Home Inventory Management System (HIMS)

RELEASE 01.00.00
PROJECT ID: HIMS001

SOFTWARE DESIGN SPECIFICATION

Document Nbr. HIMS-02.03.00-SDS00

Revision 0

December 5, 2014

Review and Approval

Approved By:_____ **Date:**_____
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Functional Analyst

Reviewed By:_____ **Date:**_____
Lead Developer

Reviewed By:_____ **Date:**_____
IT Analyst

Contents

1 INTRODUCTION

1.1 Purpose

The purpose of this project is to provide the general public with a useful and beneficial home inventory management system that will allow them to document their assets and take action if one is damaged, stolen, not working correctly or needs to be returned.

1.2 Scope

This HIMS project provides our potential users with a dynamic and responsive website paired with a mobile application for capturing home inventory pictures and details. The website will be the main portal for the users to browse their inventory, finalize the details of certain possessions and initiate insurance and warranty claims. The web and mobile applications should seamlessly communicate with each other to provide our users with up-to-date information on each page. Users will be able to email the claims departments of their insurance companies for damaged/stolen items or initiate a warranty claim. An application programming interface (API) will be developed and exposed for retailers to integrate with the system. Other functionality will include the ability to find a nearby location for the purchase of a replacement item or return of an item.

1.3 Overview

The major functional requirements for HIMS project are documented in the HIMS Software Requirements Specification (SRS) and are assigned a specific RTM identifier. The corresponding RTM identifier and the SRS section number are referenced in the applicable sections of this document.

Approval of this document shall correspond to the level established in the HIMS Software Development Plan (SDP).

1.4 Revision History

Version	Date Modified	Author	Reason for Change
A	12/4/2014	Sameep	For Review and comments

1.5 Definitions, Acronyms and Abbreviations

Term/ Acronym	Definitions/Acronym Expansion
API	Application Programming Interface
DMZ	De-Militarized Zone
HIMS	Home Inventory Management System
HTTP	Hypertext Transfer Protocol
IEEE	Institute of Electrical and Electronics Engineers

IS	Information Services
IT	Information Technology
ITSCP	Information Technology Service Continuity Plan
LRD	Low-Risk Domain
RAC	Real Application Cluster
SDP	Software Development Plan
SSL	Secure Sockets Layer
SDS	System Design Specification
SMS	Short Messaging Service
SMTP	Simple Mail Transfer Protocol
SOW	Statement of Work
SRS	Software Requirements Specification
SQL	Structured Query Language
TCP/IP	Transmission Control Protocol/Internet Protocol

2 REFERENCES

- HIMS-01.00.00-SOW00, *HIMS Statement of Work*
- HIMS-01.00.00-SRS00, *HIMS Software Requirements Specification*
- HIMS-01.00.00-SDP00, *HIMS Software Development Plan*
- IEEE 802, *Local and Metropolitan Area Networks*
- IEEE Std 1016-2009, *IEEE Recommended Practice for Software Design Specifications*
- ISO 21500:2012, *Guidance on project management*
- ISO 31000:2009, *Risk management*
- ISO 10006:2003, *Quality management systems*
- ISO 10007:2003, *Quality management systems*

3 TRANSACTION DESIGN

3.1 Transaction Decomposition Flow

The components of HIMS Release 1.0 will be decomposed as shown in Appendix A. This section of the SDS the major functions, and sub functions of the system

3.2 Input Form Design

The screens shall conform to the following requirements:

