Dynamic Response to Urgent Maintenance Request System (DRUMRS)
Design Document

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Group: 12

Contents

User Requirement

Requirement number	Use Case	Introduction	Rationale	Source	Author	Required Function	Related Requirements	Support Material	Test Cases	Date Added	Date Modified	Priority
1.1	Request Service	Emergency Request	Communicate emergency requests for safety reasons	Ross Faber	Ross Faber	The DRUMRS system will communicate using a notification that there is an emergency maintenance request that needs to be taken care immediately			1	9/24	9/24	TBD Assignment 5
1.2	Request Service	Normal Request	Communicate general service requests	Ross Faber	Ross Faber	The DRUMRS system will communicate using a notification that there is a low priority maintenance request that may or may not be fulfilled.			2	9/24	9/24	TBD Assignment 5
1.3	Request Service	One task per request	Prevent multiple requests for the same issue	Ross Faber	Ross Faber	The DRUMRS system will only allow one request per issue at a given interval to prevent multiple requests for the same issue.	1.2		3	9/24	9/24	TBD Assignment 5
1.4	Request Service	Assign priority	Easier to assign tasks based on a schedule	Ross Faber	Ross Faber	The DRUMRS system will assign the priority based on the request and reference the University of Minnesota – Facilities Management Response Time Standards document.	1.5	University of Minnesota – Facilities Management Response Time Standards	4	9/24	9/24	TBD Assignment 5
1.5	Request Service	Provide additional information	Easier to prioritize and assign tasks	Ross Faber	Ross Faber	The DRUMRS system will query for additional information regarding the request	1.4		5	9/24	9/24	TBD Assignment 5
1.6	Request Service	Template for general maintenance	Faster user use of DRUMRS	Ross Faber	Ross Faber	The DRUMRS system will have a template for the most common maintenance requests.			6	9/24	9/24	TBD Assignment 5
1.7	Request Service	Requests for custom maintenance	Customized use of DRUMRS	Ross Faber	Ross Faber	The DRUMRS system will allow for custom requests that don't fit the usual template as explained in requirement 1.6 for a maintenance request.	1.6		7	9/24	9/24	TBD Assignment 5
1.8	Request Service	Call Center	Call center will be able to create tasks	Ross Faber	Ross Faber	When a CCM calls in to the call center with a request, the call center will be able to create a request as physical request points do.			8	9/24	10/27	TBD Assignment 5
1.9	Request Service	Request Points	Convenience of access to system	Amiel Hassan	Amiel Hassan	The DRUMRS system will allow CCMs to make maintenance request in all rooms that are currently maintained by custodians and maintenacne workers			9	10/7	10/7	TBD Assignment 5
2.1	Maintenance Notifications	Notifications for general Maintenance requests	Notify staff of maintenance requests	Ross Faber	Ross Faber	Once a work order is created from request, the system shall notify relevant miantenace staff and CCms who initited the request.			10	9/24	10/27	TBD Assignment 5
2.2	Maintenance Notifications	Turning off notifications	Some people may receive way too many notifications.	Ross Faber	Ross Faber	A staff member will be able to choose to not receive notification	2.1		11	9/24	9/24	TBD Assignment 5
2.3	Maintenance Notifications	Emergency Notification	Immediate response is needed for emergencies	Ross Faber	Ross Faber	Staff will receive a more urgent notification it is an emergency.	1.1		12	9/24	10/27	TBD Assignment 5
2.4	Maintenance Notifications	System Administrator notification	Internal notifications will be necessary for certain requests	Ross Faber	Ross Faber	System Administrators will be able to send out notifications to maintenance staff regarding certain tasks or announcements to staff			13	9/24	9/24	TBD Assignment 5
3.1	Accepting and Updating Tasks by General Maintenance Staff	Assigning staff to a task	Quickly assign tasks that they are working on/have time for	Ross Faber	Ross Faber	General staff will be able to assign task to themselves using the DRUMRS system			14	9/24	9/24	TBD Assignment 5
3.2	Accepting and Updating Tasks by General Maintenance Staff	Updating task's status	Conveniently update tasks' status	Ross Faber	Ross Faber	General staff will be able to update the status of the task as Open, Scheduled, Completed,etc (Need confirmation of all type of statuses TBD)			15	9/24	9/24	TBD Assignment 5

