. Administrator selects contact(s) or department(s) from contacts' list.
    d. Administrator left clicks "Ok".
    e. The pop-up window closes and GUI displays the editable report screen with recipients added to recipients field for the new report.
3. Administrator may fail to enter all necessary fields.
    a. The GUI displays a field error.
    b. When the administrator left clicks the "Save" button, the GUI displays that there is a input error.
4. Administrator may change values and attempt to exit without saving changes.
    a. GUI displays a pop-up window warning that there are unsaved changes.
    b. Administrator left clicks "Yes".
        i. Report is saved.
        ii. GUI exits.
    c. Administrator left clicks "No".
        i. Report is not saved.
        ii. GUI exits.
5. Administrator may change values but cancel.
    a. Administrator left clicks the "Cancel" button.
    b. The GUI displays the reports' list without the new report and a blank reports' detail pane.

Brief Description: The "Delete Report" use case enables an administrator to delete a report.

Step-by-step Description:
1. Administrator selects "Reports" tab
2. GUI displays the reports' list and a blank reports' details pane.
3. Administrator selects report to be deleted from the reports' list.
4. Administrator left clicks delete button.
5. GUI displays a pop-up window asking for confirmation of the deletion.
6. Administrator left clicks "Yes" button.

NOTE: Deleting a report is irreversible.

7. The GUI displays the reports' list and a blank reports' detail pane.

Possible Alternative:
1. Program may fail to connect to database will display database error.
2. Administrator may changes values and attempt to exit without saving changes.
   a. Report is not deleted and exit is completed.
3. Administrator want to cancel the delete.
   a. Administrator left clicks "Cancel" button.
   b. The GUI displays the reports' list with the selected report and report in the reports' detail pane.

Brief Description: The "Preview Report Results" use case documents the user flow required to generate but not send report results.

Step-by-step Description:
1. Administrator selects "Reports" Tab.
2. The GUI displays the reports' list and the reports' details pane.
3. Administrator selects the desired report from the reports' list.
4. GUI displays the selected report in the reports' details pane.
5. Administrator left clicks the "Preview" button.
6. GUI displays a pop-up window containing the report results.
7. Administrator left clicks "Ok" to close the pop-up window.

Possible Alternative:
1. Program may fail to connect to database will display database error.
2. Program may fail to connect to GA server and will display server error.
3. Administrator searches for report by name via search bar instead of choosing from list.

Brief Description: The "Send Report Results" use case enables an administrator to send report results to specified recipients.

Step-by-step Description:

1. Administrator selects “Reports” Tab.
2. The GUI displays the reports’ list and the reports’ details pane.
3. Administrator selects the desired report from the reports’ list.
4. GUI displays the selected report in the reports’ details pane.
5. Administrator left clicks the "Send" button.
6. GUI displays a pop-up window containing the recipients pre-populated from the report.
7. Administrator left clicks "Send Report" button.
8. GUI closes pop-up window and sends report results to all specified recipients.
9. GUI display a pop-up window confirming that the report results have been sent.

Possible Alternative:

1. Program may fail to connect to database will display database error.
2. Program may fail to connect to GA server and will display server error.
3. Program may fail to connect to mail server and will display server error.
4. Administrator wishes to add recipients.
    a. Administrator left clicks the "Send" button.
    b. GUI displays a pop-up window containing the recipients pre-populated from the report.
    c. Administrator left clicks the "Add" button.
    d. Another pop-up window opens in the GUI that displays the contacts’ list and departments’ list.
    e. Administrator selects contact(s) and department(s) from the lists.
    f. Administrator left clicks "Ok".
    g. The second pop-up window closes and GUI displays the updated recipients.
5. Administrator attempts to send report results with no specified recipients.
    a. Administrator left clicks the “Send” button.
    b. GUI displays a message that there are no specified recipients with the option to add recipients.
    c. Administrator may add recipients if desired by clicking the “Add” button.
6. Administrator does not wish to send report results.
    a. Administrator left clicks the "Send" button.
    b. GUI displays a pop-up window containing the recipients pre-populated from the report.
    c. Administrator left clicks the “Cancel” button.

Use-Case Scenarios

1. Edit Settings
    a. Administrator selects "Settings" tab.
    b. Administrator types “mail.ku.edu” into the text field beside “Email Server:”.
    c. Administrator types “suzyq” into the text field beside “Email Username:”.
    d. Administrator types “ccr” into the text field beside “Email Password:”.
    e. Administrator then left clicks “Save Changes”.
    f. Updated settings for the email server are saved.

2. Edit an existing Contact.
    a. Administrator selects "Contact" tab.
    b. Administrator clicks in the search bar (next to the magnifying glass).
    c. Administrator enters “Cornish” (This is the last name).
    d. A list appears displaying all users with “Cornish” in any field (ex: name, phone number, email, etc.).
    e. Administrator selects the entry with the name “Conrad Cornish”.
    f. The right side of the window will be populated with “Conrad Cornish” ‘s contact information.
    g. Administrator clicks the “Edit” button.
    h. Administrator changes the telephone from “911” to “1-900-656-1224”.
    i. Administrator also changes the birthday from “01/01/1900” to “01/01/1970”.
    j. Administrator changes email from ccornish@miners.com to Cornishriotinto.com
    k. Administrator clicks “Save".
    l. A window appears explaining that the email field is incorrect.
    m. Administrator clicks “Ok”.
    n. Administrator changes the email field to Cornish@riotinto.com.
    o. Administrator clicks “Save”.
    p. A window appears confirming the save.

3. Create a new Contact.
    a. Administrator selects "Contacts" tab.
    b. Administrator clicks the create (“+”) button.
    c. Administrator types in the contact information for the employee being created into the appropriate fields.
        - First Name: Jesse
        - Last Name: Pinkman
        - Telephone: 1-505-654-3434
        - Email: jpinkman@vamanos.com

        - Birthday: 05/15/1985
    d. Administrator clicks "Save" to save new employee.
    e. A new record with the above information is created in the database.
    f. A dialog appears confirming the addition.

4. Delete an existing Contact.
    a. Administrator selects "Contacts" tab.
    b. Administrator clicks the search bar (next to the magnifying glass at the top).
    c. Administrator enters “Cornish” into the search bar.
    d. Administrator selects the entry with the name “Conrad Cornish”.
    e. The right side of the window is populated with “Conrad Cornish” ‘s contact information.
    f. Administrator clicks delete button (the trash bin).
    g. A dialog appears to confirm the deletion.
    h. Administrator clicks “Yes”.
    i. The record is now deleted from the database.
    j. All fields are now empty.

5. Edit an existing Department.
    a. Administrator selects "Departments" tab.
    b. Administrator selects “Accounting” from the list of possible departments.
    c. The contact information for that department and the employees in that department are populated into the correct fields.
    d. Administrator clicks the "Edit" button.
    e. Administrator clicks "Add" button
    f. Administrator selects the name “Hank Schrader”from the list of employees in the window that appears.
    g. Administrator clicks “Ok”.
    h. The name “Hank Schrader” now appears in the list of employees in the department.
    i. Administrator clicks the "Save" button.
    j. The changes are saved to the database.
    k. Administrator is returned to the edit department screen.

6. Create a new Department.
    a. Administrator selects "Departments" tab.
    b. Administrator clicks create (“+”) button.
    c. Administrator enters the following information into the department being created.
        - Department Name: Accounting
        - Department Telephone:1-888-555-5555
        - Department Email:acct@vamanos.com
    d. Administrator clicks “Add” button.

e. Administrator searches for the name “Walter White” in the window that appears and selects the name returned.
f. Administrator clicks "Ok" button to add employee to department’s employee list.
g. The list is now updated with the name “Walter White”.
h. Administrator clicks "Save" button to create the department and is returned to list of existing departments.

7. Delete an existing Department.
    a. Administrator selects "Departments" tab
    b. Administrator selects “Accounting” from the list of departments.
    c. The department contact information and list of employees in the department are retrieved from the database and shown in the right side of the window.
    d. Administrator clicks delete button (the trash bin).
    e. A dialog appears asking the user to confirm the deletion.
    f. Administrator clicks "Yes" button to delete department and returns to new list of existing departments.
    g. The department and its associations are deleted from the database.
    h. Administrator is returned to the “Departments” screen.

8. Edit an existing Report.
    a. Administrator selects "Reports" tab.
    b. Administrator select the “Weekly TPS” from the list of reports.
    c. Administrator clicks “Edit” button.
    d. Administrator changes Start Date to “10/14/2012”.
    e. Administrator changes End Date to “10/02/2012”.
    f. Administrator clicks “Save” button.
    g. A dialog appears informing the administrator that the end date is invalid.
    h. Administrator changes End Date to “10/20/2012”.

9. Create a new Report.
    a. Administrator selects "Reports" tab
    b. Administrator clicks create (“+”) button.
    c. Administrator enters the following information into the report being created.
        - Start Date: 01/01/2012
        - End Date: 06/01/2012
        - Dimensions: Operating System
        - Metric: Unique Visits
        - The Sort and Filter fields are left empty.
    d. Administrator clicks "Save" button.
    e. A new record with the above information is created in the database.

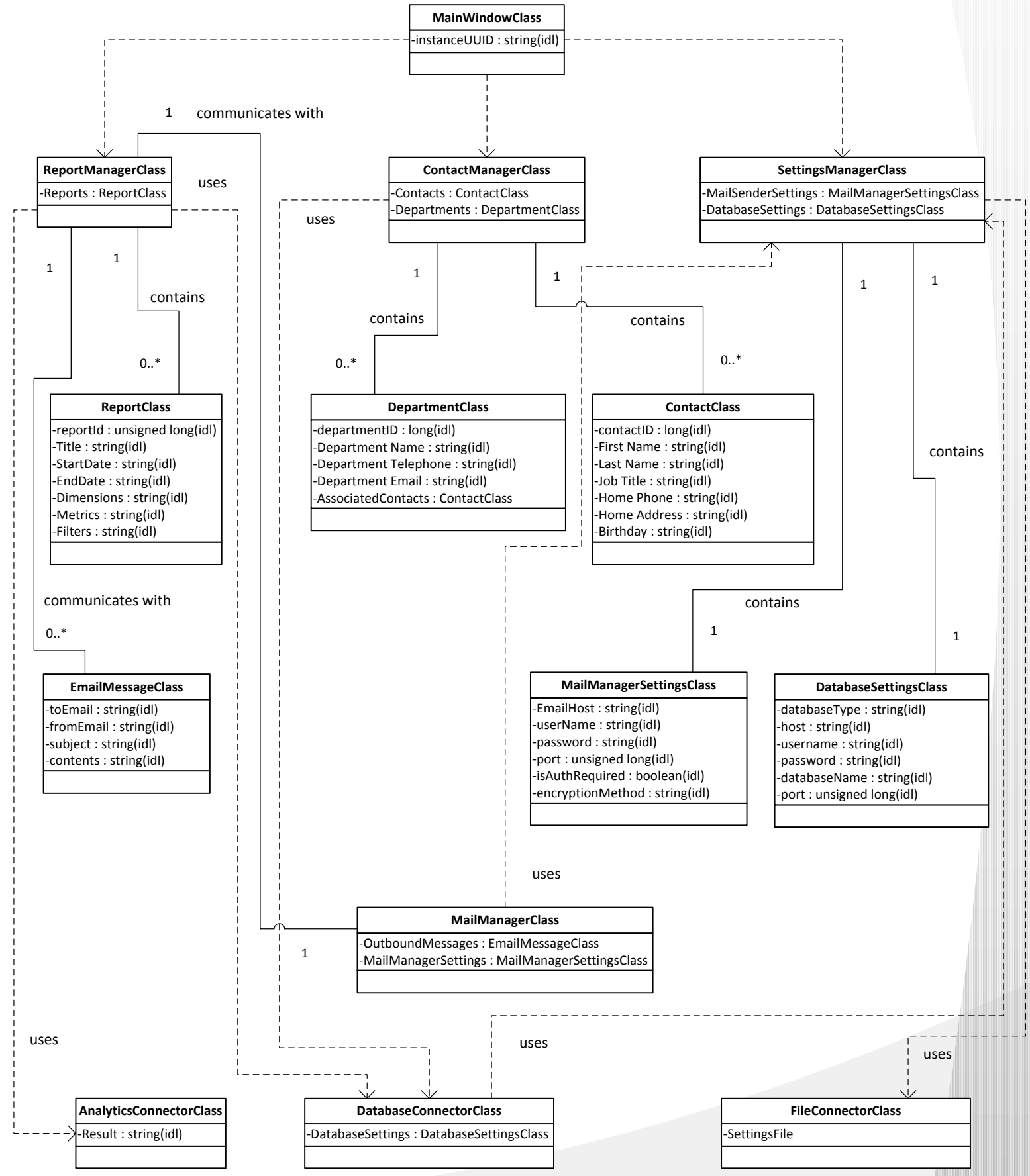
f. A dialog appears confirming the addition.

10. Delete an existing Report.
    a. Administrator selects "Reports" tab
    b. Administrator selects “Daily Mobile Visitors” report from the list of reports.
    c. Administrator clicks delete (the trash bin).
    d. A dialog appears asking for confirmation of the deletion.
    e. Administrator clicks "Yes".
    f. The report is deleted from the database.
    g. Administrator is returned to the “Reports” screen.

11. Preview Report Results
    a. Administrator selects "Reports" tab.
    b. Administrator selects the “Weekly IE Visitors” report from the list of reports.
    c. The right side of the window populates with the “Weekly IE Visitors” report information.
    d. Administrator clicks "Preview" button.
    e. A pop-up window showing the formatted results for the “Weekly IE Visitors” report is displayed.
    f. Administrator clicks “Ok” to close the preview window.