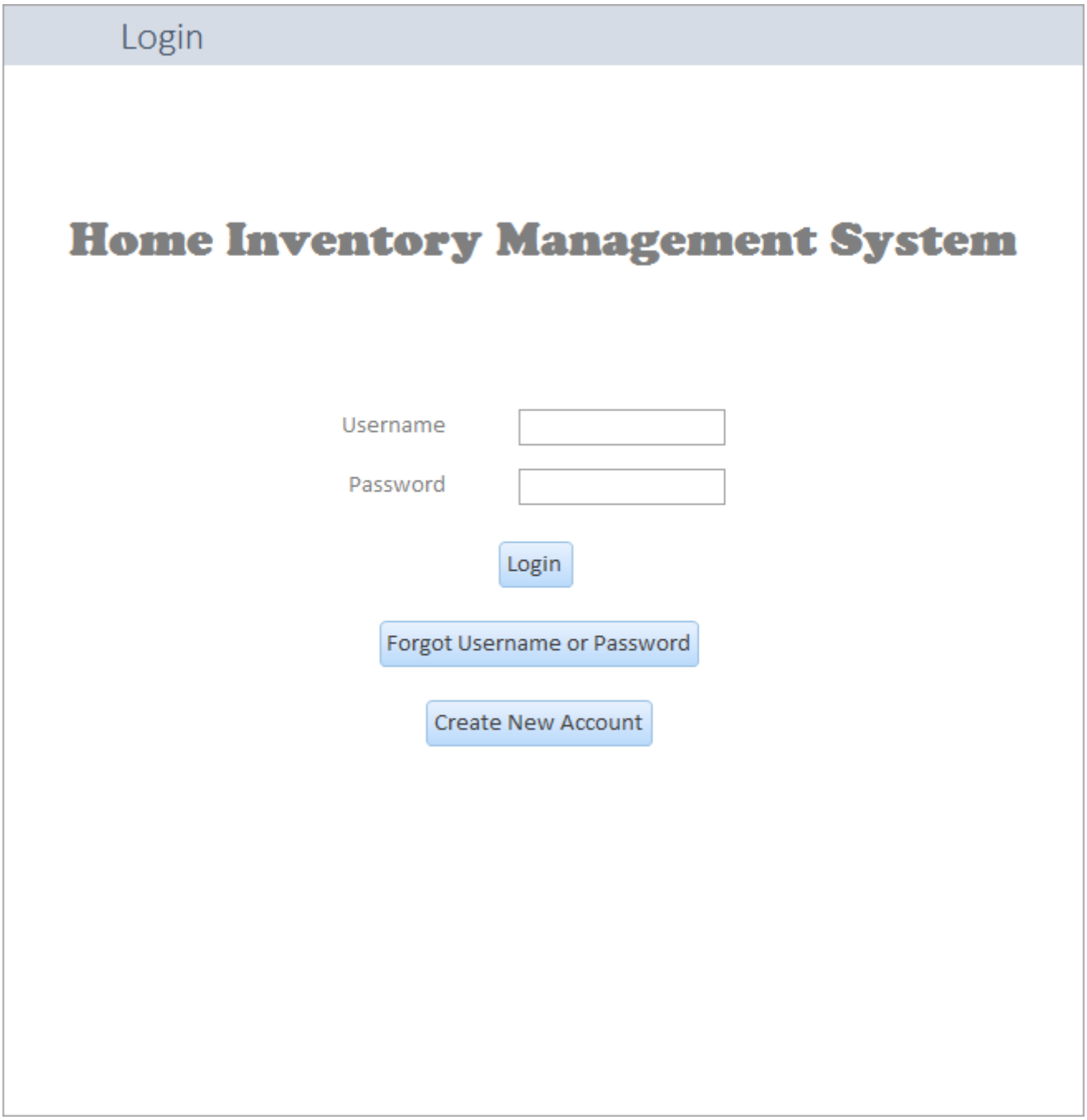
- Extensive use of Dropdown list for data fields in all screens;
- Inquiry and Update modes, Search screens
- Print capability to printer, screen or file;
- Labels that appear on multiple screens shall read the same;
- Column headings, buttons and labels common to multiple screens shall be identical in spelling, abbreviation and case;
- Data field labels shall be of the same color on all screens;
- Data field values shall be of the same color on all screens and different in color from the data field labels;
- Inactive buttons, menu items shall be grayed out;
- Data fields shall be recessed;
- Selection of any item on a table shall result in that item being highlighted to distinguish the selected item from the non-selected item;
- Menu items shall have short cut keys for quick keyboard access. The short cut key shall be identified with an underscored letter. The menu item shall be accessible by holding the alt-key and depressing the short cut key;
- An Exit button shall be available as an item on all module button bars.

All navigation functions will be accessible through the use of mouse and keyboard. The tab progression for data fields will be left to right and top to bottom within each screen and subsection within a screen. If more information is available and unavailable to be fully displayed, a scroll bar will be available to the user to access and display the additional information.