User Requirement

3.3	Accepting and Updating Tasks by General Maintenance Staff	Filter tasks	Quickly find necessary tasks	Ross Faber	Ross Faber	Staff will be able to filter tasks based on various attributes listed in requirement 3.2.1	3.2.1		16	9/24	9/24	TBD Assignment 5
3.3.1	Accepting and Updating Tasks by General Maintenance Staff	Task attributes	Additional information needed for each task	Ross Faber	Ross Faber	Each task will have the following information; location (building, floor,room), problem, asset, contact information of the user who requested maintenance, start date, due date, priority, and type			17	9/24	9/24	TBD Assignment 5
3.4	Accepting and Updating Tasks by General Maintenance Staff	Version Control	See who edited tasks	Ross Faber	Ross Faber	Every task must have history of who edited it, when, and when the edit was done.			18	9/24	9/24	TBD Assignment 5
3.5	Accepting and Updating Tasks by General Maintenance Staff	Permanence of Work Orders	Responsibility and History of Work Orders	Ross Faber	Ross Faber	Work orders cannot be deleted.			19	9/24	11/1	TBD Assignment 5
4.1	Assign Work Orders to Staff by Maintenance Managers	Assigning Staff to a Work Order	Manage tasks of subordinates.	Ross Faber	Ross Faber	Maintenance managers will be able to assign work orders to the maintenance staff that they manage.			20	9/24	11/1	TBD Assignment 5
5.1	System Maintenance & Manager Report	DRUMRS User Permissions	Groups of users should have a subset of functionality depending on their use cases.	Ross Faber	Ross Faber	DRUMRS will have an access hierarchy determining allowed functionality for general staff, managers, system administrator, and IT			21	9/24	11/1	TBD Assignment 5
5.2	System Maintenance & Manager Report	Manager Report	Report for important work order data statistics.	Ross Faber	Ross Faber	Managers will be able to run a report for work order allocation against a set of employees.			22	9/24	11/1	TBD Assignment 5
5.3	System Maintenance & Manager Report	System Maintena	Catch internal issues.	Chun F Chak	Chun F Chak	DRUMRS system shall allow System Administrators to complete a routine check over vital functionality.			23	10/7	11/1	TBD Assignment 5
5.3.1	System Maintenance & Manager Report	Notify IT Support	Take further action in event of internal issues.	Amiel Hassan	Amiel Hassan	If an issue is found during the routine check described in 5.1, IT support will be notified.			24	11/1	11/1	TBD Assignment 5

Specifications

Requirement number	Specifications	Author
1.1	Notification will be sent via SMS on emergency Emergency is anything that compromises safety or learning.	Ross Faber
1.2	Notification will be sent via SMS Low Priority is considered anything that does not compromise safety or learning.	Ross Faber
1.3	Intervals are every 30 minute Extra requests are logged CMM's will still be able to make a request even if it is within the extra 30 minute interval	Ross Faber
1.4	Priorities that are not emergency are as follow; urgent, expedited, routine, fixed. These priorities will be assigned based on flags, such as type of request Managers will be able to assign priorities to work orders based on requests.	Ross Faber
1.5	Information includes the problem, contact information of the user, and the type of problem Query will be a prompt that comes immediately after request	Ross Faber
1.6	Common requests include but are not limited to toilet paper, markers, paper towels, lights, cleaning.	Ross Faber
1.7	User will be able to not use the template for request and enter custom information for the request.	Kah Hin Lai
1.8	call center staff shall be able to create a request in call center.	Kah Hin Lai
1.9	A system request point shall be placed in all rooms that are currently maintained by custodians and maintenance workers.	Kah Hin Lai
2.1	Once a work order is created from request, a notification that a new request has been assigned will be sent to relevant maintenance staff as well as the CCM who initiated the request.	Kah Hin Lai
2.2	A staff member will be able to turn on/off notifications	Kah Hin Lai
2.3	Manager will receive a phone call while an emergency request is made	Kah Hin Lai
2.4	A notification will be sent to corresponding person by email and SMS message	Chun F Chak
3.1	A staff member will be able to gain accessibility to assign task to themselves or maintainers.	Chun F Chak
3.2	A task will be differentiated into Open, Scheduled, Completed. System Admin will be getting notifications if two or more status changes are occurred in 30 minutes period.	Chun F Chak
3.3	The filter execution will sort by status, Name, Date, Priority levels.	Chun F Chak
3.3.1	Maintenance Manager will have access to update additional information to the tasks. It will also push the changes to the database.	Chun F Chak
3.4	The Staff member should have access to the history to show that who have made any changes to the task for further assistance.	Chun F Chak
3.5	Work orders will be assigned a unique, unmodifiable identification key to ensure work orders can still be modified, but not deleted or changed to blank work orders.	Amiel Hassan

