

Key and Inventory Assistant
(KIA)
Software Requirements Specification
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Saturday, February 5th, 2011

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1. Introduction

1.1 Purpose

This document has been created to present a set of verifiable software requirements for KIA. It will be used by the users of the software as an aid to help in understanding the function of the software. The users the software is designed for is the administrative faculty and staff in the Tennessee Technological University Computer Science Department. It will also be used by developers as an aid in future development on this software.

1.2 Scope

The KIA system will work as an administrative aid to Computer Science Department at Tennessee Technological University. It will provide a way for keeping track of the inventory of physical keys in the possession of the department and for managing the groups that have access to certain areas of the department through door swipes. Other than the two functions already listed, the system will also have the ability to track additional simple inventories as those inventories are needed. Currently, the management of all of these items are separated, and the goal of this software is to coalesce the management of these functions into one setting. This should save time and energy for the person managing these items

1.3 Definitions, Acronyms, and Abbreviations

TTU – Tennessee Technological University

CSC Department – Computer Science Department

Groups – A group of people that have access to a set of rooms with their Eagle Card and a card swipe.

1.4 References

MySQL website – www.mysql.com

Qt website – qt.nokia.com

1.5 Overview

Section 2 of this SRS contains an overview of KIA which should assist in understanding the specific requirements of the system. The last section, section 3 provides those specific requirements and should be useful to developers who are seeking to create this system.

2. Overall Description

2.1 Product Perspective

KIA is a self contained application, however the system must interact with a MySQL database on CSC Department servers.

2.1.1 System Interfaces

The system will make use of a MySQL library to connect to and interact with the remote database.

2.1.2 User Interfaces

- Login Screen – Where the users login to gain access to the system.
- Configuration Screen – Where the database connection parameters are set.
- Authorized Users Screen – Where authorized users are viewed, added and removed.
- People Screen – Where borrowers or group members can be queried for, viewed, added, and deleted from the system. The process of removing a person from a group or returning one of his checked out items will be initiated here, and a person will be chosen from here to check out an item or be placed in a group.
- People Addition Screen – Where users input the information necessary to add a new person to the system.
- Group's Person Removal Screen – Where the user will select the group(s) to remove a person from.
- Inventory Check-in Amount Screen – Where the user will select the inventory to be checked in from a borrower and how much of that inventory to check-in.
- Room Screen – Where rooms opened by keys or keycard groups can be viewed, added, and deleted.
- Keys Screen – Where keys can be queried for, viewed, added, and deleted from the system. Rooms can be added or removed from a key from here, and the key checkout process is begun from here.
- Other Inventory Screen – Where other inventory can be queried for, and viewed. Simple inventories can be added or removed from the system here and the currently viewed inventory can be changed here. For the currently selected inventory, an item may be queried for, added, and removed from the system. The checkout process for the selected inventory will begin from this screen.
- Inventory Checkout Amount Screen – Where the user will select the amount of inventory to be checked out and selects whether a due date is requested for the check out.
- Groups Screen – Where groups can be viewed, added, and deleted. Rooms can be added and deleted from a group here, and all of the people in a group can be removed from the group. The process to add a person to the group can be initiated from this screen.

- Calendar Screen – Where a calendar for inventory due dates is shown. The user can select a due date for items being checked out from here, if required, and will be able to see items due back on a chosen date.
- Agreement Screen – Where an agreement will be displayed showing the borrowers name, the item(s) being checked out and the due date, if required. This is to be printed off and signed. The user will be able to complete the checkout from here.

2.1.3 Hardware Interfaces

Not applicable. All interaction with hardware will be performed through other software interfaces.

2.1.4 Software Interfaces

Name: MySQL

Version: 5.1.25

Source: www.mysql.com

Description of Usage: This is the database that is to be used to store the information added to and retrieved from the system.

Name: Qt

Version: 4.7.1

Source: <http://qt.nokia.com>

Description of Usage: This will be the toolkit used to create the graphical user interface for the system.