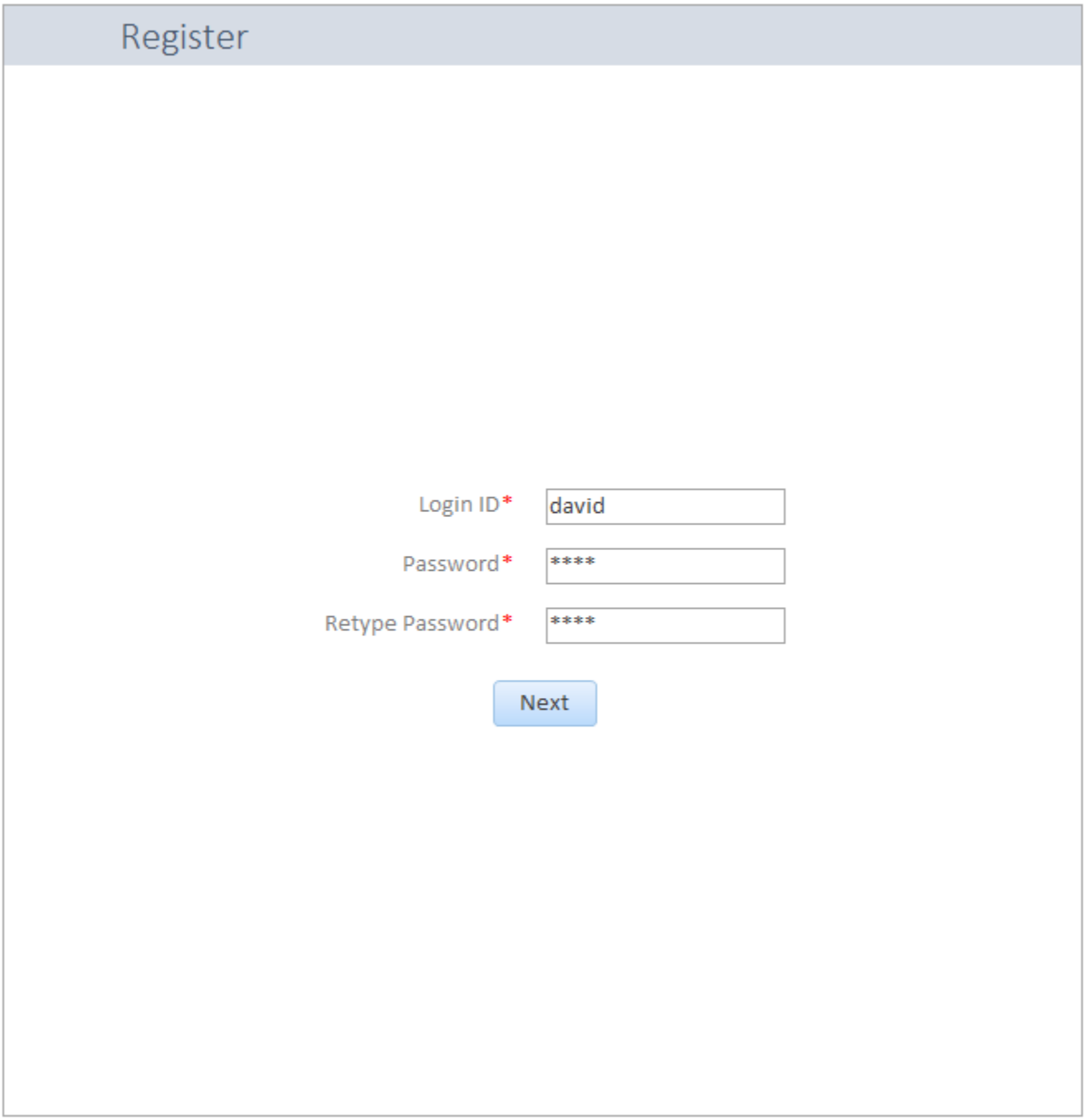
To facilitate correct data input, drop-down lists will be used as extensively as possible. A drop-down list will provide the user with a list of valid data-field choices from which to select. This feature serves to alleviate the need to memorize lists or refer to other sources for valid entry codes for these fields.