Specifications

4.1	Managers shall be able to select a work order from a collection of work orders associated with their building, select a staff worker from a collection of all workers the manager manages, and update the Assigned To field of the work order to be the name/id of the chosen worker.	Amiel Hassan
5.1	Each of the following user permission groups will be defined within the DRUMRS system: Staff worker, manager, system administrator, IT support. Each permission group will be associated with the DRUMRS functionalities as described in requirements 3.1, 3.2, 3.3, 3.3.1, 4.1, 5.2, and 5.3	Amiel Hassan
5.2	Managers shall be able to generate a comprehensive list of all staff members the manager manages and list all work orders currently assigned to each worker.	Amiel Hassan
5.3	System administrators of the DRUMRS system will be able to run system check that checks: All request points are connected and can send requests to the DRUMRS system; Call center is connected	Amiel Hassan
5.3.1	When any of the system checks fail, an SMS message will be sent to IT support users. The SMS text will contain a general issue topic: Request point disconnected; Call center disconnected	Amiel Hassan

Requirements Based Test Cases for
DRUMRS

Revision 0.1
November 1, 2017

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Document Revision History

Rev	Date	Author	Change Description
0.1	**11/1**	Everyone	adding test cases

This document is originating from Neil Bitzenhofer and DataCard Corporation.

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1. Test Requirements

1.1 Objective

The purpose of the Test Requirements section is to list ALL hardware and software test requirements, whether explicitly determined from any relevant documents or implicitly determined from experience and product knowledge. For most projects, the documents referred to may be the Product Definition Document, Software/Hardware Requirements Specification and perhaps the Software/Hardware Design Specification. A Test Case Matrix is provided that simply lists all the test cases by title or description, and includes a method of tracking when the test case was run and whether it passed or not.

1.2 Definitions and Acronyms

List any technical terms or acronyms used in the document, along with their meanings.
Examples for this document:

SRS	Software Requirements Specification
TM	Traceability Matrix
DRUMRS	Dynamic Response to Urgent Maintenance Request Systems

1.3 Traceability Matrix

Requirement \ Test Case	TestCaseID1	TestCaseID2	TestCaseID3	TestCaseID4	TestCaseID5	TestCaseID6	TestCaseID7	TestCaseID8	TestCaseID9
1.1	X								
1.2		X							
1.3			X						
1.4				X					
1.5					X				
1.6						X			
1.7							X		
1.8								X	
1.9									X

Requirement \ Test Case	TestCaseID10	TestCaseID11	TestCaseID12	TestCaseID13	TestCaseID14	TestCaseID15	TestCaseID16	TestCaseID17	TestCaseID18	TestCaseID19	TestCaseID20	TestCaseID21	TestCaseID22	TestCaseID23	TestCaseID24
2.1	X														
2.2		X													
2.3			X												
2.4				X											
3.1					X										
3.2						X									
3.3							X								
3.3.1								X							
3.4									X						
3.5										X					
4.1											X				
5.1												X			
5.2													X		
5.3														X	
5.3.1															X

2. Test Cases

Test Case 1	Emergency Request
Description:	User will be able to communicate an emergency request to maintenance staff
Test Inputs:	Emergency request to DRUMRS system
Expected Results:	Maintenance staff receives emergency maintenance request.
Dependencies:	None
Test Steps:	1. CCM requests emergency service 2. Request will go through DRUMRS system 3. Respective Maintenance staff will receive request.

Test Case 2	Normal Request
Description:	User will be able to communicate a low priority to maintenance staff
Test Inputs:	low priority request to DRUMRS system
Expected Results:	Maintenance staff receives low priority maintenance request.
Dependencies:	None
Test Steps:	1. CCM requests low priority service 2. Request will go through DRUMRS system 3. Respective Maintenance staff will receive request.

Test Case 3	One task per Request
Description:	User will be able to send multiple requests with only one request going through
Test Inputs:	9 request to DRUMRS system within 30 minutes, 9 requests after 30 minutes
Expected Results:	Maintenance staff receives 2 requests. One right away, and then one after 30 minutes.
Dependencies:	None
Test Steps:	1. CCM requests service once. 2. Confirm maintenance staff receives request. 3. CCM sends 8 more requests within half an hour of original request. 4. Confirm maintenance staff does not receive more requests. 5. Repeat steps 1 - 4. 6. Confirm that the interval is working correctly.