2.1.5 Communications Interfaces

Not applicable. All inter-process communication will be handled by interaction with software interfaces.

2.1.6 Memory Constraints

Not Applicable.

2.1.7 Operations

Not Applicable.

2.1.8 Site Adaptation Requirements

The system will have the ability to set connection parameters for the particular MySQL database to be used.

2.2 Product Functions

- User Login – The user will be required to login to the system before they have access to any of the information stored in the system.
- User Addition/Removal – The user will be able to add a new user to the system or remove a user from the system
- Inventory Checkout/Check-in – The user will be able to check keys and other inventory items in and out of the system.
- Group Management – The user will be able to create and delete keycard groups, as well as assigning and unassigning people and rooms from groups.
- Key Management – The user will be able to add and delete keys from the system, as well as assigning and unassigning rooms to the keys.
- General Inventory Management – The user will be able to create and delete general inventories, and for each general inventory be able to add and delete inventory items from the system.
- People Management – The user will be able to add and remove people from the system.
- Room Management – The user will be able to add and remove rooms from the system.
- Due Date Observation – The user will be allowed to add a due back date for checked out inventory and will be able to see what items are due back on a particular day.

2.3 User Characteristics

The typical user of KIA would need little in the way of technical knowledge but does need knowledge of the CSC Department and its inventory systems, and must also be cleared by the CSC Department to access the information contained within the system.

2.4 Constraints

Not Applicable

2.5 Assumptions

Due to the sensitive nature of the information to be contained in the system, it is assumed that there will be a secure connection available between KIA and the MySQL database on the CSC Department

servers.

2.6 Apportioning of Requirements

The addition of other, specific inventories, or additional management systems may be added at a future date depending upon CSC Department needs.

3. Specific Requirements

3.1 External Interfaces

3.1.1 User Interfaces

As all data required by KIA is stored in a remote database, database connectivity is a requirement for the system. However, for any screen that requires information from the database, if the database is unavailable due to network loss or other circumstances, a pop-up screen will appear informing the user that the database is unavailable. A similar screen will appear informing the user of any database errors that may occur.

3.1.1.1 Login Screen

- Purpose: Will provide a means of authenticating a user with the system.
- Input: Unique username and password to be found in the remote database, both strings.
- Screen Organization: The login ability will be at the top of the screen with the ability to reach the configuration screen below it.
- Relationships to Other Interfaces: A successful login will allow access to the other user interfaces in the system. An incorrect login will display an error and remain on this interface.

3.1.1.2 Configuration Screen

- Purpose: Will provide a means of changing the database connection parameters.
- Input: Hostname of remote database server, username used to connect to the database, and the password needed to connect as that user, all strings.
- Output: The given information is saved to a configuration file and is stored in the system for use.
- Screen Organization: Input fields above finish and cancel buttons.

3.1.1.3 Authorized User Screen

- Purpose: To allow for the deletion and creation of new users.

- Input: Mouse actions to delete users. A unique username – string, and a non-recoverable password – string, for the creation of a new user. The password is non-recoverable due to the hash being stored in the database.
- Output: The changes made are saved to the remote database, if the change is not successful the user is shown an error message.
- Screen Organization: List of current users to the left, with the ability to delete the selected user beneath it. Fields to add a new user to the right, with the ability to add the new user beneath them. Finish and Cancel buttons on the bottom.