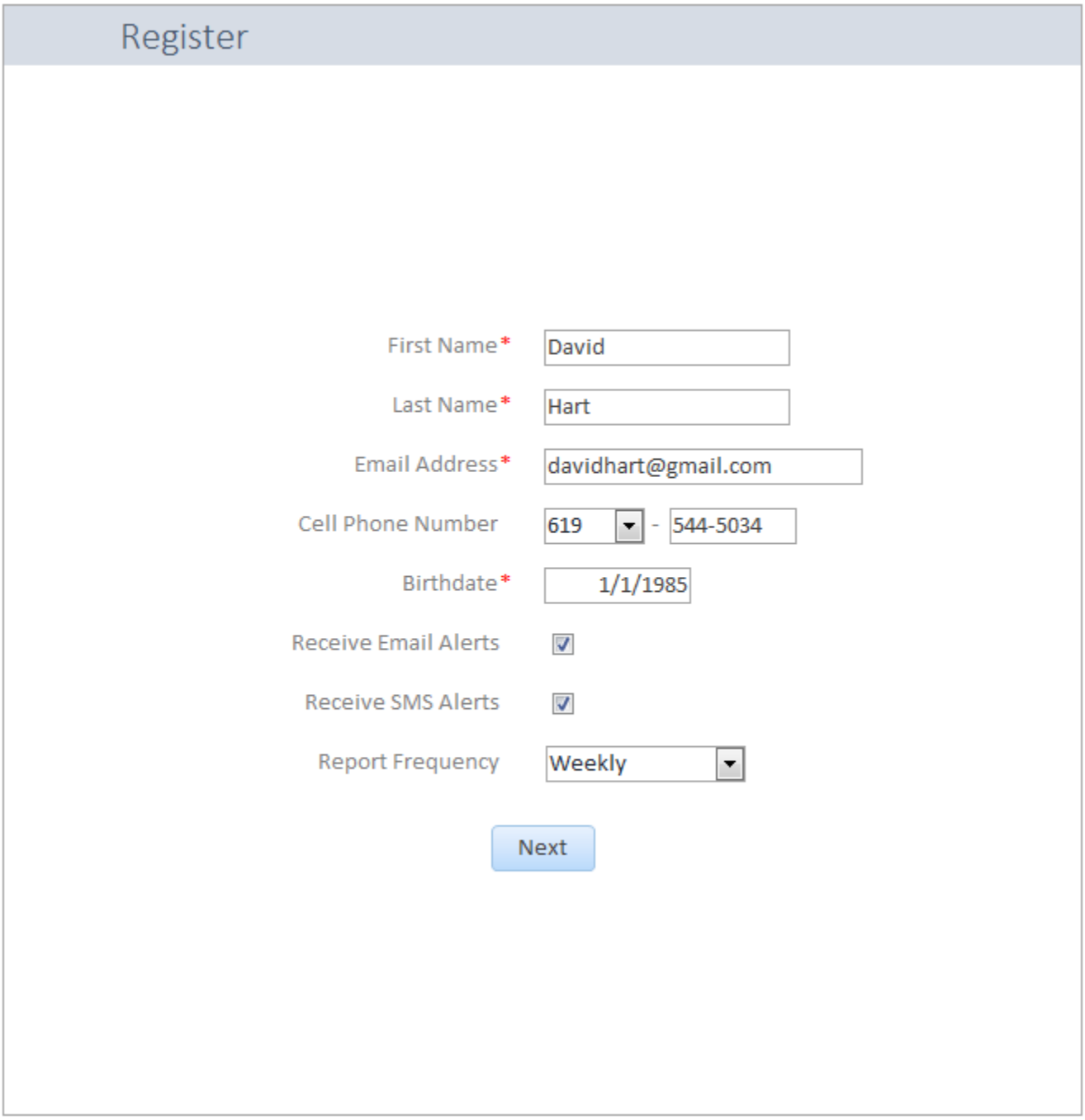
Radio buttons will be used to present the user with a group of two or more mutually exclusive options. Only one radio button in a group may be selected at a time. The selected radio button will contain a black dot.