Test Case 4	Assign Priority
Description:	Managers will be able to assign a priority to a work order created by a request
Test Inputs:	Low-priority request
Expected Results:	A work order with “routine” priority
Dependencies:	None
Test Steps:	1. CCM will create a low- priority request 2. Manager will receive request 3. Manager will create work order for request 4. Manager will assign priority “routine” 5. Staff will be able to view priority. 6. Repeat steps 1-5 for each priority.

Test Case 5	Provide additional information
Description:	DRUMRS system will ask for additional information after request
Test Inputs:	Low-priority request
Expected Results:	Query for additional information
Dependencies:	None
Test Steps:	1. CCM will create a low- priority request

	2. DRUMRS interface will ask CCM for more information including the problem, contact information, and the type of problem
Test Case 6	Templates for general maintenance
Description:	The DRUMRS system will have templates for common requests.
Test Inputs:	Low-priority request
Expected Results:	A list of available templates will display
Dependencies:	None
Test Steps:	1. CCM will create a low- priority request 2. DRUMRS system will show multiple templates for common requests, including but not limited to toilet paper, markers, paper towels, lights, cleaning.
Test Case 7	Request for Custom Maintenance
Description:	User will be able to not use the template for request and enter custom information for the request.
Test Inputs:	None
Expected Results:	Custom request form is displayed
Dependencies:	None
Test Steps:	1. CCM request for a form of maintenance request. 2. CCM choose the optional custom request form. 3. Custom request form is displayed. 4. CCM enter information of custom request. 5. Verify that system receive accurate request information.
Test Case 8	Call center staff shall be able to create a request in call center.
Description:	Call center staff create request
Test Inputs:	None
Expected Results:	Request is made
Dependencies:	None
Initialization:	Request point is installed in call center
Test Steps:	1. CCM calls in to the call center to make maintenance request. 2 Call center staff record maintenance request information from CCM. 3. Call center staff create a request. 4. Verify that system receive the correct request.
Test Case 9	CCM are able to create request in all rooms that are maintained by custodians and maintenance workers.
Description:	All request points that are installed is publicly accessible
Initialization:	Request points are installed in all selected room
Test Steps:	1. Go to the one of the selected room 2.Verify that requests points in that room are accessible 3. Repeat step 1 and 2 for all the other selected room.
Test Case 10	Sending Notification when work order is created from request.
Description:	Check if the notification is sent
Test Inputs:	None
Expected Results:	a SMS message should be received on the phone
Dependencies:	Test
Initialization:	Phone numbers of the assigned staff and CCM who initiated the request are in the system.
Test Steps:	1. Created a work order from a request and assign it to a maintainer. 2. SMS notifications are created by system and sent to the maintainer and CCM who initiated the request. 3. Verify that notification is sent to the correct phone number.
Exception Path:	If the maintainer has switch off the notification, maintainer will not receive SMS notification in step 2.

Test Case 11	A staff member will be able to turn on/off notifications
Description:	turn off notification
Test Inputs:	None
Expected Results:	a notification is not received by the maintainer.
Dependencies:	None
Test Steps:	1. Maintainer turns of notification in setting 2. Create a system SMS notification manually and send it to the maintainer. 3. Verify that notification is not received by the maintainer.

Test Case 12	Manager will receive a phone call while an emergency request is made.
Description:	emergency notification
Test Inputs:	None
Expected Results:	A phone call for emergency notification
Dependencies:	None
Initialization:	Phone numbers of selected maintainer staff are in the system
Test Steps:	1. Make an emergency request in the system. 2. Automated voice calls are created by system and it calls selected maintainer staff. 3. Verify that system is calling the correct phone number

Test Case 13	Sending Notification to others
Description:	Checks that if a notification is sent
Test Inputs:	None.
Expected Results:	a SMS message should be received on the phone.
Dependencies:	None
Initialization:	A phone number that corresponds to a staff is set in the system.
Test Steps:	1. A notification is requested by System Administrators or Maintenance Staff. 2. Verify that the numbers of people that need to send notifications. 3. Send out notice to specific phone numbers 4. Verify that notification is sent.