12. Send Report Results.
    a. Administrator selects "Reports" tab.
    b. Administrator selects the “Weekly Report for IT” report from the list of reports.
    c. The right side of the window populates with the “Weekly Report for IT” report information.
    d. Administrator clicks "Send" button.
    e. A dialog appears asking for confirmation and shows the specified recipients (IT). An option to add additional recipients is included.
    f. Administrator clicks “Add”.
    g. A dialog appears with the list of contacts and departments.
    h. Administrator selects “John Doe” and clicks “Ok”.
    i. “John Doe” is now added to the recipients.
    j. Administrator clicks “Send Report”.
    k. The report results are generated and sent to the IT department and John Doe.
    l. A dialog appears confirming that the message was successfully sent.

Class Diagram



Class-Responsibility-Collaboration (CRC) Cards

Class: **MainWindowClass**
Responsibility: 1. Send message to **ContactManagerClass** to open. 2. Send message to **ReportManagerClass** to open. 3. Send message to **SettingsManagerClass** to open. 4. Generate a (unique)instanceUUID value. 5. Encapsulates all other classes. 6. Encapsulates all application level information.
Collaboration: 1. **ContactManagerClass**(Dependency) 2. **ReportManagerClass**(Dependency) 3. **SettingsManagerClass** (Dependency)

Class: **ReportManagerClass**
Responsibility: 1. Check with **MainWindowClass** if database is ready. 2. Send request for report definitions to **DatabaseConnectorClass**. 3. Receive report definitions from **DatabaseConnectorClass**. 4. Make a new **ReportClass** for each possible report definition. 5. Send message to **AnalyticsConnectorClass** class requesting for data. 6. Send message to **ContactManagerClass** to request data. 7. Send message to **MailManagerClass** to start. 8. Process received data into a series of ready reports. 9. Binds received contacts to ready-made report(s). 10. Sends a request for contents of a department to **ContactManagerClass**. 11. Responsible for all report related functionality. 12. Save new **ReportClass** instances into database. 13. Respond to changes in related **ReportClass** Instances**.** 14. Process all necessary **ReportClass** instances into **EmailMessageClass** instances. 15. Push **EmailMessageClass** instances to **MailManagerClass**.
Collaboration: 1. **AnalyticsConnectorClass**(Dependency) 2. **DatabaseConnectorClass**(Dependency) 3. **ContactManagerClass** 4. **EmailMessageClass** 5. **MailManagerClass** 6. **MainWindowClass** 7. **ReportClass**

Class: **ContactManagerClass**
Responsibility: 1. Send message to **DatabaseConnectorClass** to open (if not opened). 2. Send queries to **DatabaseConnectorClass**. 3. Receive data from **DatabaseConnectorClass.** 4. Make a new **ContactClass** for each entry received from **DatabaseConnectorClass**. 5. Serialize all **ContactClass** instances and send to **DatabaseConnectorClass**. 6. Make a new **DepartmentClass** for each entry received from **DatabaseConnectorClass**. 7. Serialize all **DepartmentClass** instances and send to **DatabaseConnectorClass**.
Collaboration: 1. **DatabaseConnectorClass**(Dependency) 2. **ContactClass** 3. **DepartmentClass**

Class: **SettingsManagerClass**
Responsibility: 1. Send requests for settings data **FileConnectorClass**. 2. Process incoming data from **FileConnectorClass**. 3. Process requests from **MailManagerClass** for settings. 4. Process requests from **DatabaseConnectorClass** for settings. 5. Manage **MailManagerSettingsClass** and **DatabaseSettingsClass** using settings data. 6. Send requests to **FileConnectorClass** to save settings data.
Collaboration: 1. **FileConnectorClass** (Dependency) 2. **DatabaseSettingsClass** 3. **MailManagerSettingsClass** 4. **MainWindowClass**

Class: **ReportClass**
Responsibility: 1. Respond to changes in the report definition from **ReportManagerClass**. 2. Notify **ReportManagerClass** when it is safe to write changes back to database. 3. Return necessary parameters for a given report as request by **ReportManagerClass**.
Collaboration: 1. **ReportManagerClass**

Class: **DepartmentClass**
Responsibility: 1. Hold data for department-related information. 2. Respond to requests to various pieces of itself from **ContactManagerClass**. 3. Respond to changes to itself as requested by **ContactManagerClass**. 4. Notify **ContactManagerClass** when changes are successful and can be written to database. 5. Department should directory store all related contact information.
Collaboration: 1. **ContactManagerClass**

Class: **ContactClass**
Responsibility: 1. Respond to requests for information from **ContactManagerClass.** 2. Process inbound changes as requested by **ContactManagerClass**. 3. Notify **ContactManagerClass** when it is safe to write changes to database. 4. Notify **ContactManagerClass** when data for the requested information does not exists. 5. References **DepartmentAssociationClass** to determine contact-department associations.
Collaboration: 1. **ContactManagerClass** 2. **DepartmentAssociationClass**

Class: **EmailMessageClass**
Responsibility: 1. Encapsulate all data related to each email message. 2. Receive change requests from **ReportManagerClass.** 3. Send message to **MailManagerClass** when it is ready to be sent.
Collaboration: 1. **MailManagerClass** 2. **ReportManagerClass**

Class: **MailManagerSettingsClass**
Responsibility: 1. Respond to request for information from **SettingsManagerClass**. 2. Process inbound changes as requested by **SettingsManagerClass**.
Collaboration: 1. **SettingsManagerClass**

Class: **DatabaseSettingsClass**
Responsibility: 1. Respond to request for information from **SettingsManagerClass**. 2. Process inbound changes as requested by **SettingsManagerClass**.
Collaboration: 1. **SettingsManagerClass**

Class: **MailManagerClass**
Responsibility: 1. Recieve **EmailMessageClass** from **ReportManagerClass**. 2. Request settings from **SettingsManagerClass**. 3. Send emails through **Mail Server** by reading each **EmailMessageClass** instance.
Collaboration: 1. **SettingsManagerClass** (Dependency) 2. **EmailMessageClass** 3. **ReportManagerClass** 4. **Mail Server** (External)

Class: **AnalyticsConnectorClass**
Responsibility: 1. Send requests for data to **Google Analytics**. 2. Process incoming data from **Google Analytics.** 3. Receive requests from **ReportManagerClass** and translate into requests ready to be sent to **Google Analytics**. 4. Send received to **ReportManagerClass**. 5. Notify **ReportManagerClass** when data is ready to be retrieved.

Collaboration:
1. **ReportManagerClass**
2. **Google Analytics** (External)

Class: **DatabaseConnectorClass**

Responsibility:
1. Request settings from **SettingsManagerClass**.
2. Connect to database management system.
3. Handles all database-related traffic.
4. Translate queries from **ReportManagerClass** into database queries.
5. Translate queries from **ContactManagerClass** into database queries.

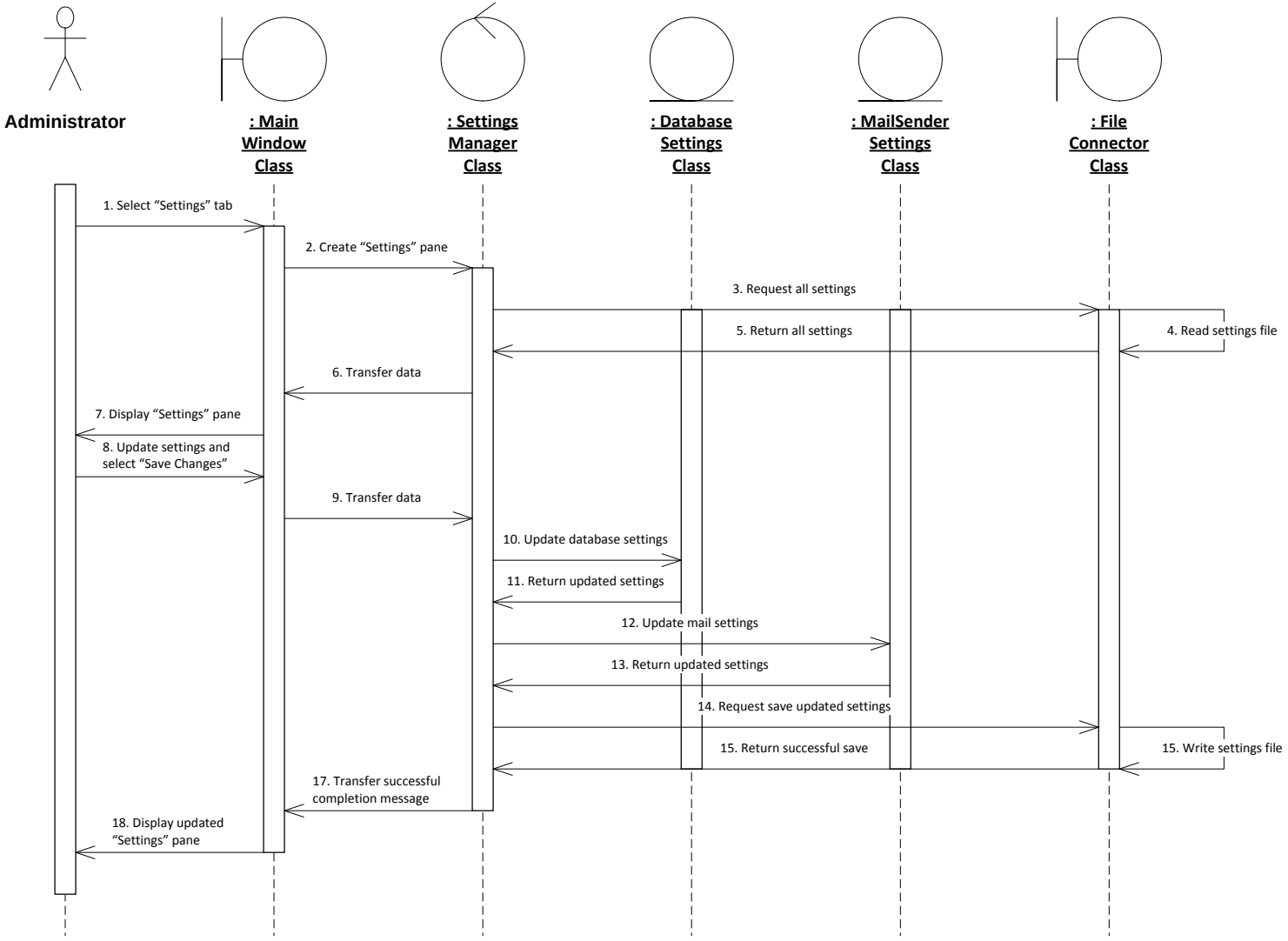
Collaboration:
1. **SettingsManagerClass**(Dependency)
2. **ContactManagerClass**
3. **ReportManagerClass**

Class: **FileConnectorClass**

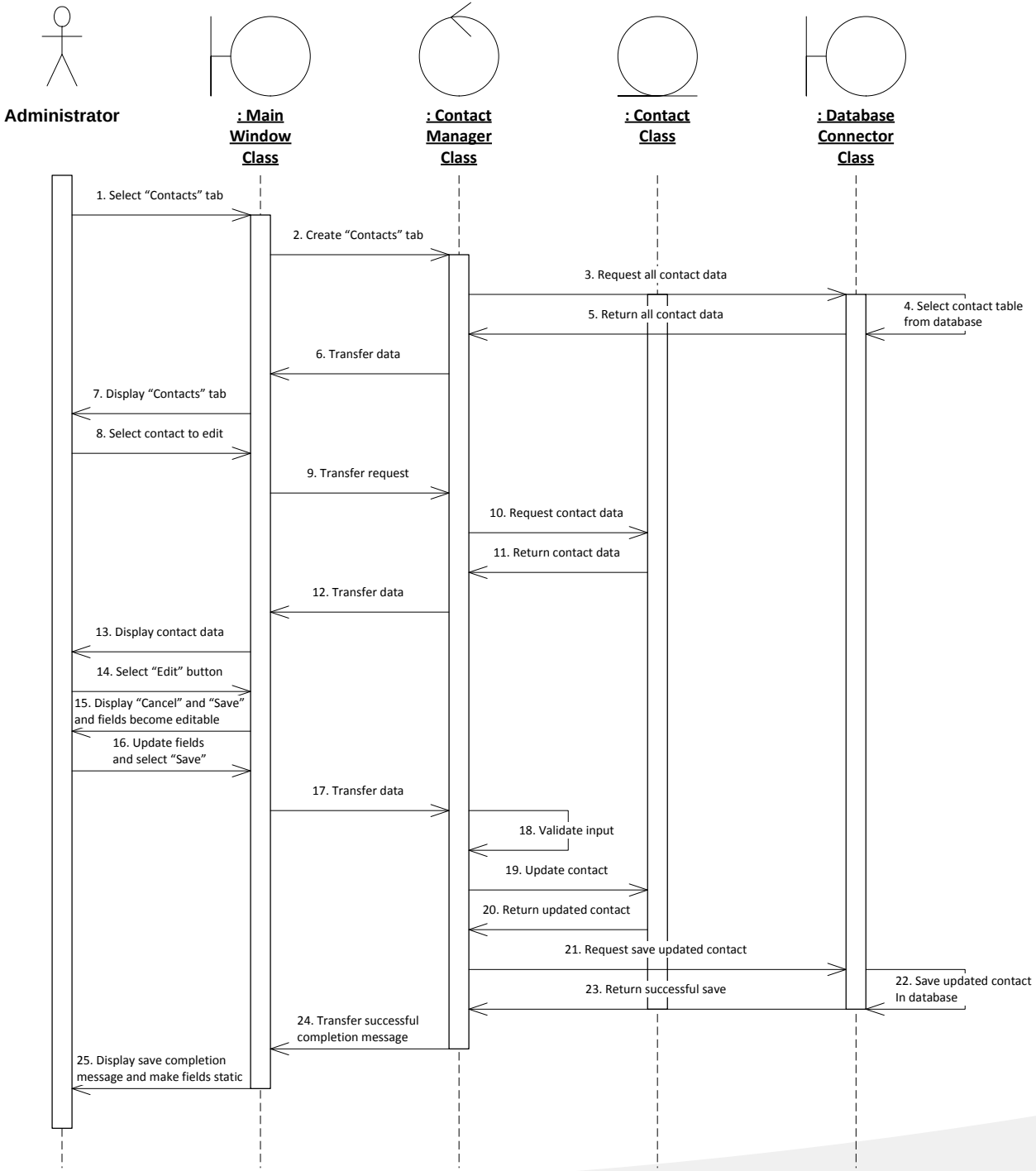
Responsibility:
1. Load or save settings file in filesystem.
2. Receive requests from **SettingsManagerClass** to load or save settings file.
3. Notify **SettingsManagerClass** when settings file cannot be found.
4. Notify **SettingsManagerClass** when settings file is ready to be retrieved.