3.1.1.4 People Screen

- Purpose: To allow for people in the system to be viewed and queried for. It will also allow for the deletion of people and the initiation of user addition. From here the process of removing a person from his group(s) and returning an item that he has checked out will begin. People will also be selected from here to be added to groups or to check out pieces of inventory.
- Input: Mouse and keyboard actions to query for people, fields should include Last Name – string , First Name – string, and T Number – string. Mouse actions to select user to view, for deletion, and for checkouts; and to initiate user addition, group removal, and inventory check-in.
- Output: When querying, the names of people matching the given parameters will be displayed on this screen and when selected, their information will also be displayed on this screen. When deleting the changes will be made in the remote database. For checkouts, group removal, and inventory check-in, the selected person will be stored in the system and the system will move to the next step of the process for those actions.
- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. A person's information will be viewed in the upper right corner and they will be selected in the bottom left corner. The user will have the ability to query for, and delete people, and to start the people addition process in the upper left corner. The other functions mentioned will be available in the bottom right.
- Relationship to Other Interfaces: When adding a user the People Addition Screen will appear to continue that process. When removing a person from a group the Group's Person Removal Screen will appear to continue that task and when checking in an item the Inventory Check-in Amount Screen will appear to continue that task. Users will be brought here from the Keys and Other Inventory Screens when checking out an item to select a person, and also from the Groups Screen to select people to be added to a group. When checking out, the user will either be taken to the Calendar Screen or the Agreement Screen depending on whether a due date was requested.
- Messages: An error message will be displayed if no people are selected for adding to a group, checkout, or deletion. An error message will also be displayed if a user is not in a group or does not have any inventory out and the appropriate action is selected, or if the user selected for deletion no longer exists.

3.1.1.5 People Addition Screen

- Purpose: To provide the necessary fields to enter a person into the system.
- Input: First name, Last name, T Number, Home address, Home phone number, Office phone number, E-mail address. All of these are strings.
- Output: If the addition is successful then the changes are made to the remote database. If it is not then a message is displayed to the user informing him.
- Screen Organization: Form fields at the top of the screen with Finish and Cancel features at the bottom of the screen.

3.1.1.6 Group's Person Removal Screen

- Purpose: To allow the user to remove a person from one or more groups.
- Input: Mouse actions to select one or more of the groups the previously selected person is a part of.
- Output: If the group removal is successful then the changes are made to the database, otherwise a message is displayed to the user informing him.
- Screen Organization: Groups to select for removal at the top of the screen with Finish and Cancel features at the bottom of the screen.

3.1.1.7 Inventory Check-in Amount Screen

- Purpose: To allow the user to check in one or more items that a borrower has checked out.
- Input: Mouse and keyboard actions to select one or more of the inventory that the selected person has checked out and select how many items of each inventory to check in.
- Output: If the check-in is successful, the remote database is changed, otherwise an error message is displayed to the user.
- Screen Organization: Items of inventory the person has checked out and the amount to check in at the top with Finish and Cancel buttons on the bottom.

3.1.1.8 Room Screen

- Purpose: To allow for the viewing, addition, and deletion of rooms from the system.
- Input: Mouse and keyboard actions to add a room. The one field is a string to hold the room name. Mouse inputs to view and delete a room.
- Output: On addition and deletion, if it is successful then the remote database is updated, otherwise an error message appears to inform the user. On selection, the information on the room is shown on this screen.
- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. The information for the selected room is found on the right hand side and the rooms will be selected on the bottom left side. The ability to add and remove rooms from the system will be found in the upper left corner.
- An error message will be displayed if the room selected for deletion no longer exists

3.1.1.9 Keys Screen

- Purpose: To allow the user to query for, and view keys managed by the system. The user will also be able to add new keys to the system, add or remove existing keys to/from the inventory, add or remove rooms from keys, and begin the checkout process for keys.
- Input: Mouse and keyboard input for querying, adding new keys, adding/removing existing keys, and adding/removing rooms from keys. Fields are Tag Number – positive integer, used for new key addition and querying, Key Name – string, used for new key addition and querying, Rooms – comma separated strings, used for new key addition and room addition/removal from existing keys, and Amount – integer, used for new key addition and addition/removal for existing keys. Amount must be positive for new keys, but could be negative for existing key removal. Mouse input to begin the key checkout procedure, and for viewing.
- Output: If successful new keys, adding/removing existing keys, or room addition/removal from rooms, the remote database is changed, otherwise a message is displayed informing the user. For querying and viewing, outputs are displayed on this screen. For checking out, the selected keys are stored internally and the user is taken to the next step in the checkout procedure.
- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. The information for the selected key is found in the upper right hand side and the keys will be selected on the bottom left side. The ability to query, add new keys, add/remove existing keys, and add/remove rooms from a key will be found in the upper left corner. The checkout ability will be found in the lower right corner.
- Relationship to Other Interfaces: When the checkout function is selected the user is shown the Inventory Checkout Amount screen to continue with the checkout.
- Messages: An error message will be displayed if a new key could not be added, if a room requested to be added does not exist in the system, or if a request to remove keys from the inventory reduces the number of keys to less than 0.