Test Case 14	Assigning tasks
Description:	Checks that if a maintainer can be able to assign task to themselves
Test Inputs:	None.
Expected Results:	A task is assigned to a maintainer.
Dependencies:	None
Test Steps:	1. Loaded the time schedule of a maintainer and unassigned task chart. 2. match if any suitable time slots for maintainer to finish the task 3. Verify the assigning task with maintainer. 4. Verify if the System have record of Assigning task to a specific maintainers

Test Case 15	Updating tasks' status
Description:	Checks if a staff member should change the status of a task.
Test Inputs:	The information of a task, such as Name, Date, maintainers who respond to the task's ID and passwords.
Expected Results:	the status of a task is changed by a staff member.
Dependencies:	None
Test Steps:	1. Loaded the task checklists 2. A maintainer logged into the System and Change the status of the task 3. Verify if the System recognize the changes occurred. 4. Go to step 2 to check all the status functionable.

Exception Path:	If the status have been changed for twice in 30 minutes, notify maintenance manager for further assistance.
Test Case 16	Filter tasks
Description:	Check if the system will be able to filter tasks according to status, Date, Maintainers.
Test Inputs:	a list of tasks
Expected Results:	a list of tasks is sorted with a special order such as status.
Dependencies:	None
Test Steps:	1. Loaded the list of the tasks 2. execute the buttons of filtering task according to status 3. verify if the task is match.
Test Case 17	Task Attributes
Description:	Adding new information to an existed task
Test Inputs:	the item of the task
Expected Results:	an updated task is appeared in the task list.
Dependencies:	None
Test Steps:	1. Loaded the list of task. 2. verify that a staff member has accessible to update task information. 3. Check if the update task file is different with the original document. 4. Verify if the update task file is loaded into the database.
Test Case 18	Version Control
Description:	Be able to see who edited the task.
Test Inputs:	the item of the task
Expected Results:	a list of history according to the task
Test Steps:	1. Loaded the list of task. 2. Verify if the task has been updated. 3. check if the person on the history is the same as expected.
Test Case 19	Unmodifiable Work Order ID
Description:	Prevents work orders from being deleted
Test Inputs:	User modification of work order
Expected Results:	Work order and ID persisting
Dependencies:	None
Initialization:	Work order modification begins
Test Steps:	1. DRUMRS user begins modifying work order in system. 2. Verify work order ID cannot be modified
Test Case 20	Manager Assign Work Order
Description:	Allows managers to assign work orders to workers
Test Inputs:	Manager work order modification
Expected Results:	Work order Assigned To status reflects manager's worker choice
Dependencies:	None
Initialization:	Work order modification begins
Test Steps:	1. Manager selects work order 2. Manager begins modifying work order 3. Manager views list of subordinate workers 4. Manager selects worker and submits modification 5. Verify work order Assigned To displays name of chosen worker
Exception:	Subordinate worker is not listed under manager. Will need to be added.
Test Case 21	User Permissions