Collaboration:
1. **SettingsManagerClass**

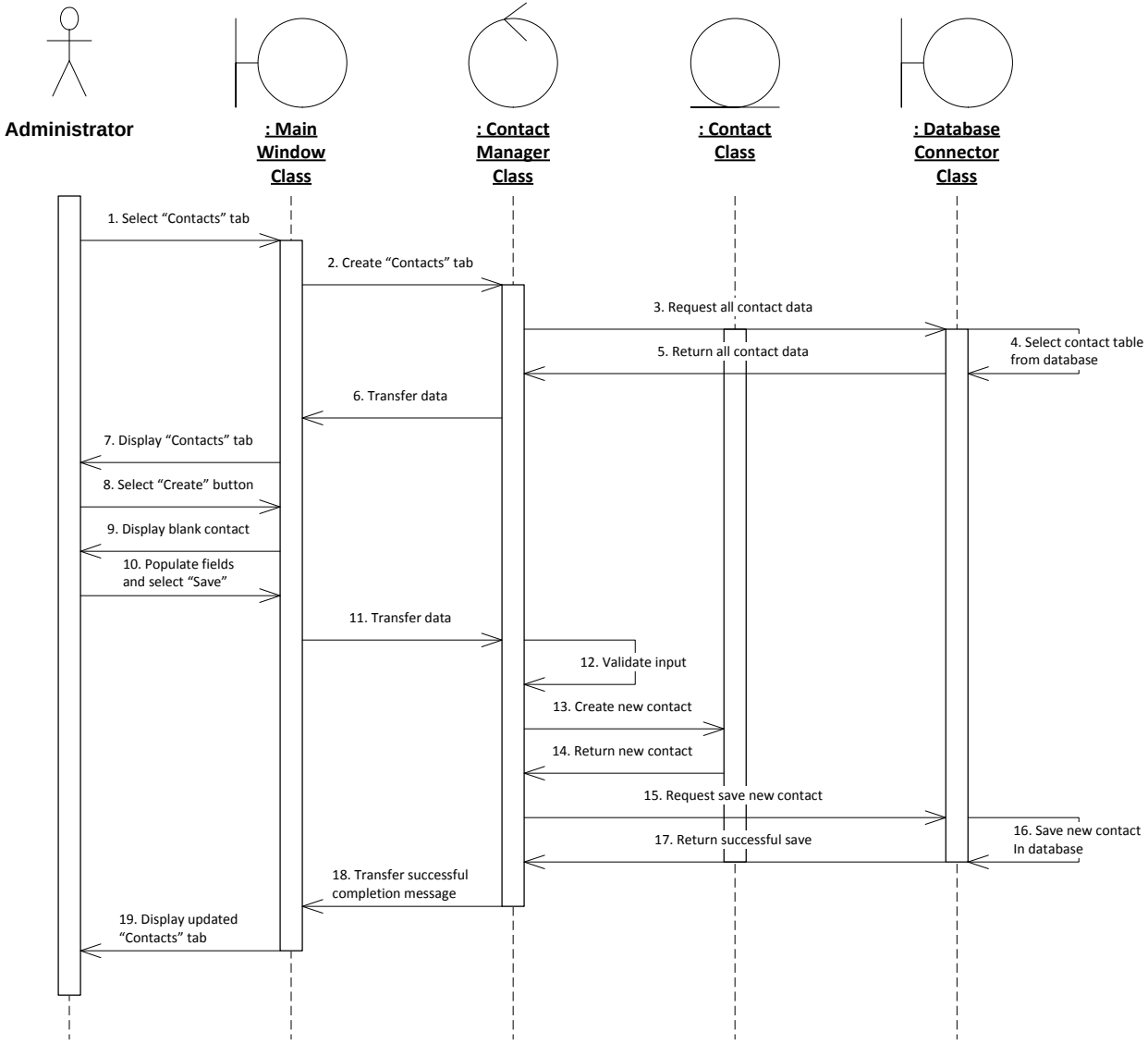
Edit Settings



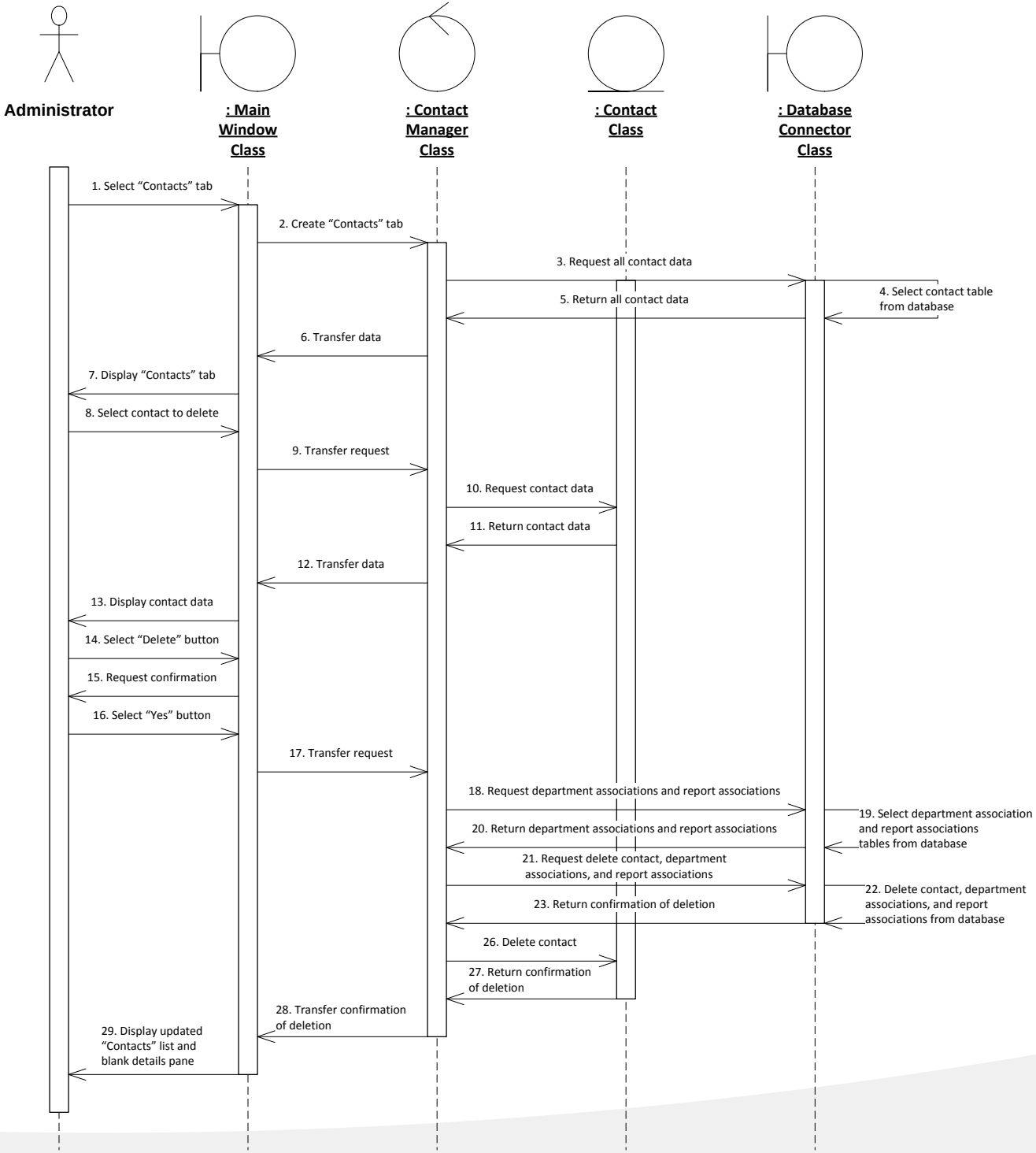
Edit Contact



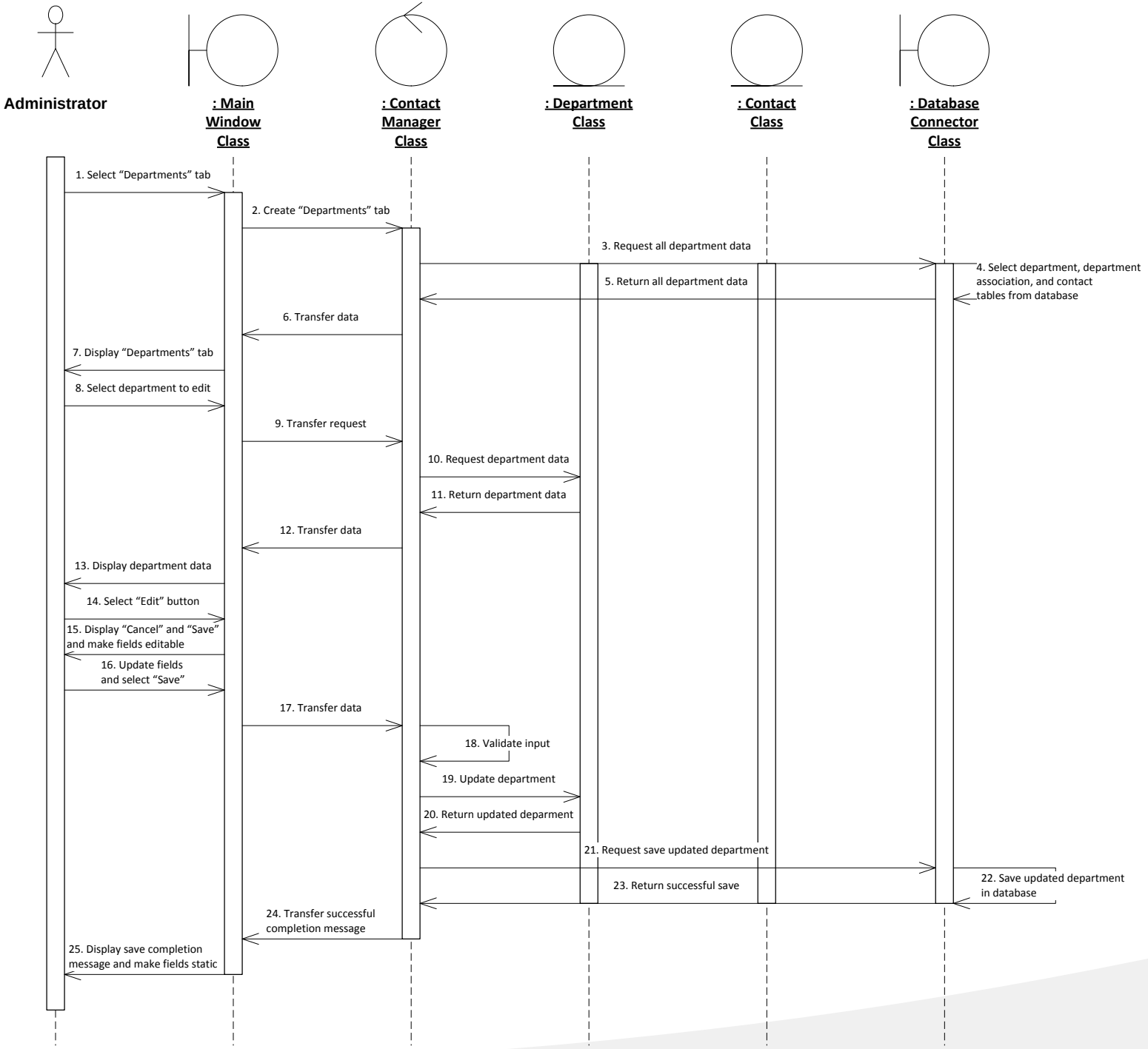
Create Contact



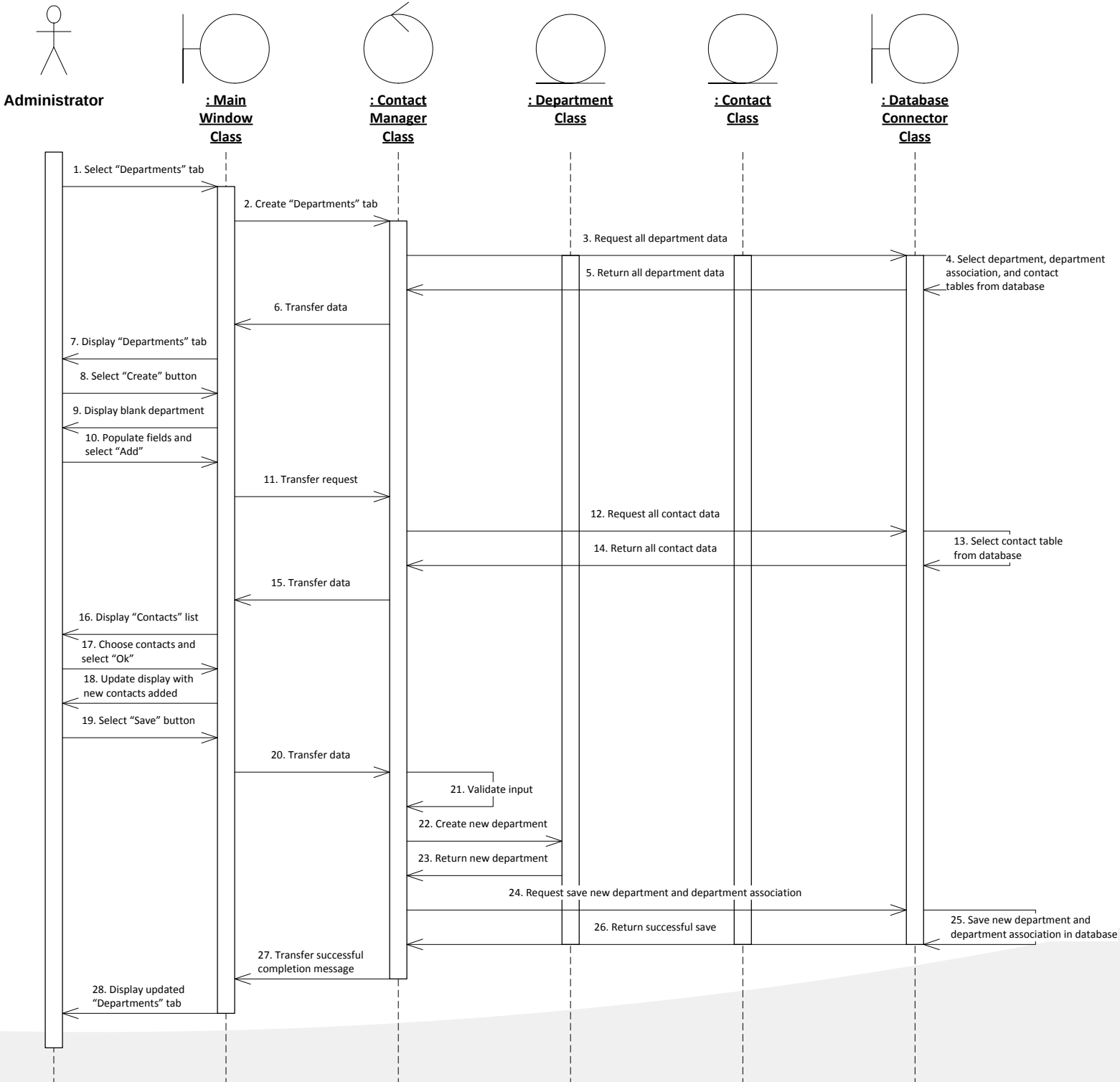
Delete Contact



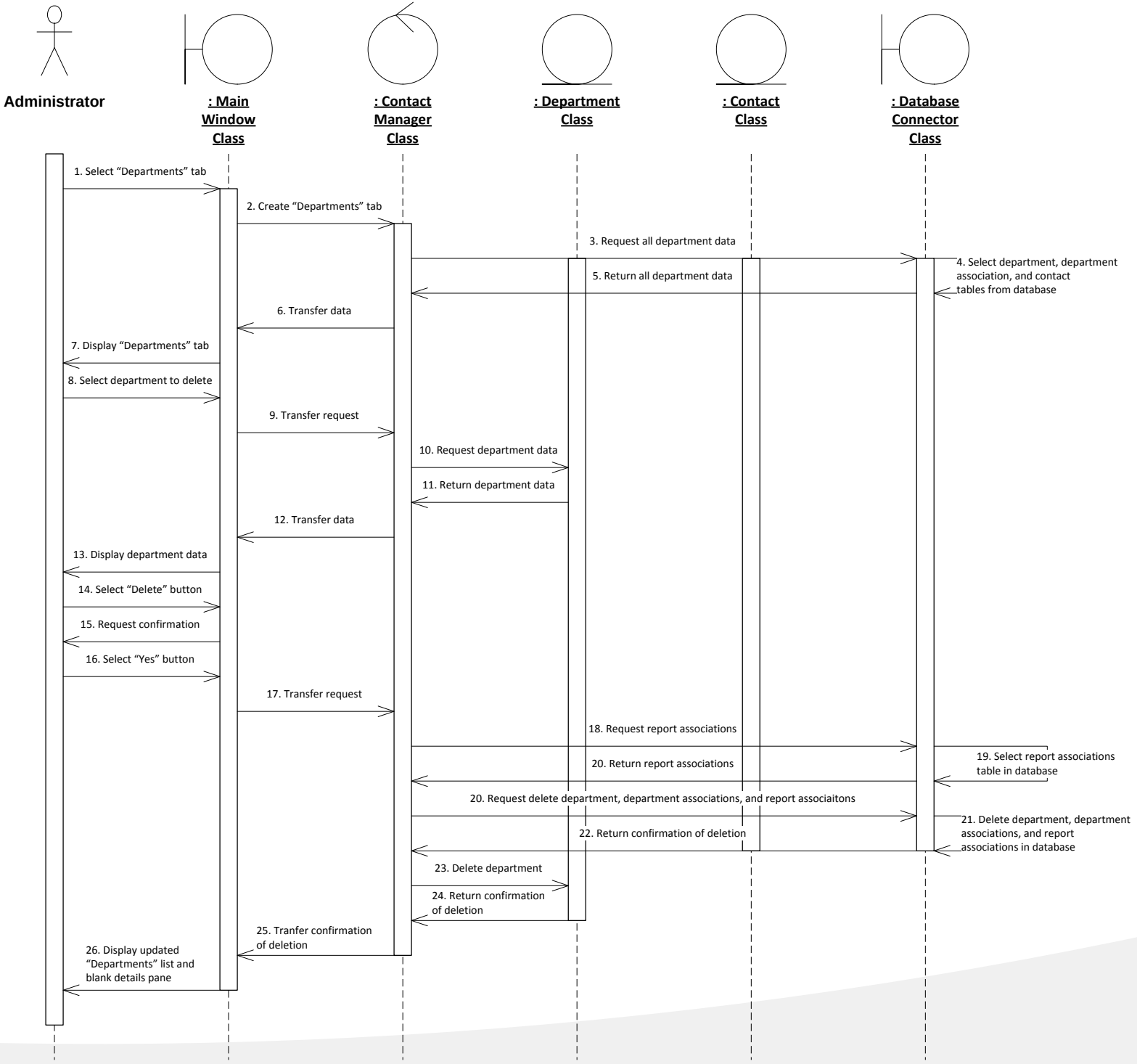
Edit Department



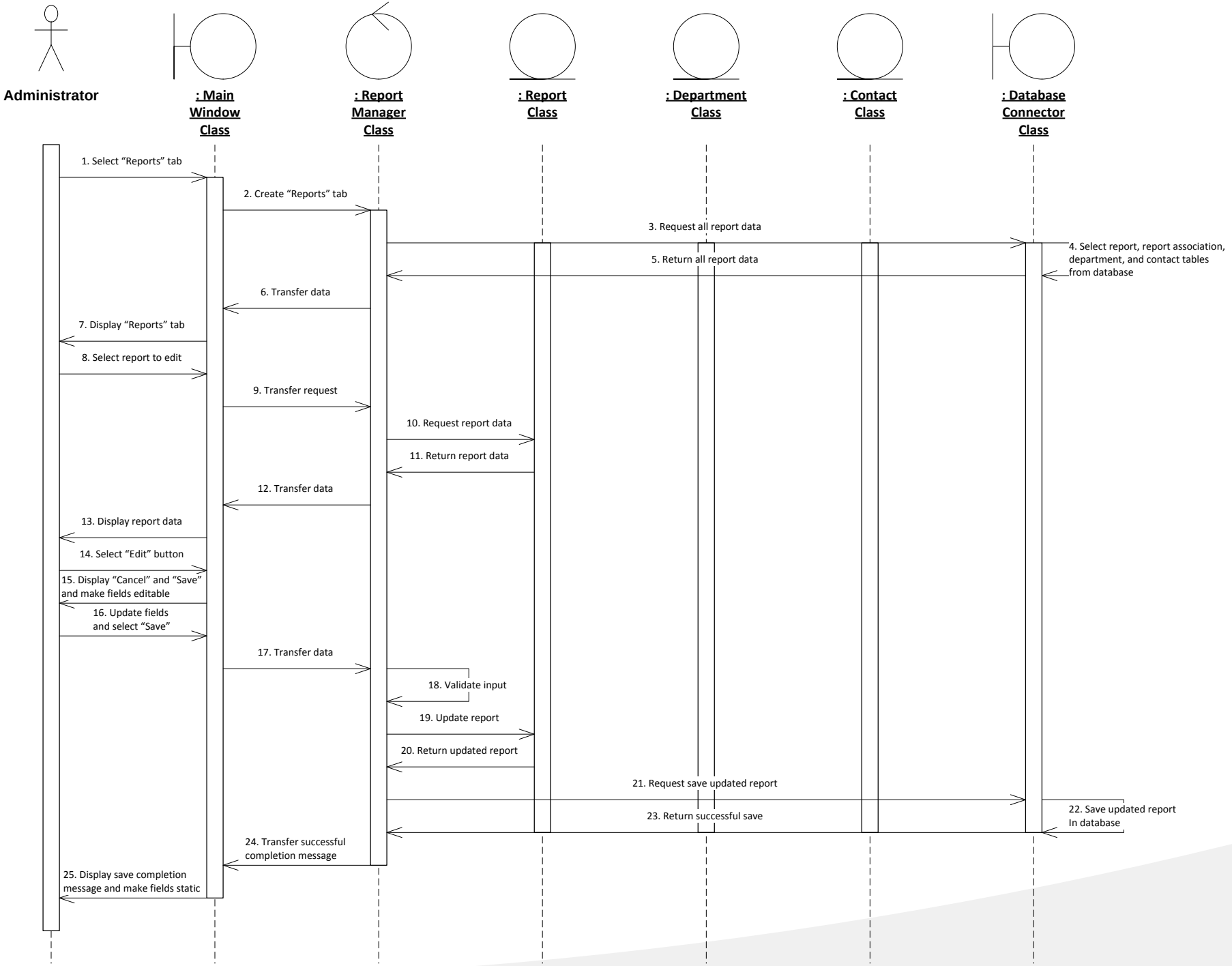
Create Department



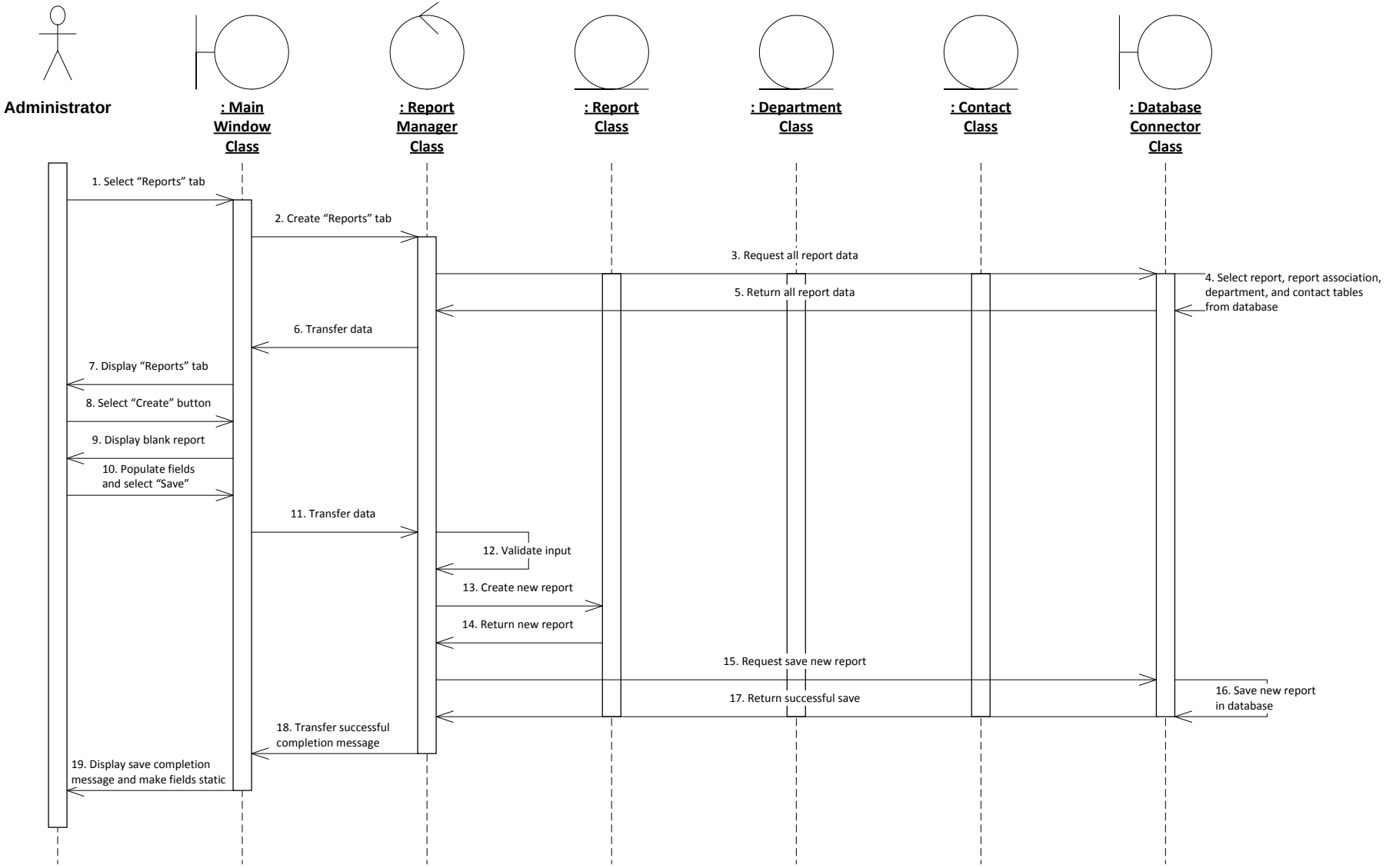
Delete Department



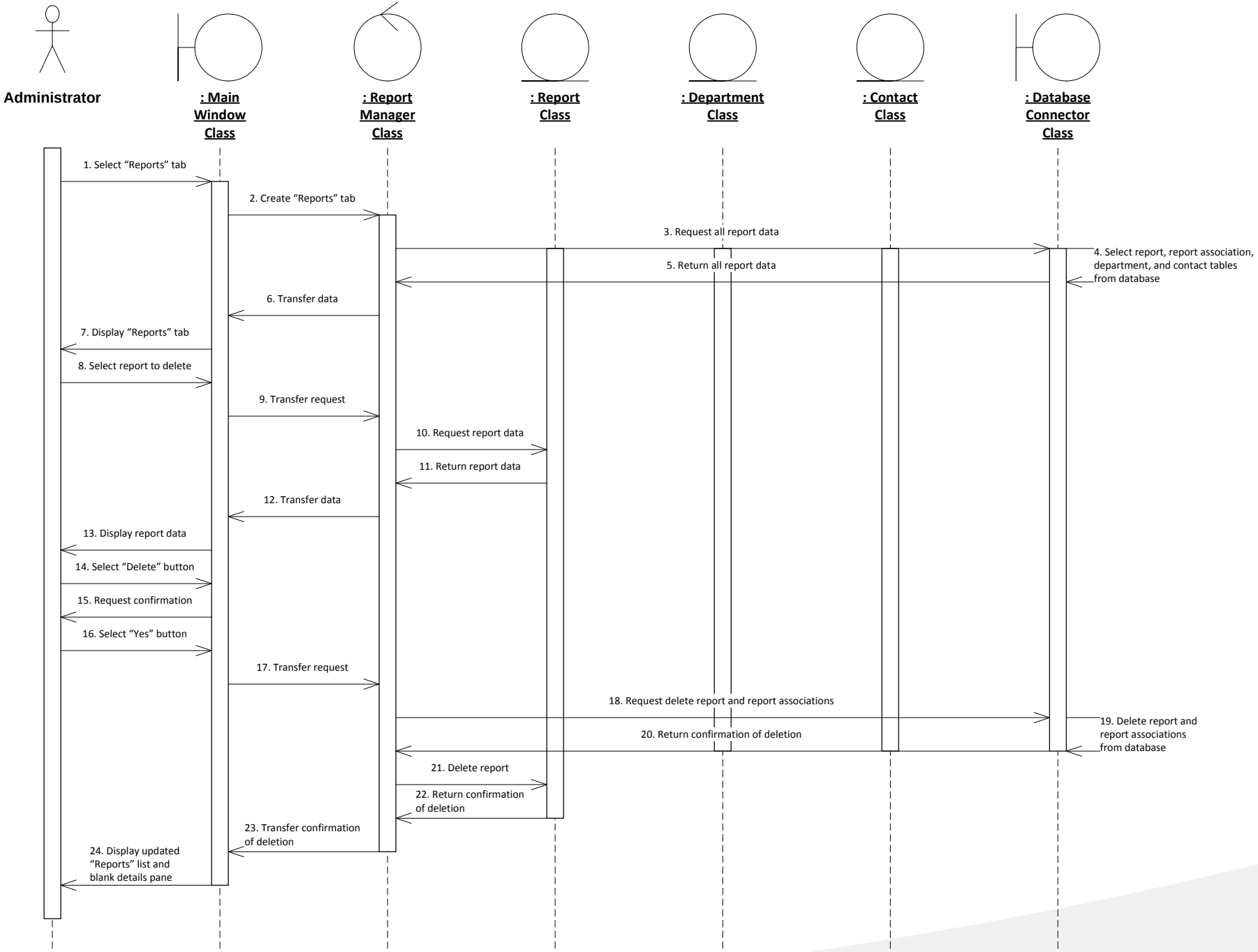
Edit Report


Administrator
: Main Window Class
: Report Manager Class
: Report Class
: Department Class
: Contact Class
: Database Connector Class
1. Select “Reports” tab