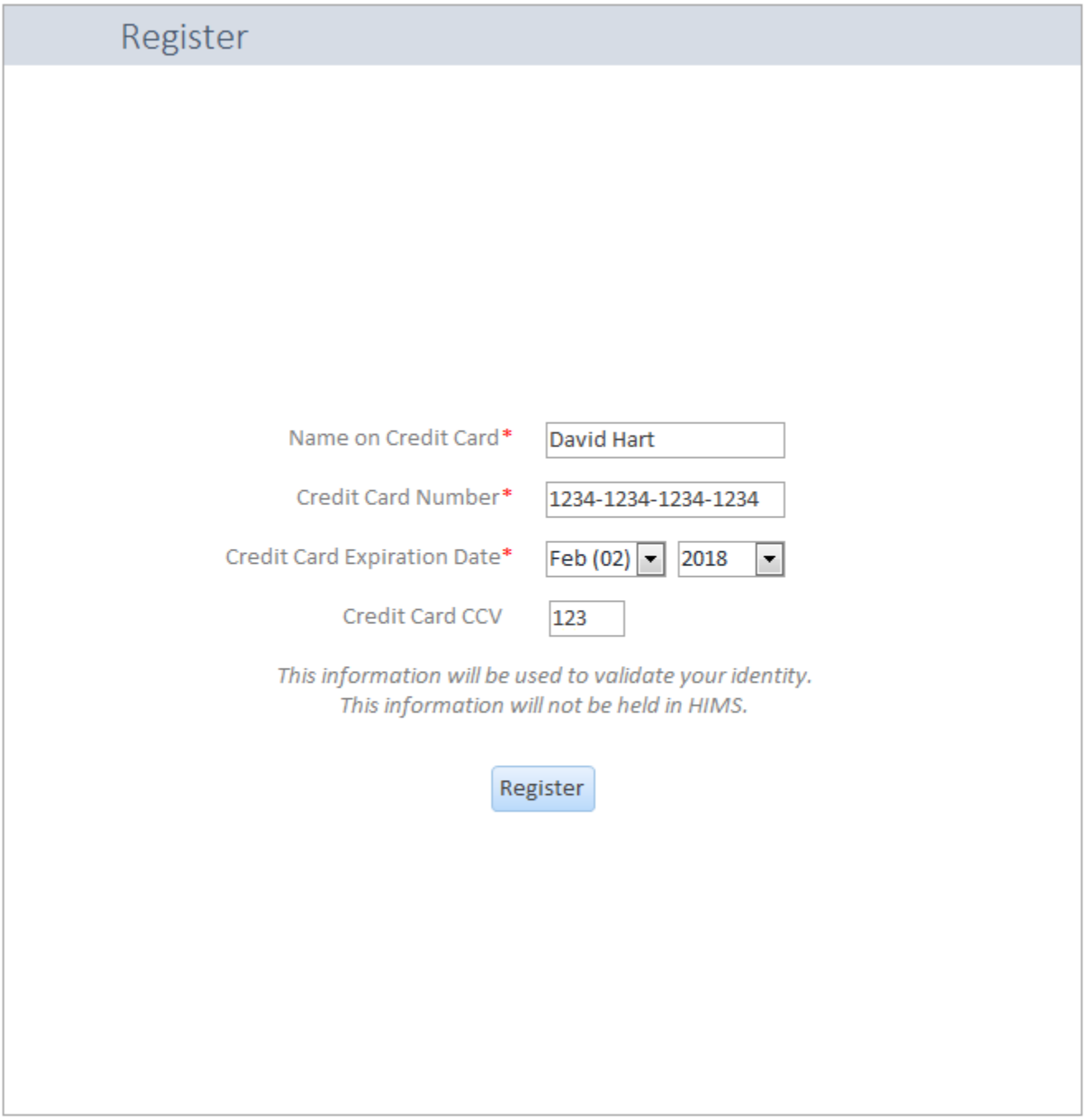
3.2.1 Login


Login
Home Inventory Management System
Username
Password
Login
Forgot Username or Password
Create New Account