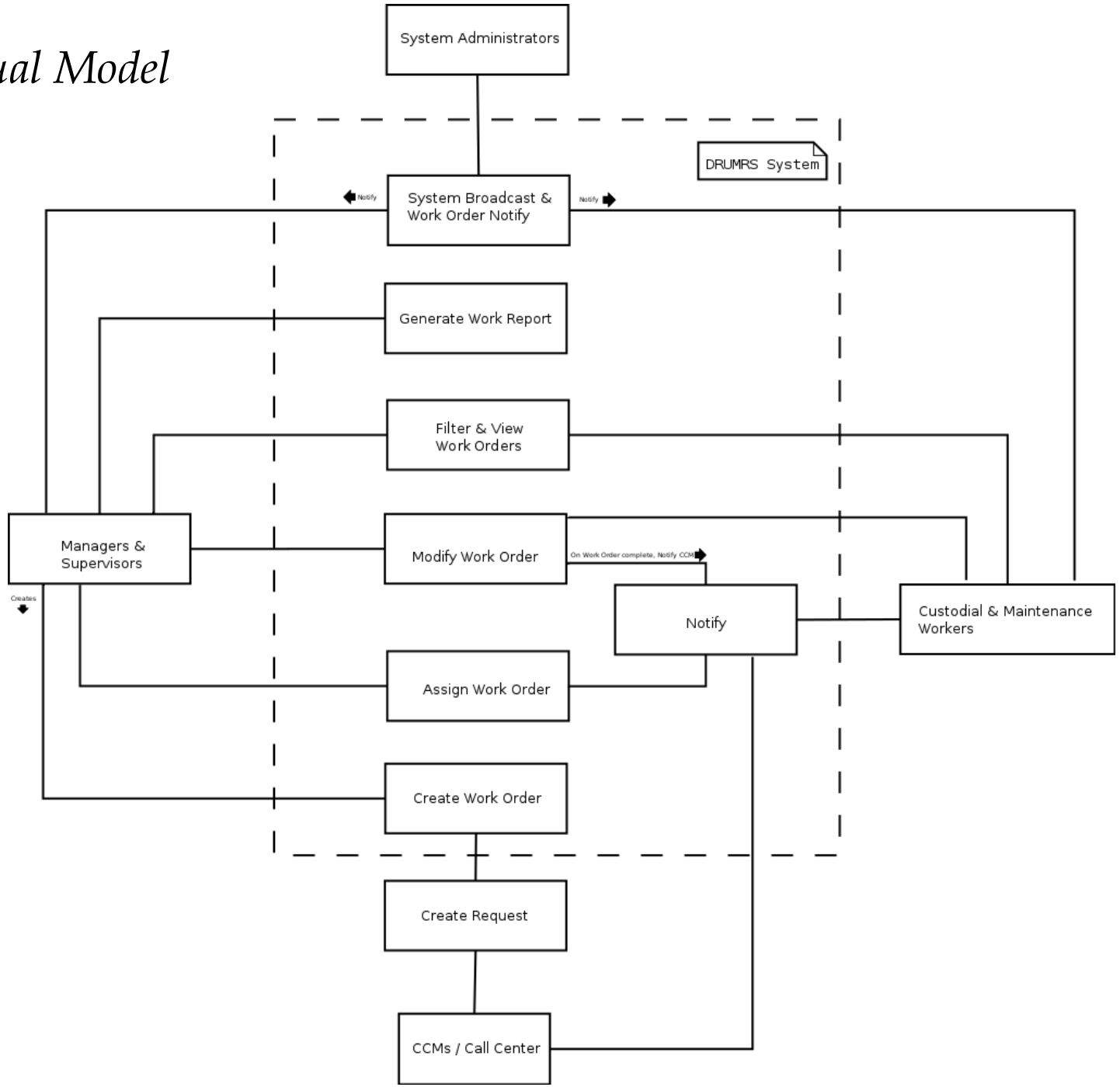
Description:	Allow and disallow DRUMRS functions for users
Test Inputs:	DRUMRS User Groups: Worker, manager, system admin, IT
Expected Results:	Error when user attempts to perform action not permitted to their user group. Success when permitted
Dependencies:	Permission groups set up within system
Initialization:	DRUMRS function is used
Test Steps:	1. For each user group, attempt all functions associated and not associated with the group (as outlined in other test cases) 2a. For all allowed functions, verify the operation was allowed and completed 2b. For all restricted functions, verify the operation was not carried out, and an error is displayed
Exception:	User lacks a user group or user successfully performs unpermitted operation.

Test Case 22	Manager Report Generation
Description:	Generate comprehensive manager subordinate work order report
Test Inputs:	Manager requests report
Expected Results:	Comprehensive list of all subordinate workers and work orders assigned to them
Dependencies:	Manager has subordinate workers within building
Initialization:	Manager requests work order report
Test Steps:	1. Manager initiates work order report request 2. Verify all workers managed by the manager are present 3. Verify all workers are associated with work orders that have been assigned to them