2. Create “Reports” tab
3. Request all report data
4. Select report, report association, department, and contact tables from database
5. Return all report data
6. Transfer data
7. Display “Reports” tab
8. Select report to edit
9. Transfer request
10. Request report data
11. Return report data
12. Transfer data
13. Display report data
14. Select “Edit” button
15. Display “Cancel” and “Save” and make fields editable
16. Update fields and select “Save”
17. Transfer data
18. Validate input
19. Update report
20. Return updated report
21. Request save updated report
22. Save updated report In database
23. Return successful save
24. Transfer successful completion message
25. Display save completion message and make fields static

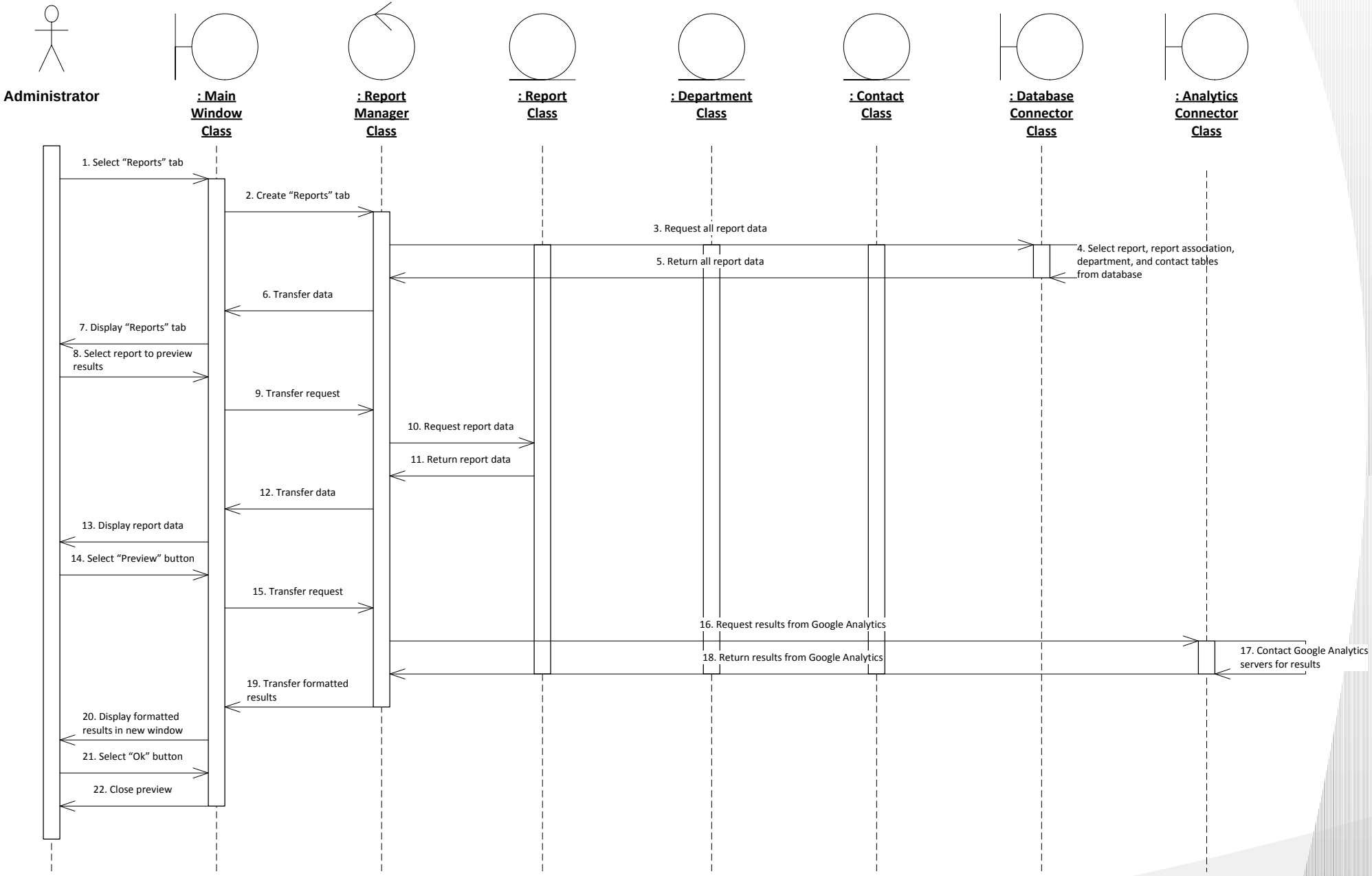
Create Report



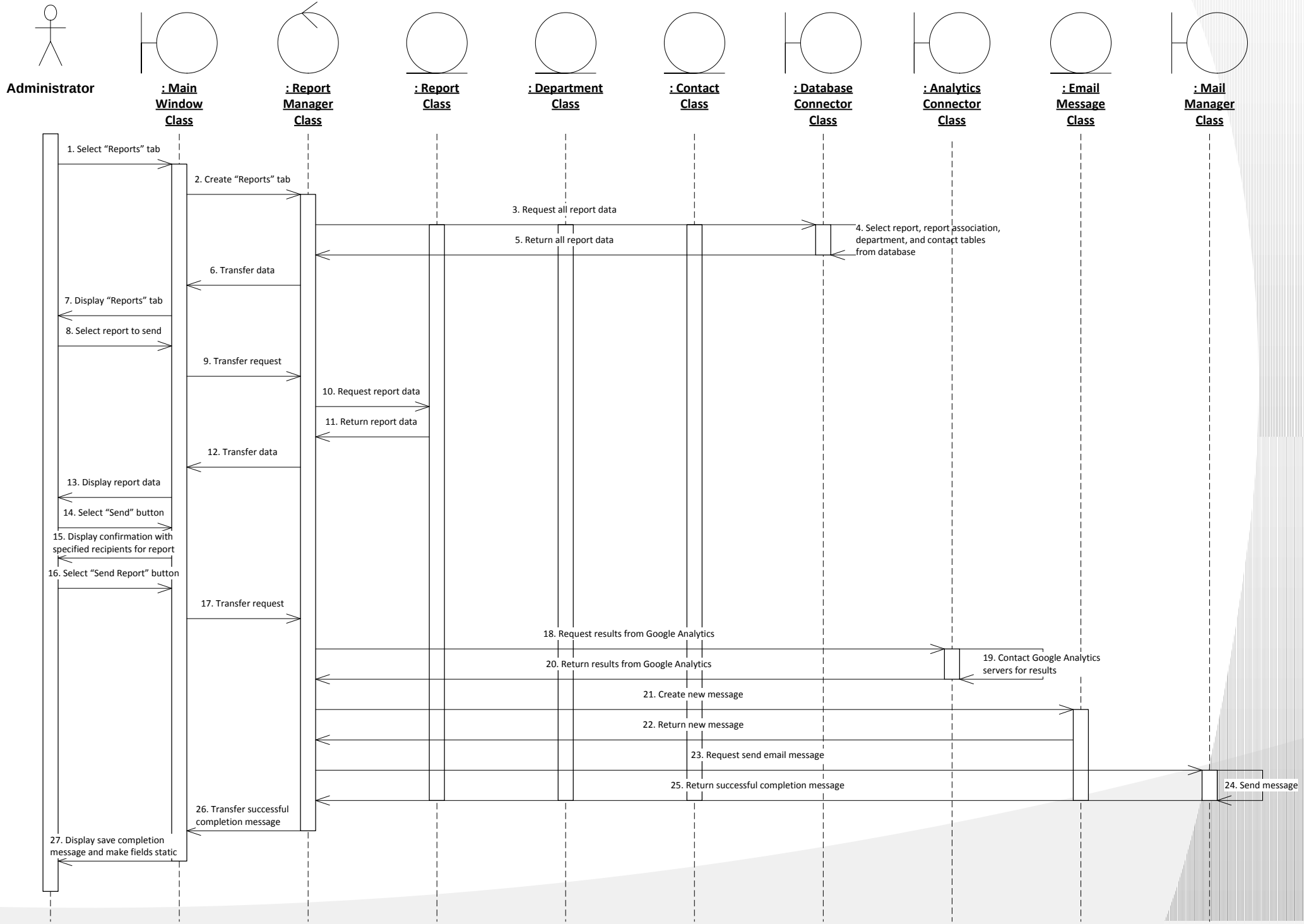
Delete Report



Preview Report Results



Send Report Results



User Interface Descriptions

Brief Contents

I. Introduction

The interface consists of a main window with four tabs: “Contacts,” “Departments,” “Reports,” and “Settings.” Selecting a tab displays the information associated with that tab. Although each differs in content, the look-and-feel among the tabs is unified using two panes: the list pane and the details pane. The only exception to this rule is the “Settings” tab, which is discussed further in Section IV.