3.1.1.10 Other Inventory Screen

- Purpose: To allow the user to control other inventories that can be added and removed from the system. For each of these inventories the items can be queried for, viewed, added, removed, and checked out.
- Input: Mouse and keyboard actions for querying, adding a category, adding a new item, and adding/removing existing items. Fields are Category Name – string, used to add a new inventory, ID – string, used to query, to add new items, and to add/remove existing items, Description – string, used to add new items, and Amount – integer, used for new item addition and addition/removal for existing items. Amount must be positive for new items, but could be negative for existing item removal. Mouse actions for removing categories, viewing items, removing items, adding items, and checking out.
- Output: If successful, adding/removing a category, and adding/removing an item will change the remote database, otherwise an error will be displayed to the user. Output for changing active category, querying and viewing will be displayed on this page. For checking out, the selected items are stored internally and the user is taken to the next step in

the checkout procedure.

- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. The information for the selected item is found in the upper right hand side and the items will be selected on the bottom left side. The ability to query, add/remove categories, and add/remove items will be found in the upper left corner. The checkout ability will be found in the lower right corner.
- Relationship to Other Interfaces: When the checkout function is selected the user is shown the Inventory Checkout Amount screen to continue with the checkout.
- Messages: An error message will be displayed if a new item could not be added, or if a request to remove items from the inventory reduces the number of items to less than 0.

3.1.1.11 Inventory Checkout Amount screen

- Purpose: To allow the user to select how many of the selected items to check out, and to select whether or not the item is due back at a specific date.
- Input: Mouse and keyboard actions to select the amount of the inventory to check out.
- Output: The amount and due date request are stored internally and the user is taken to the next step in the process.
- Screen Organization: Items of inventory the user has selected and the amount to check out at the top with Finish and Cancel buttons on the bottom.
- Relationship to Other Interfaces: The user is taken to the People Screen to select the people to check out the items and continue with the checkout.

3.1.1.12 Groups screen

- Purpose: To allow the user to view and create/remove groups. As well as add/remove rooms, add people, and remove all people from a group.
- Input: Mouse and keyboard actions to create groups, and add/remove rooms. Fields are Name – string, used to add groups, and Rooms – comma separated strings, used to add groups and add/remove rooms. Mouse actions to view, remove groups, remove all people, and start the add people to group process.
- Output: If successful, add/remove group, add/remove room, and remove all people will change the remote database. Viewing a group outputs in this screen, and adding a person will store that group internally and will continue to the next step in the process.
- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. The information for the selected group is found in the upper right hand side and the groups will be selected on the bottom left side. The ability to add/remove categories, and add/remove rooms will be found in the upper left corner. The remove all people, and add people abilities will be found in the lower right corner.
- Relationship to Other Interfaces: For adding people the user is taken to the People Screen to select the people to join the group.
- An error message will be displayed if the group selected for deletion no longer exists

3.1.1.13 Calendar screen

- Purpose: To allow the user to select a due date for the item(s) being checked out as well as being able to view items due back on a selected day.
- Input: Mouse and keyboard actions to select a date for setting a due date and viewing items due back that day. Fields are Month – integer, must lie between 1 – 12, Day – integer, must lie between 1 – 31, Year – integer, must be a year greater then or equal to the present year. The date must be in the future.
- Output: If viewing a date and the items due back then the output displays to this screen. If selecting a due date for a checkout, the date is stored internally and the user will be transferred to the next step in the process.
- Screen Organization: The tabs used to access the other main pages are found at the top of this screen. The calendar used to chose dates is found in the right hand side and the items due back for a date will be seen on the bottom left side. The fields to manually select a date will be found in the upper left corner.
- Relationship to Other Interfaces: For selecting a date for checkout the user is taken to the Agreement Screen to continue the checkout process.