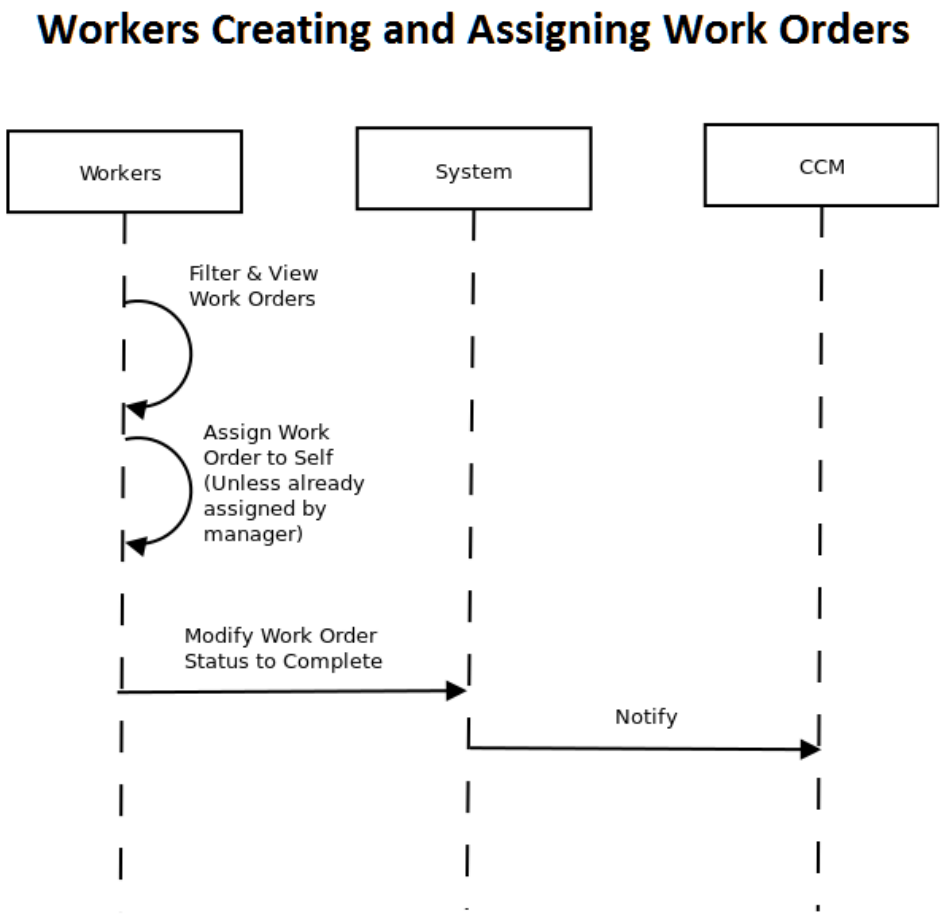
Test Case 23	System Admin Routine Check
Description:	System admin vital system functionality check
Test Inputs:	System admin requests system check
Expected Results:	Status of system components as outlined in specification 5.3
Dependencies:	None
Initialization:	System admin requests system check
Test Steps:	1. System admin initiates system check 2a. Verify that all system check criteria is checked 2b. Verify all request points are connected through pinging 2c. Verify call center is connected through pinging
Exception:	False positive/negative results from any component

Test Case 24	System Admin Routine Check Notify
Description:	IT notification as a result of system admin check
Test Inputs:	Failed system admin routine check
Expected Results:	SMS message sent to IT support team
Dependencies:	Faulty system component
Initialization:	Make each of the components fail
Test Steps:	1. For each component tested by routine check as outlined in specification 5.3, make fail 1b. Disconnect a request point and run routine check 1c. Disconnect call center and run routine check 2. Verify an SMS message was sent with associated issue message 3. Verify SMS message was received by IT support