The list pane shows a list of items relevant to the current tab, updating as a user changes context. Likewise, the details pane will show in-depth information about the current selection in the list pane. As the user changes selections in the list pane, the details pane updates accordingly. This is analogous to the list pane updating when the user changes tabs.

Another component of the unified appearance is that user actions are grouped according to the target of the action. That is, creating and deleting items from the list pane will affect the list pane at the highest level. Thus, these actions are contained inside the list pane. Similarly, the details pane contains all of the controls that affect a single item, such as editing items. All actions are presented in a toolbar across the bottom of the appropriate pane, providing users a consistent and convenient location to find the available options.

II. Interface Overview

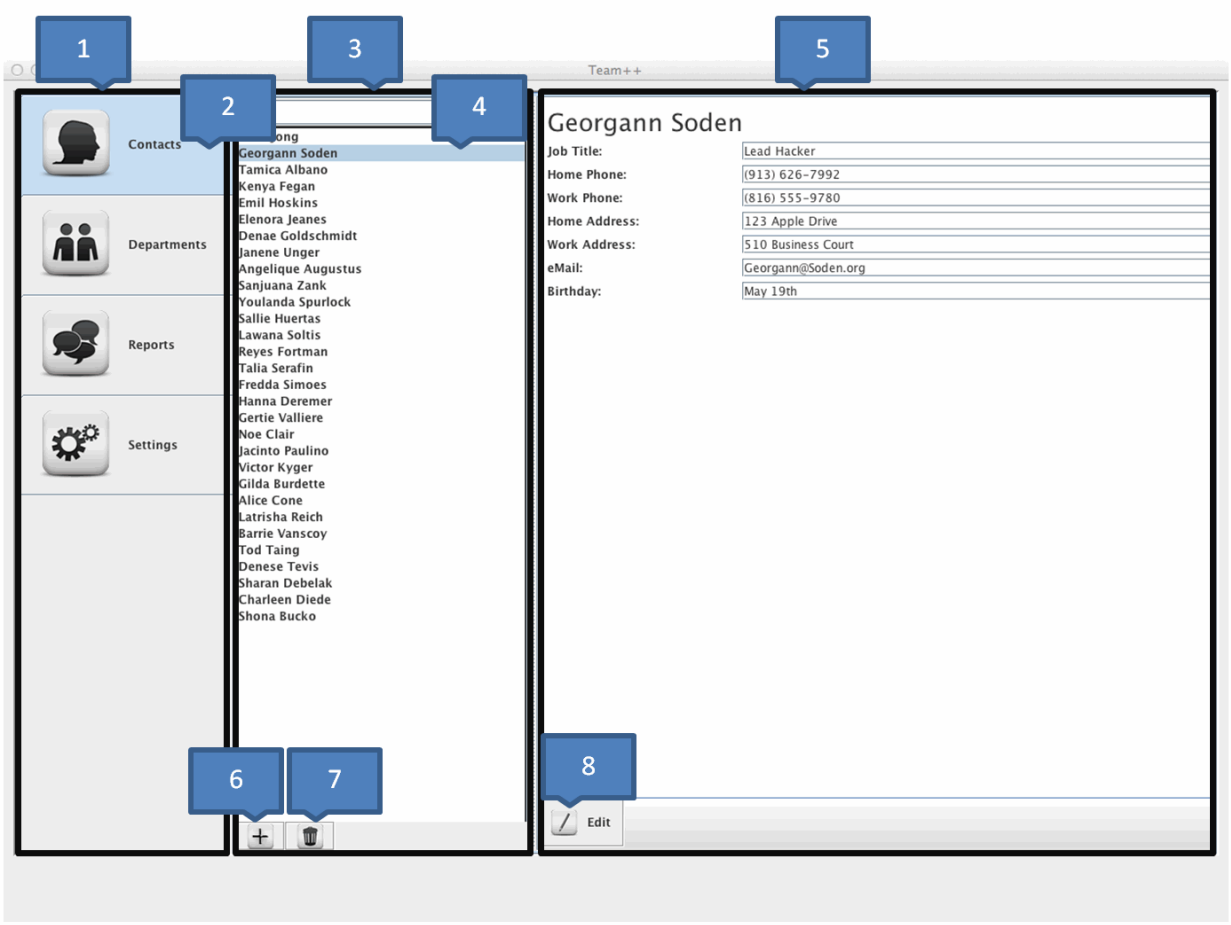


Figure 1. The typical appearance of the interface when viewing a list item.

1. Tabs - The tabs differentiate the operations a user will be performing. All of the content in the subsequent panes is determined by the selected tab.
2. Currently selected tab - The selected tab is highlighted.
3. List Pane - The list pane shows all of the available items in the current tab.
4. Currently selected list item - The selected list item is highlighted.
5. Details Pane - This pane displays the extended information about a currently selected list item.
6. Create Button - The “=” sign signifies the “Create” action. It allows the user to add a new item to the list.
7. Delete Button - The trash bin allows the user to permanently delete the currently selected item from the list.
8. Edit Button - Once selected, the fields for the currently selected item will become editable, and the “Edit” button itself transforms into “Cancel” and “Save” buttons. “Cancel” allows the user to abort the edit operation, and “Save” allows the user to save changes. These buttons may be seen in Figure 5.

III. Contacts Tab

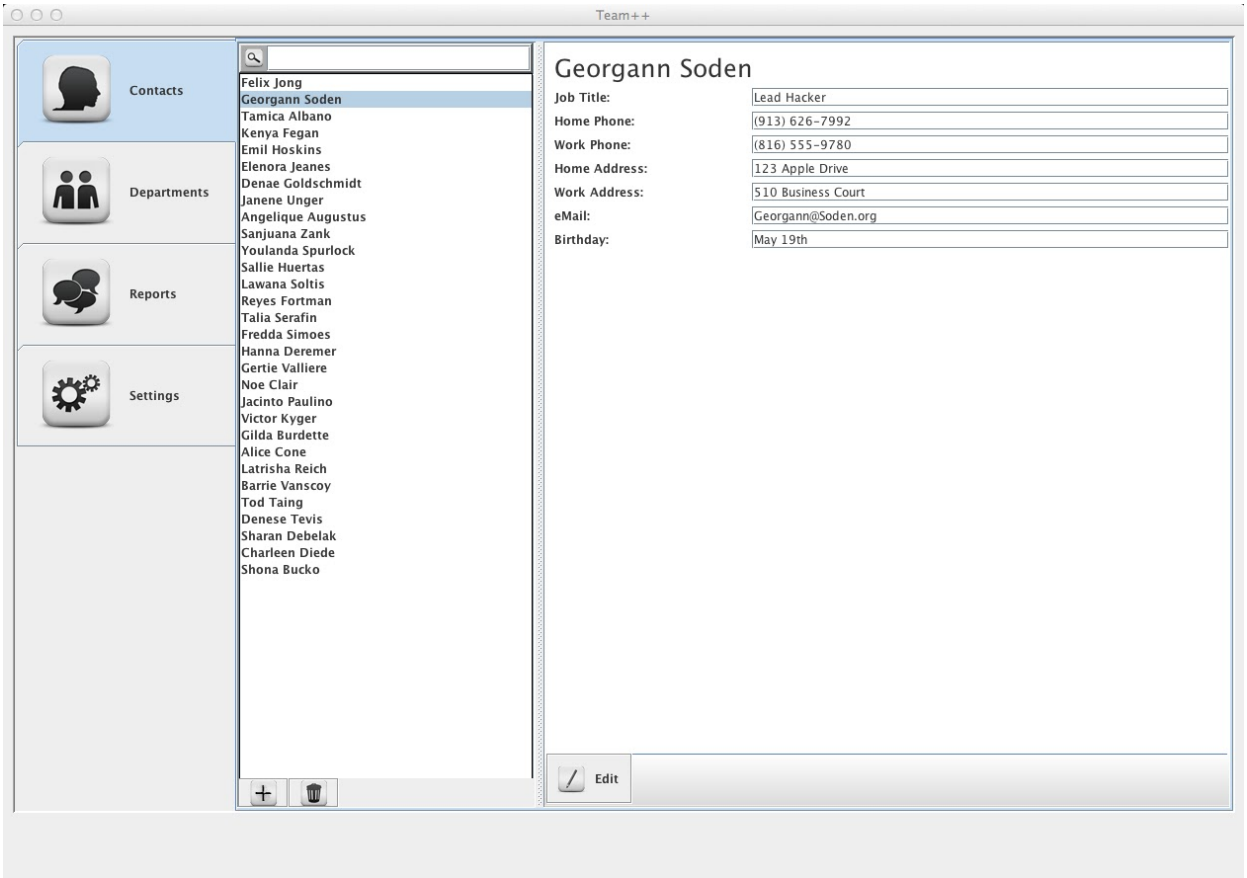


Figure 2. The “Contacts” tab when viewing a contact

The “Contacts” tab presents users with a list of contacts. A user may select a contact from the list directly or use the search feature across the top of the list, which will dynamically load results as the user types. Once a selection is made, the selected contact’s information is displayed on the right side, in the details pane.

The details pane shows all of the stored information for a given contact. This includes the contact’s name, job title, home phone, work phone, home address, work address, eMail, and birthday. When only viewing a contact, these fields are unchangeable. Selecting “Edit” allows the user to edit the contact.

The “+” allows the user to create a new contact. When clicked by the user, the details pane is populated with editable fields, which can be used to enter contact information. When in this editing mode, the “Edit” button is replaced by “Cancel” and “Save” options, allowing the user to abort the creation of a new contact or save the new contact. The trash bin allows users to permanently delete the currently selected contact.

IV. Departments Tab

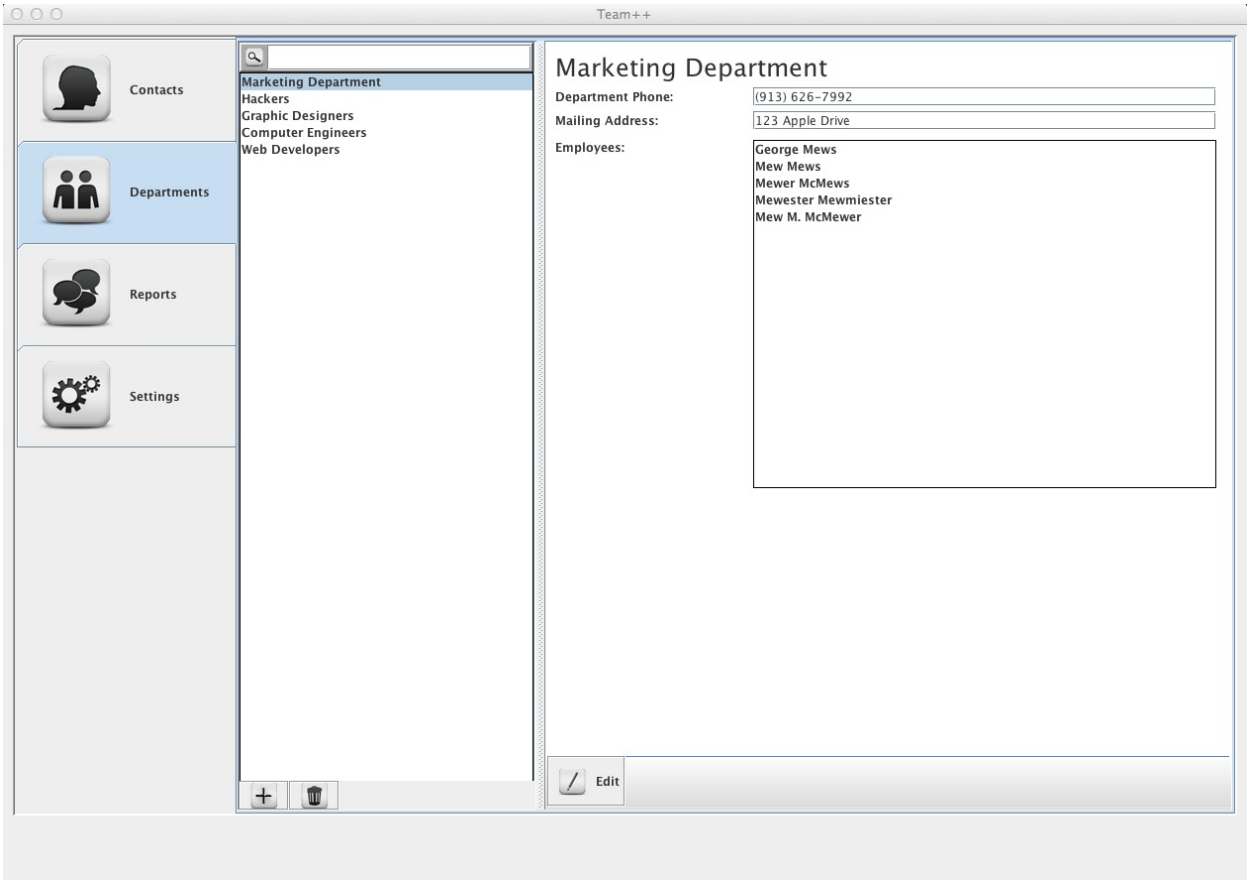


Figure 3. The “Departments” tab when viewing a department.