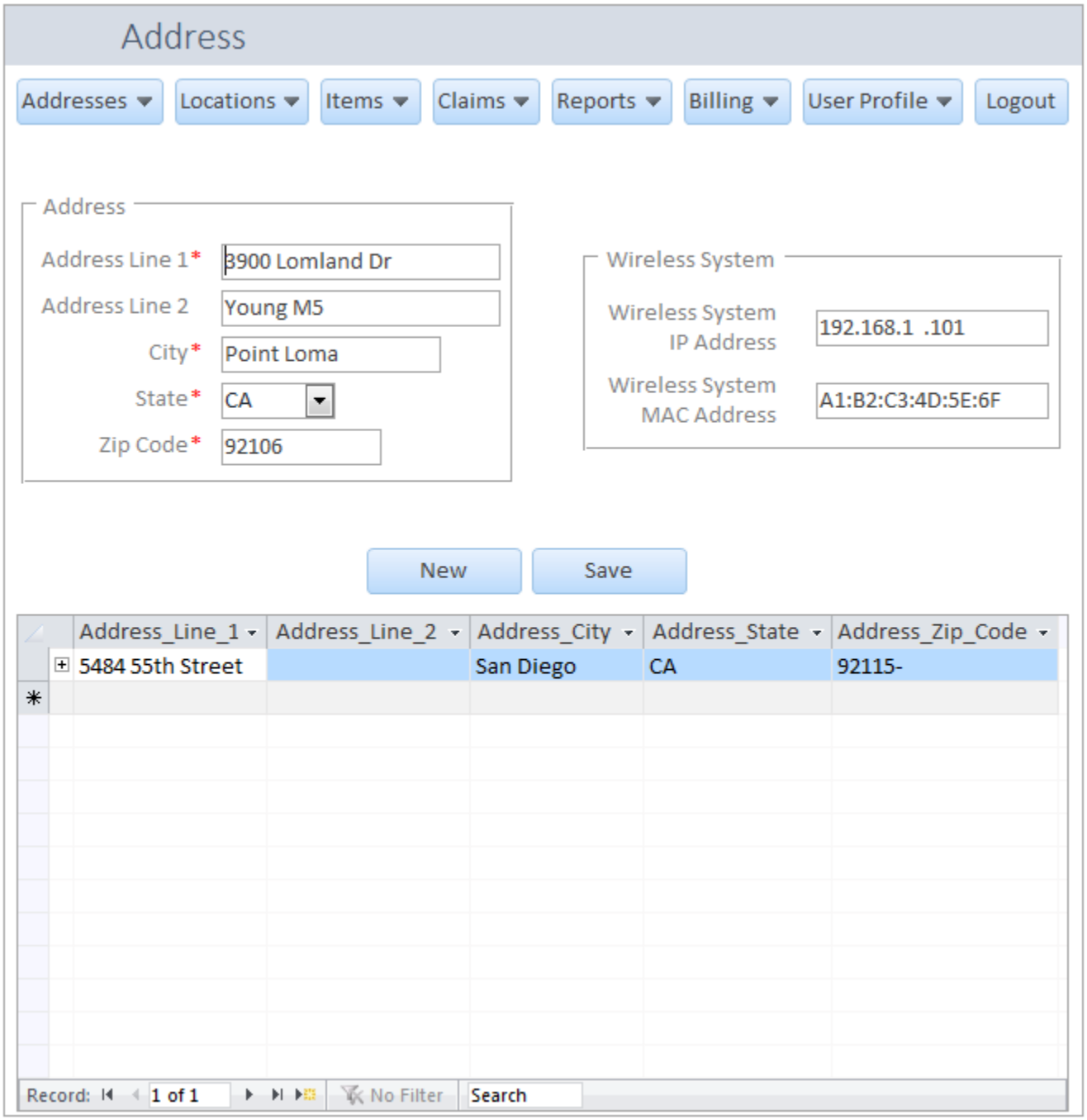
3.2.2 Registration



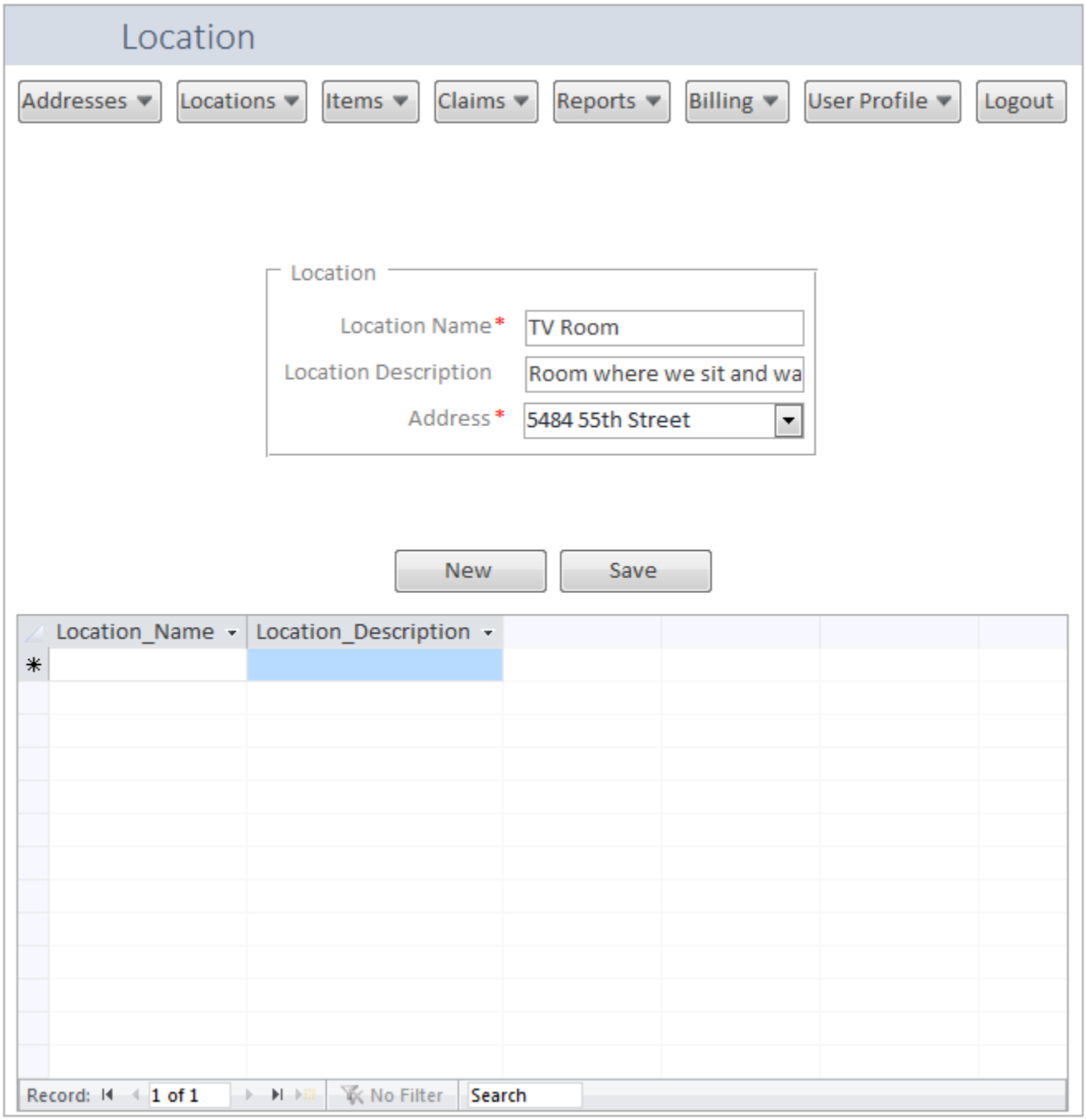

Register
First Name*
David
Last Name*
Hart
Email Address*
davidhart@gmail.com
Cell Phone Number
619
544-5034
Birthdate*
1/1/1985
Receive Email Alerts
Receive SMS Alerts
Report Frequency
Weekly
Next


Register
Name on Credit Card*
David Hart
Credit Card Number*
1234-1234-1234-1234
Credit Card Expiration Date*
Feb (02)
2018
Credit Card CCV
123
This information will be used to validate your identity.
This information will not be held in HIMS.
Register