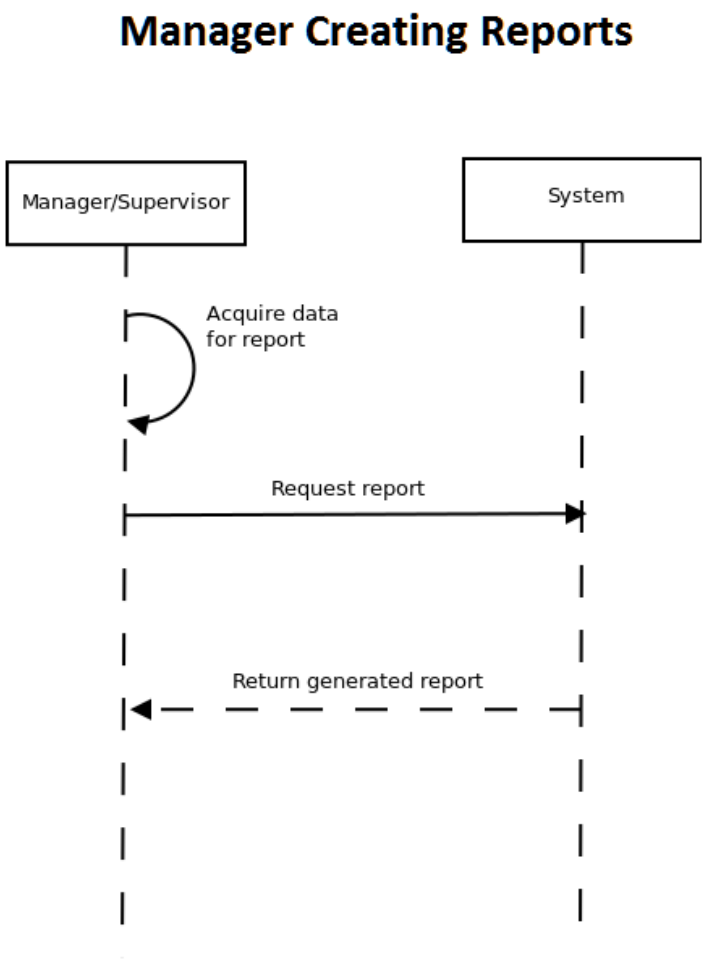
Conceptual Model



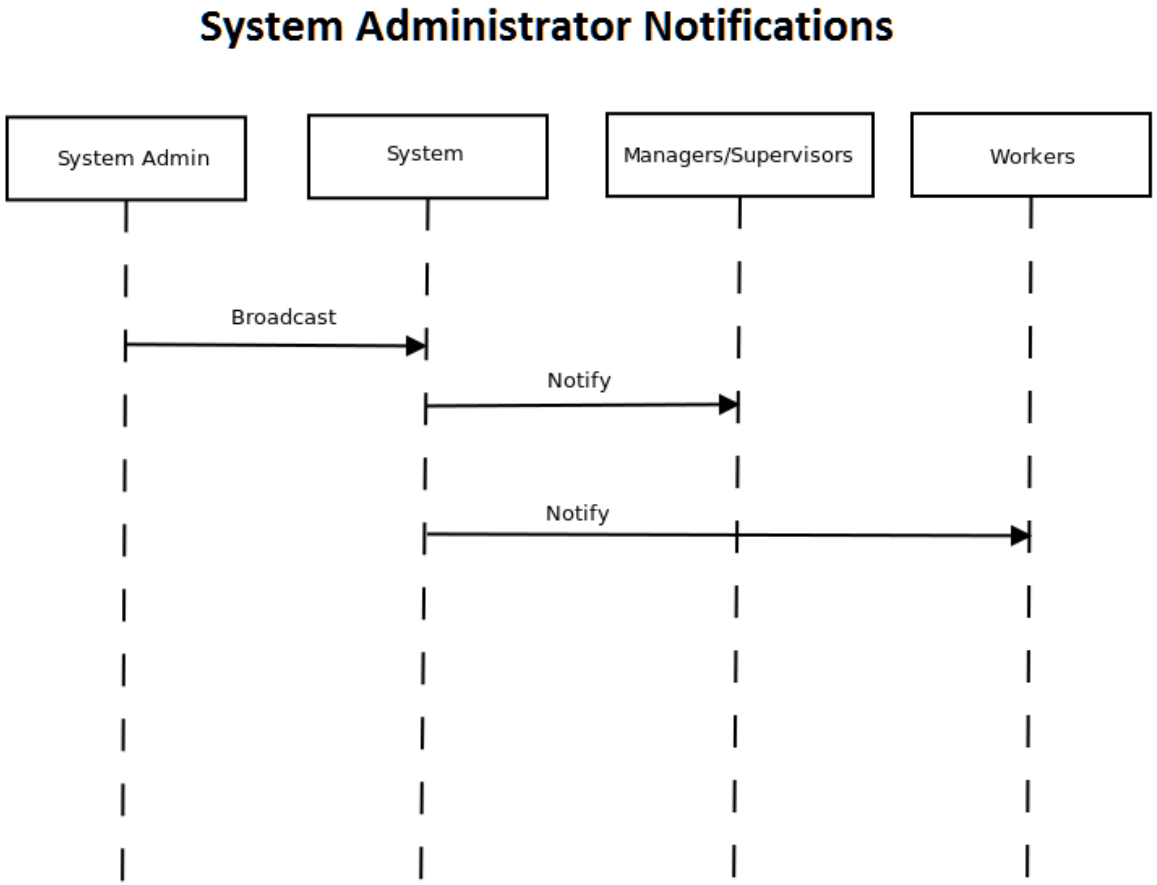
Interaction Diagram 1



Interaction Diagram 2



Interaction Diagram 3



Interaction Diagram 4