The “Departments” tab demonstrates the similarities between the different tabs. When selected, the list pane shows only the departments. Selecting a department will give detailed information about that department. This includes the department’s name, phone, and mailing address.

A new section of the details pane for departments is a field containing the names of all employees inside a department. This field is populated with contacts’ names. Selecting the “Edit” button makes two new buttons appear: “Add” and “Remove” (not shown as Figure 3 shows viewing a department only). The “Add” button allows the user to select contacts from a pop-up window and add them to the department. “Remove,” as expected, will remove the selected contact from the department, but it will not delete the contact.

To create a new department, the user may select the “+” button, and to delete the currently selected department, the user should click the trash bin.

V. Reports Tab

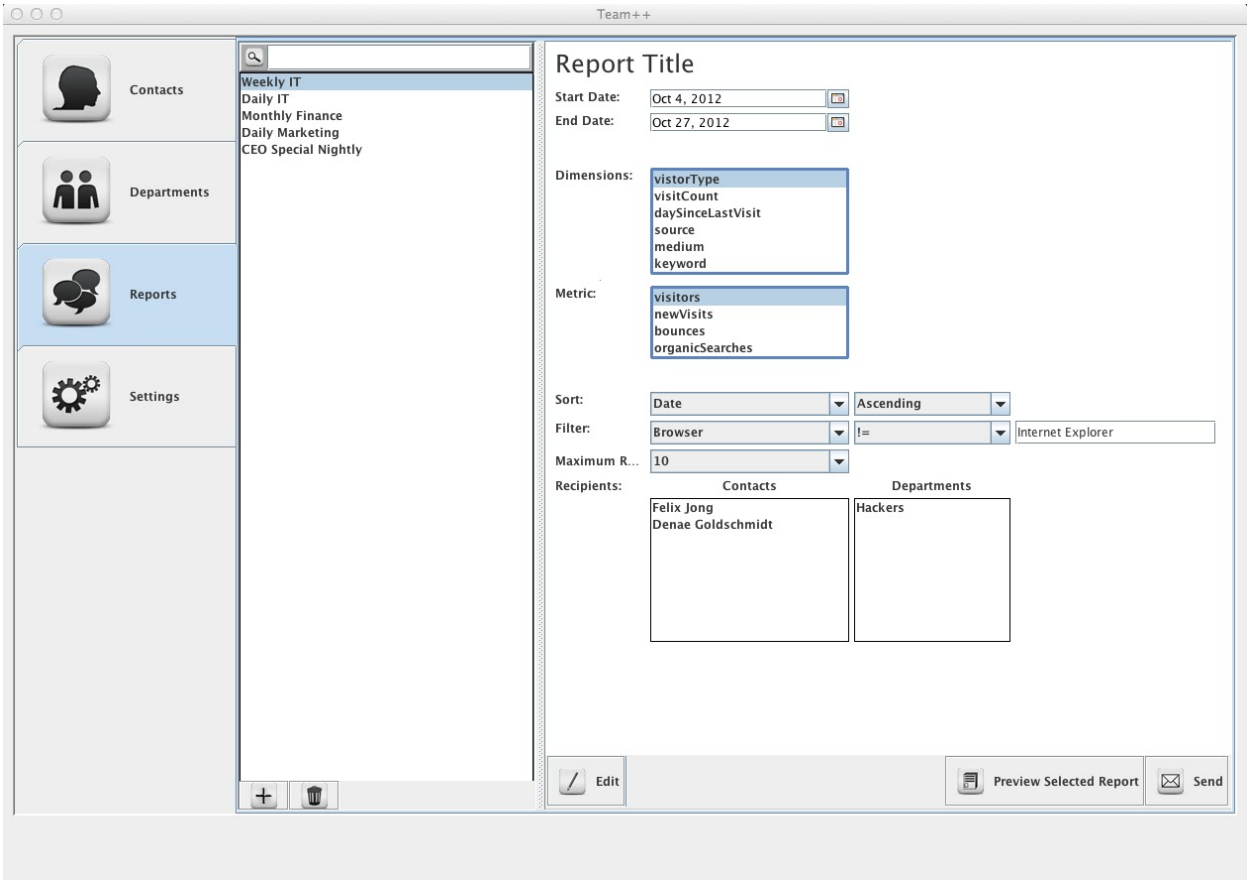


Figure 4. The “Reports” tab when viewing a report.

The “Reports” tab contains saved reports in the list pane. Selecting a saved report allows the user to view and edit the report. Figure 4 shows the appearance of the interface when viewing a report.

For a selected report, the details pane will show the dates, dimensions, metrics, and other specifications of the report, such as filters. Additionally, the user may specify recipients who will automatically receive copies of the report results when the “Send” button is pressed. As with editing a department, when the user selects “Edit” on a report, “Add” and “Remove” buttons appear under the specified recipient’s fields that allow management of the recipients list.

Figure 5 shows the interface for editing a list item. In this case, a report is being edited. If the “Add” button is pressed under the “Contacts” field, a pop-up window appears showing the available contacts to add to the specified recipients. Figure 6 shows an example of this window. Also note the appearance of “Cancel” and “Save” buttons in place of the standard “Edit” button while editing an item.

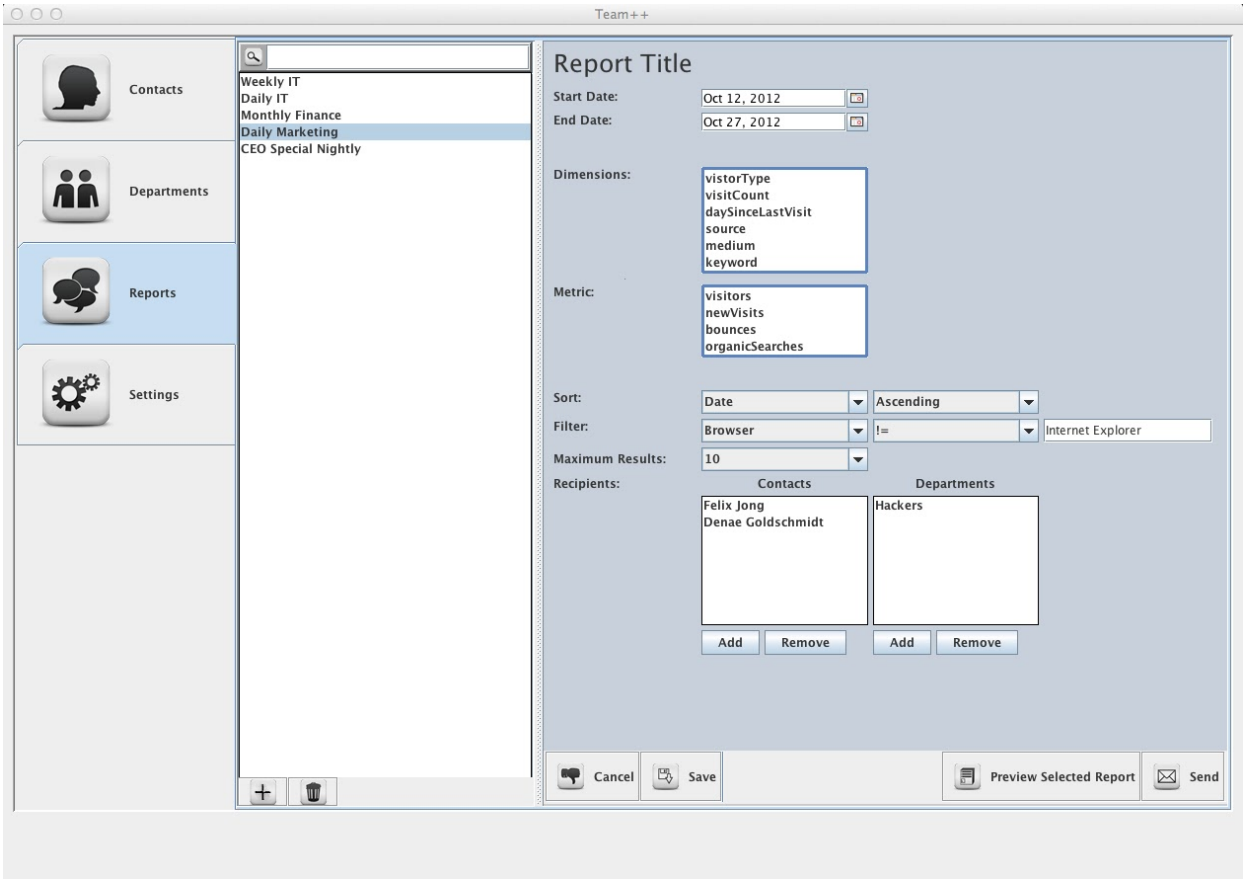


Figure 5. The “Reports” tab when editing a report.

The “+” button will create a new report, and the trash bin will delete the currently selected report. The other two noteworthy buttons on this tab allow the user to preview or send the report results associated with the current report. Previewing report results runs the query generated from the report’s dimensions, metrics, etc. and displays a pop-up window containing the report results.

Sending the report results generates an email containing the results of the report to the specified recipients. If no recipients have been specified, they may be added at send time using the same pop-up window shown in Figure 6.

Figure 6. An example of the pop-up window displayed when pressing “Add” under one of the recipients fields on a report. A similar window would appear when pressing “Add” to add a contact to a department.

VI. Settings Tab

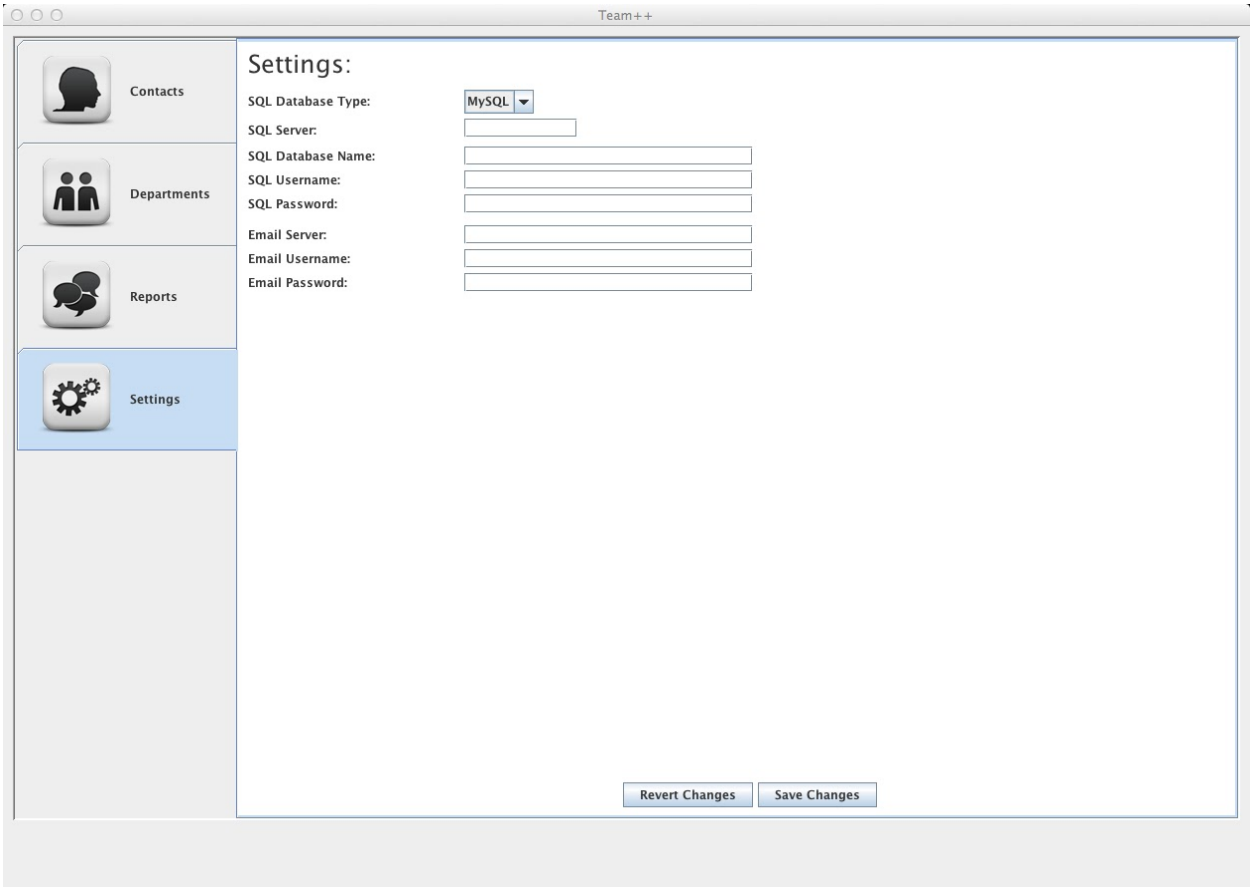


Figure 7. The “Settings” tab.

The “Settings” tab is the most distinct. Unlike the other tabs, there is no list or details pane; the settings pane is entirely self-contained. This tab provides a convenient interface for editing the settings located in the program’s configuration file. It allows the user to change the SQL database type, name, and authentication credentials as well as SMTP server name and credentials.

At the bottom are the "Revert Changes" and "Save Changes" buttons. “Revert Changes” will restore the settings to the previously saved state. This button should be used if the user enters information but does not wish to update the settings. “Save Changes” will store the new settings in the program’s configuration file.

Planning and Estimation

COCOMOII

Unadjusted Function Points

Reference information:
DET: Data Element Type, a unique piece of data
FTR: Full Text Retrieval, a Master File that is read for a process
RET: Record Element Type, a subgroup of data within a Master File

Inputs

An input is a process that originates outside the program. Inputs control the program's data in some way; for example, an input may update the program's settings file.