3.1.1.14 Agreement screen

- Purpose: To allow the user to print a paper contract for the borrower to sign and return to the user.
- Input: Mouse actions to print the document, finish the checkout, or cancel.
- Output: For printing the contract, the contract is printed through the operating systems print functionality. If the checkout is finished, then the checkout is stored in the remote database.
- Screen Organization: The contract is displayed at the top with the print, finalize checkout and cancel abilities at the bottom.

3.1.2 Software Interfaces

There are no specific requirements as to the software requirements. Please see section 2.1.4 for general information and please see the references in section 1.4 for more information.

3.2 Functional Requirements

3.2.1 User Login

- 3.2.1.1 – The system shall not use local data other than the given username and password to authenticate users.
- 3.2.1.2 – The system will authenticate users against information held in a separate database from the other information dealt with by the system.

3.2.2 User Addition/Removal

3.2.2.1 – The system shall not allow users of duplicate username.

3.2.2.2 – The system shall allow any user to delete and create new users.

3.2.3 Inventory Checkout/Check-in

3.2.3.1 – The system shall not allow a person to checkout more of an item/key than is currently in the inventory.

3.2.3.2 – The system shall not allow a person to check-in more of an item/key than is currently checked out in his name.

3.2.3.3 – The system shall record the date that an item was checked out.

3.2.3.4 – The system shall record both the total amount for each inventory item and the amount of each item currently in the inventory.

3.2.3.5 – The system shall not allow a person to checkout or check-in 0 of an item.

3.2.3.6 – The system shall require that at least one item is either checked out or checked in.

3.2.4 Group Management

3.2.4.1 – The system shall not allow groups of duplicate names.

3.2.4.2 – The system shall remove all people and rooms from the group when the group is removed from the system.

3.2.4.3 – The system shall not allow groups to have access to rooms that do not exist in the system.

3.2.5 Key Management

3.2.5.1 – The system shall not allow keys with duplicate tag numbers.

3.2.5.2 – The system shall not allow the user to remove more keys than what are currently in the inventory from the system.

3.2.5.3 – The system shall not allow keys to open rooms that do not exist in the system.

3.2.6 General Inventory Management

3.2.6.1 – The system shall not allow categories with duplicate names.

3.2.6.2 – The system shall remove all items, both in the inventory and those checked out, when the category those items belong to is removed from the system.

3.2.6.3 – The system shall not allow items within the same category to have duplicate IDs.

3.2.6.4 – The system shall not allow the user to remove more keys than what are currently in the inventory from the system.

3.2.7 People Management

- 3.2.7.1 – The system shall only require first name, last name and T Number as mandatory when adding a user.
- 3.2.7.2 – The system will allow for a home address, home phone, office phone, and e-mail to be entered for each user.
- 3.2.7.3 – The system shall require phone numbers to be in the form XXX-YYY-ZZZZ
- 3.2.7.4 – The system shall require e-mail address to be in the format <string>@<string>
- 3.2.7.5 – The system shall remove a person from any groups he is a part of when the person is removed from the system.
- 3.2.7.6 – The system shall put any items still checked out back into the inventory when a person is removed.

3.2.8 Room Management

- 3.2.8.1 – The system shall not allow rooms with duplicate names.
- 3.2.8.2 – The system shall remove a room from any groups that can open it when that room is removed from the system
- 3.2.8.3 – The system shall remove a room from any key that can open it when that room is removed from the system.

3.2.9 Due Date Observation

- 3.2.9.1 – The system shall only allow dates in the future to valid due dates.
- 3.2.9.2 – The system shall only allow days between 1 – 31 and months between 1 - 12
- 3.2.9.3 – The system shall differentiate between keys and other items due back by color.