Complexity Key:

FTRs	DETs 1-4	5-15	16 or more
0-1	Low	Low	Average
2	Low	Average	High
3 or more	Average	High	High

Function Points Key:

Low	3
Average	4
High	6

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Create Contact	ContactId, FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	10	Contacts Table	1	Low	3
Edit Contact	FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	9	Contacts Table	1	Low	3
Delete Contact	ContactId	1	Reports, Departments, Contacts Tables	3	Average	4
Create Department	DepartmentId, DepartmentTitle, Phone, MailingAddress	4	Departments, Contacts Tables	2	Low	3
Edit Department	DepartmentTitle, Phone, MailingAddress	3	Departments, Contacts Tables	2	Low	3
Delete Department	DepartmentId	1	Reports, Departments Tables	2	Low	3
Create Report	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	12	Reports, Departments, Contacts Tables	3	High	6

Edit Report	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports, Departments, Contacts Tables	3	High	6
Delete Report	ReportId	1	Reports Table	1	Low	3
Update Settings	SQL_DBType, SQL_Server, SQL_DBName, SQL_Username, SQL_Password, Email_Server, Email_Username, Email_Password	8	Settings File	1	Low	3
					Total Input Function Points:	37

Outputs

An output is any process that yields a result which is sent outside of the program.

Complexity Key:

FTRs	DETs 1-5	6-19	20 or more
0-1	Low	Low	Average
2-3	Low	Average	High
4 or more	Average	High	High

Function Points Key:

Low	4
Average	5
High	7

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Email Report Results	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	12	Reports, Departments, Contacts Tables	3	Average	5
					Total Output Function Points:	5

Master Files

Master files, also called internal logic files, are data stored and maintained by the program.

Complexity Key:

RETs	DETs 1-19	20-50	51 or more
1	Low	Low	Average
2-5	Low	Average	High
6 or more	Average	High	High

Function Points Key:

Low	7
Average	10
High	15

Master File Name	DET Names	# of DETs	RET Names	# of RETs	Resulting Complexity	# of FPs
Contacts Table	ContactId, FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	10	Contacts	1	Low	7

Departments Table	DepartmentId, DepartmentTitle, Phone, MailingAddress; DepartmentId, ContactId	6	Departments; Department Associations	2	Low	7
Reports Table	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults; ReportId, DepartmentId; ReportId, ContactId	16	Reports; Report Associations Departments; Report Associations Contacts	3	Low	7
Settings File	SQL_DBType, SQL_Server, SQL_DBName, SQL_Username, SQL_Password, Email_Server, Email_Username, Email_Password	8	Settings	1	Low	7
					Total Master File Function Points:	28

Queries

A query, or inquiry, is a request prompted by the user, returning within the application domain (for example, previewing a result).

Complexity Key:

FTRs	DETs 1-5	6-19	20 or more
0-1	Low	Low	Average
2-3	Low	Average	High
4 or more	Average	High	High

Function Points Key:

Low	3
Average	4
High	6

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Preview Report Results	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports Table	1	Low	3
Search and Display Contacts	FirstName, LastName	2	Contacts Table	1	Low	3
Search and Display Departments	DepartmentTitle	1	Departments Table	1	Low	3
Search and Display Reports	ReportTitle	1	Reports Table	1	Low	3
					Total Query Function Points:	12

Interfaces

An interface is any process that requires working with information controlled by another program, such as querying data on an external server.

Complexity Key:

RETs	DETs 1-19	20-50	51 or more
1	Low	Low	Average

Function Points Key:

Low	5
Average	7
High	10

2-5	Low	Average	High
6 or more	Average	High	High

Process	DET Names	# of DETs	RET Names	# of FTRs	Resulting Complexity	# of FPs
Retrieve Data from Google Analytics	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports	1	Low	5

Total Interface Function Points: 5

Total Unadjusted Function Points: 87

Scale Drivers

Overview

Driver	Rating	Justification
Precedentedness (PREC)	Low	The largely unprecedented rating is based on the fact that the developers have had some small experience with GUI design, writing a report results generator for Google Analytics, and an email generator, but it will be new putting everything together.
Development Flexibility (FLEX)	Very Low	The development flexibility is very low, as a rigorous adherence to the requirements must be maintained.
Architecture and Risk Resolution (RESL)	High	Many of the associated risks have already been resolved. For instance, sample programs have been written for sending the email, querying Google Analytics, and connecting to a database.
Team Cohesion (TEAM)	Nominal	Even though the team can be very cooperative at times, each developer has differing opinions, and it can be difficult to reach a resolution. For this reason, a basically cooperative rating has been selected.
Process Maturity (PMAT)	Very Low	The Process Maturity could be found using the Capability Maturity Model (CMM) Level or examining key process areas. Because this is the first time the team is doing this procedure, the CMM Level is 1 by default.

Details

Precedentedness

Feature	Rating	Justification
Organizational understanding of product objectives	Very Low	The developers have a general understanding of the objectives but not very much experience with creating software to fulfill these objectives
Experience in working with realted software systems	Nominal	Even though designing the product as a whole is largely unprecedented, the developers have a lot of related experience working with databases, email servers, and Google Analytics APIs
Concurrent development of associated new hardware and operational procedures	Extra High	There is no concurrent development of associated new hardware, so the highest rating has been selected, minimizing the impact of this feature.
Need for innovative data processing architectures and algorithms	Extra High	There is little to no need for innovative data processing architectures and algorithms, since this product provides the same sort of functionality found in other programs that integrate with databases and other servers.

Development Flexibility

Feature	Rating	Justification
Need for software conformance with pre-established requirements	Very Low	The software must comply fully with all specified requirements.
Need for software conformance with external interface specifications	Very Low	The software must comply fully with external interfaces. For instance, a user cannot specify any part of a report that is not supported by Google Analytics or the results will fail to generate.
Premium on early completion	Extra High	There is no premium on early completion, which helps loosen the rigorousness slightly.

Team Cohesion

Characteristic	Rating	Justification
Consistency of stakeholder objectives and cultures	High	Each team member has an understanding of the objectives, and so wishes to achieve the same objectives. Although, there are a few inconsistencies among team members as to how the objectives should be reached.
Ability, willingness of stakeholders to accommodate other stakeholders' objectives	High	The team can reach a compromise after some debate of the pros and cons of each idea.
Experience of stakeholders in operating as a team	Low	Each team member has a little experience with teamwork but have not worked together on any projects.
Stakeholder teambuilding to achieve shared vision and commitments	Very Low	There has been no teambuilding outside of team meetings.

Cost Drivers

Factor	Rating	Justification
		Product Factors
Required Software Reliability (RELY)	Low	A product malfunction would result in easily recoverable losses. For example, a corrupted report could be re-created.
Database Size (DATA)	Low	The amount of data being stored in the database is going to be very small, including all of the data in all the tables.
Product Complexity (CPLX)*	Low	The Product Complexity Breakdown chart below shows that the complexity for the product tends towards a lower rating.
Required Reusability (RUSE)	Nominal	There is some expected reusability between similar classes, such as Contacts and Departments. This will be used to employ reusability across the project
Documentation Match to Life-Cycle Needs (DOCU)	Nominal	The amount of documentation should be about right-sized for the life-cycle needs.
		Platform Factors
Execution Time Constraint (TIME)	Nominal	There are no major execution time constrants, and the product should have no problem executing within normal time constraints.
Main Storage Constraint (STOR)	Nominal	There are no required storage constraints, and the database is expected to be very small, regardless.

Platform Volatility (PVOL)	Low	Google Analytics is not likely to change majorly very often.
Personnel Factors		
Analyst Capability (ACAP)	Low	The analysis is being performed by the developers, so the analyst capability is certainly not high. However, in general, the team has been able to perform fairly efficient analysis and design.
Programmer Capability (PCAP)	Nominal	As a collection of student developers, the team is not as knowledgeable as professionals may be, but the team members have a lot of combined talents and knowledge which can help overcome obstacles.
Applications Experience (AEXP)	Very Low	The team has had under two months of experience developing the product.
Platform Experience (PEXP)	Low	Cumulatively, the team has a fair amount of experience with graphical user interface design, database connectivity, and other platforms.
Language and Tools Experience (LTEX)	Low	Even though the team has had years of experience with languages such as C++, there is some amount of unfamiliarity with Java and the Eclipse IDE.
Personnel Continuity (PCON)	Very High	There will be no personnel turnover during the course of the project. At least, there had better not be.
Project Factors		
Use of Software Tools (TOOL)	Low	For this project, the Eclipse IDE will be used for writing the code, the Swing Designer for creating the GUI, and some tools like JUnit will be used for testing. There is no significant integration to life-cycle management tools.
Multisite Development (SITE)	High	For any offsite development, the team can easily communicate through a variety of means: phone, text, email, and online chat systems.
Required Development Schedule (SCED)	Nominal	The development schedule is fitted to 100% of the available time.

* Product Complexity Breakdown:

Factor	Rating	Justification
Control Operations	Nominal	The program will use some message passing and intermodule control.
Computational Operations	Very Low	There are no extensive computations to be performed by the product.
Device-dependent Operations	Very Low	All of the input and output will be done using straightforward reads and writes.
Data Management Operations	Low	There is a single settings file which is expected to have no structural changes. Some of the database calls may be moderately complex.
User Interface Management Operations	Nominal	The GUI is being built using the simple Swing widget set.

Calculation Result

Using the online COCOMOII calculator at http://diana.nps.edu/~madachy/tools/COCOMOII.php:

Effort = 15.1 Person-months
This is a fair estimation. For a five person team, this is about 3 person-months of effort each.

Schedule = 9.0 Months
The online calculator returns a schedule of 9 months. However, this does not account for team sizes. Using the estimated effort from above, 3 months would also be reasonable estimate for duration.

Product Backlog

Priority	Product Backlog Item	Estimate (Points)
1	Manage connection to the SQL database.	1
2	Administrator shall be able to create a new contact in the database.	5
3	Administrator shall be able to create a new department in the database.	8
4	Administrator shall be able to create an ad-hoc report by selecting start date, end date, metrics, dimensions, sorting, filters as well as recipients.	5
5	Administrator shall be able to preview report results before sending.	5
6	Administrator shall be able save reports to the database.	8
7	Administrator shall be able to edit an existing contact.	3
8	Administrator shall be able to edit an exisiting department.	5
9	Administrator shall be able to edit an existing report.	5
10	Administrator shall be able to delete a contact from the database.	3
11	Administrator shall be able to delete a department from the database.	3
12	Administrator shall be able to delete a report from the database	3
13	Administrator shall be able to send report results via email to the specified recipients.	5
14	Administrator shall be able to select a contact by searching for the contact's first name or last name.	8
15	Administator shall be able to select a department by searching for its title.	3
16	Administrator shall be able to select a report by searching for its title.	3
17	Administrator shall be able to edit database and mail settings.	1
	Total	**74**

Sprint 1 Backlog

Oct 29 (Mon)	Oct 31 (Wed)	Nov 2 (Fri)	Nov 5 (Mon)	Nov 7 (Wed)	Nov 9 (Fri)	Nov 12 (Mon)	Nov 14 (Wed)	Sprint Backlog Item	Tasks	Developer	Hour Estimate	Hours Remaining:
								Manage connection to the SQL database.				
									Research connection persistence library	Howard	2	
									Make config file for database	Howard	1	
									Create database connector class	Howard	3	
									Test database connection	Pho	1	
									Document classes and functionality	Howard	1	
								Administrator shall be able to create a new contact in the database.				
									Create contact table	Allison	1	
									Create contact GUI	Allison	1.5	
									Create contact class	Allison	3	
									Define SQL statements for storing contacts in database	Allison	2	
									Test creating a contact	Howard	3	
									Create GUI validation rules	Seth	2	
									Document classes and functionality	Allison	3	
								Administrator shall be able to create a new department in the database.				
									Create department table	Pho	0.5	
									Create departments to contacts table	Pho	0.5	
									Create department class	Pho	1	
									Create departments GUI	Pho	2	
									Define SQL statements to store department in database	Pho	1	
									Test creating a department	Howard	1	
									Create GUI validation rules	Pho	3	
									Document classes and functionality	Pho	1	
								Administrator shall be able to create an ad-hoc report by selecting start date, end date, metrics, dimensions, sorting, filters as well as recipients.				
									Create reports GUI	Tim	1.5	
									Create GUI validation rules	Tim	3	
									Document functionality	Tim	4	
								Administrator shall be able to preview report results before sending.				
									Create report results preview GUI	Pho	2	

Sprint 1 Backlog

Oct 29 (Mon)	Oct 31 (Wed)	Nov 2 (Fri)	Nov 5 (Mon)	Nov 7 (Wed)	Nov 9 (Fri)	Nov 12 (Mon)	Nov 14 (Wed)	Sprint Backlog Item	Tasks	Developer	Hour Estimate	Hours Remaining:
									Create analytics connector class	Pho	2	
									Format report results	Pho	1	
									Test report preview	Allison	3	
									Documentation	Pho	1	
								Administrator shall be able save reports to the database.				
									Define SQL statement to store report in database	Tim	1	
									Create report class	Tim	3	
									Test saving report to database	Seth	2	
									Documentation	Tim	4	
								Administrator shall be able to edit an existing contact.				
									Define SQL statements for updating contacts	Seth	3	
									Make necessary GUI changes	Pho	1	
									Test contact update	Tim	3	
									Documentation	Seth	2	