3.3 Performance Requirements

- At least four simultaneous users will be supported, one client per computer.
- All operations involving database usage should complete in at most 10 seconds 80% of the time, assuming a high speed internet connection to the CSC Department servers.

3.4 Logical Database Requirements

3.4.1 Users Table

Purpose: To hold the information about the users who are authorized to use the system.

Fields:

- username – string – name used to uniquely identify a user
- password – string – hash of password given

3.4.2 People Table

Purpose: To hold the information about the people who can borrow inventory items or who can be members of groups.

Fields:

- Tnumber – string – the unique identifier for a person
- LastName – string – the person's last name
- FirstName – string – the person's first name
- StrAddr – string – home mailing address of the person
- HPhone – string – home phone number of the person
- WPhone – string – work phone number of the person
- Email – string – e-mail address of the person

3.4.3 Key Table

Purpose: To hold the information about the keys that are in the system.

Fields:

- TagNum – integer – the unique identifier for each key
- KeyName – string – the keys name, should also be unique
- Total – integer – the total number of that key that are in the system
- InInv – integer – the total number of that key that are available to be checked out

3.4.4 P-K Table

Purpose: To hold the information about which people have what keys checked out.

Fields:

- Tnumber – string – the unique identifier for a person
- TagNum – integer – the unique identifier for each key
- NumOut – integer – the number of that key that the person has checked out
- DateOut – Date – the date the last of that item was checked out
- DateDue – Date – the date that the key is due back

3.4.5 Groups Table

Purpose: To hold the information about groups that are in the system.

Fields:

- Gid – integer – the unique identifier for a group
- GroupName – string – the name for each group, should also be unique

3.4.6 P-G Table

Purpose: To hold the information about which people are in which groups.

Fields:

- Tnumber – string – the unique identifier for a person
- Gid – integer – the unique identifier for a group

3.4.7 Rooms Table

Purpose: To hold the information about rooms that are in the system, and can be accessed by groups and keys.

Fields:

- RoomId – integer – the unique identifier for a room
- RoomName – string – name for each room, should also be unique

3.4.8 K-R Table

Purpose: To hold the information about which keys give access to which rooms.

Fields:

- TagNum – integer – the unique identifier for each key
- RoomId – integer – the unique identifier for a room

3.4.9 G-R Table

Purpose: To hold the information about which groups have access to which rooms.

Fields:

- Gid – integer – the unique identifier for a group
- RoomId – integer – the unique identifier for a room

Note: The following two tables will be created for each new category of inventory that will be created. I will use **\$category** as a stand in for the category name.

3.4.10 \$category Table

Purpose: To hold information about the items for the \$category category.

Fields:

- ID – string – this is some sort of serial number or other unique id for the item
- desc – string – a string describing the item
- Total – integer – the total number of that item that are in the system
- InInv – integer – the total number of that key that are available to be checked out

3.4.11 P-\$category Table

Purpose: To hold information about which people have which items from \$category.

Fields:

- Tnumber – string – the unique identifier for a person
- ID– integer – the unique identifier for each item
- NumOut – integer – the number of that item that the person has checked out
- DateOut – Date – the date the last of that item was checked out
- DateDue – Date – the date that the key is due back

3.5 Design Constraints

KIA requires the use of a MySQL database on the CSC Department servers. Its database interface is therefore constrained by software versions on the CSC Department servers.

3.6 Software System Attributes

3.6.1 Reliability

The user shall be informed of any connection loss with the database. The user will then be asked to try to connect again at a later date.

3.6.2 Security

All passwords will be irrecoverably hashed and placed into the database. To provide a secure connection between KIA and the CSC Department MySQL server a VPN will be used. Implementation and setup of this VPN is left to the administrators of the CSC Department.

3.6.3 Portability

While every attempt will be made to make KIA as cross-platform as possible, however, it will be primarily developed for the Windows family of operating system. No other operating system family will be officially supported.