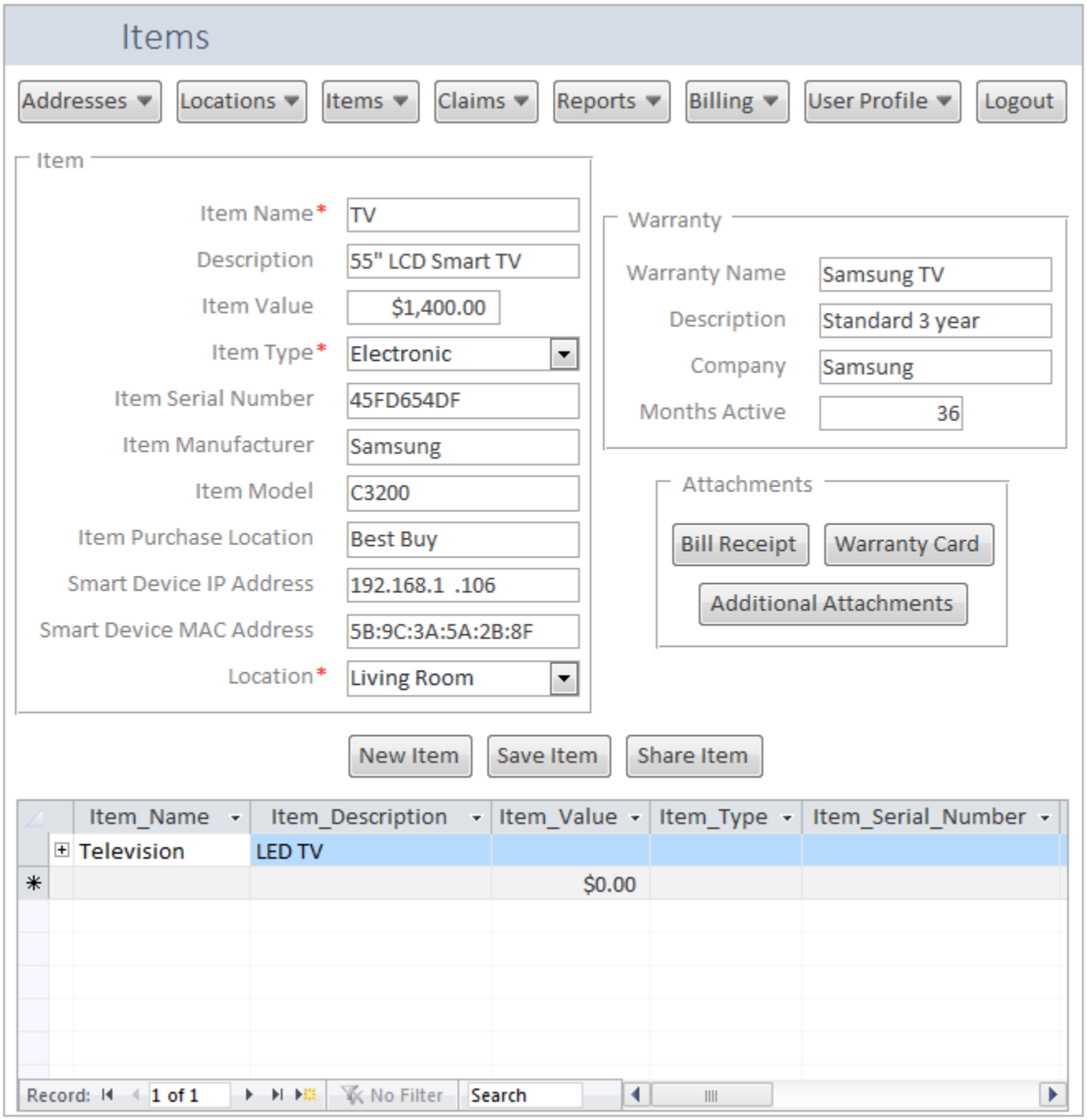
3.2.3 Manage Address



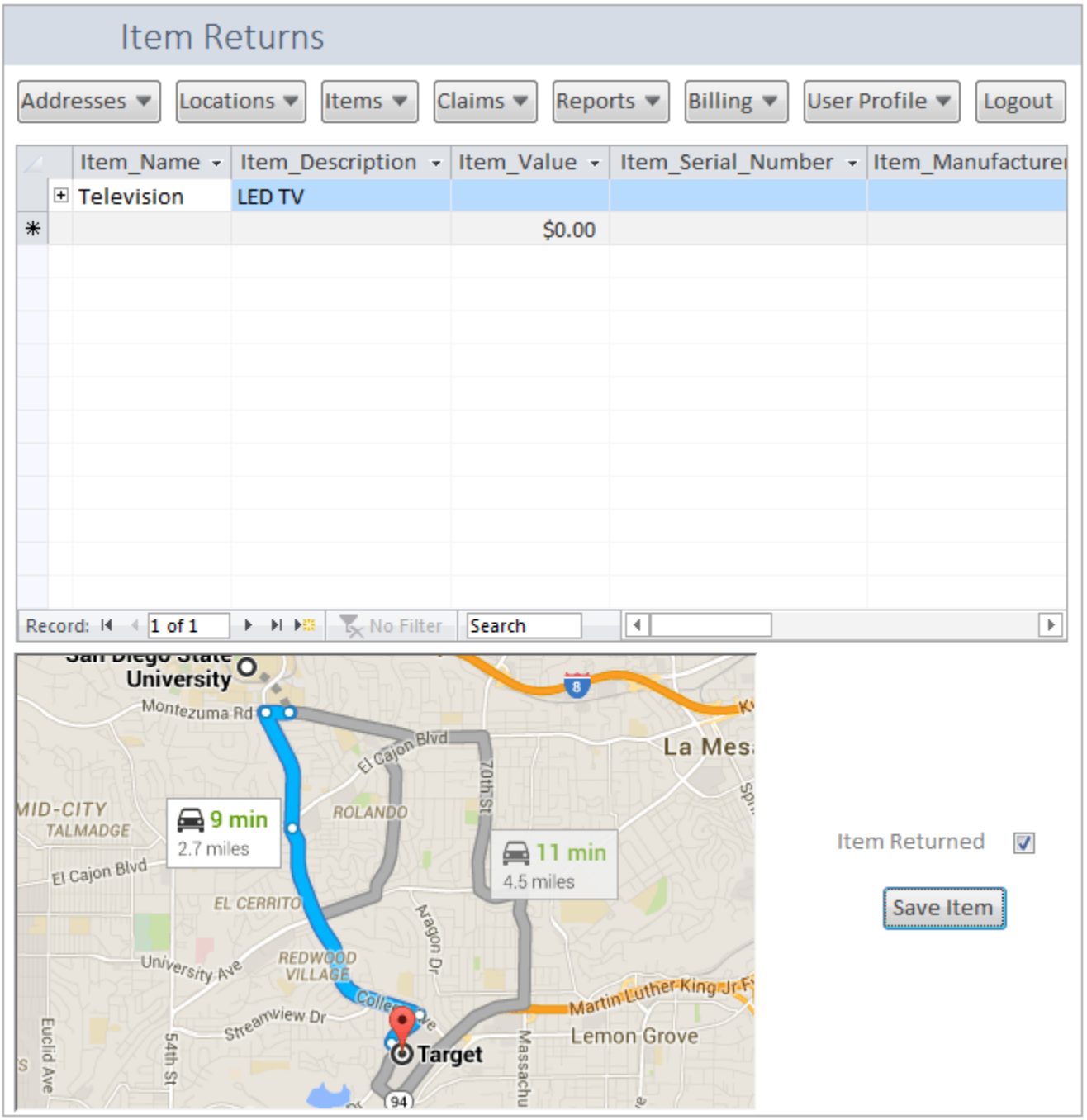
3.2.4 Manage Location



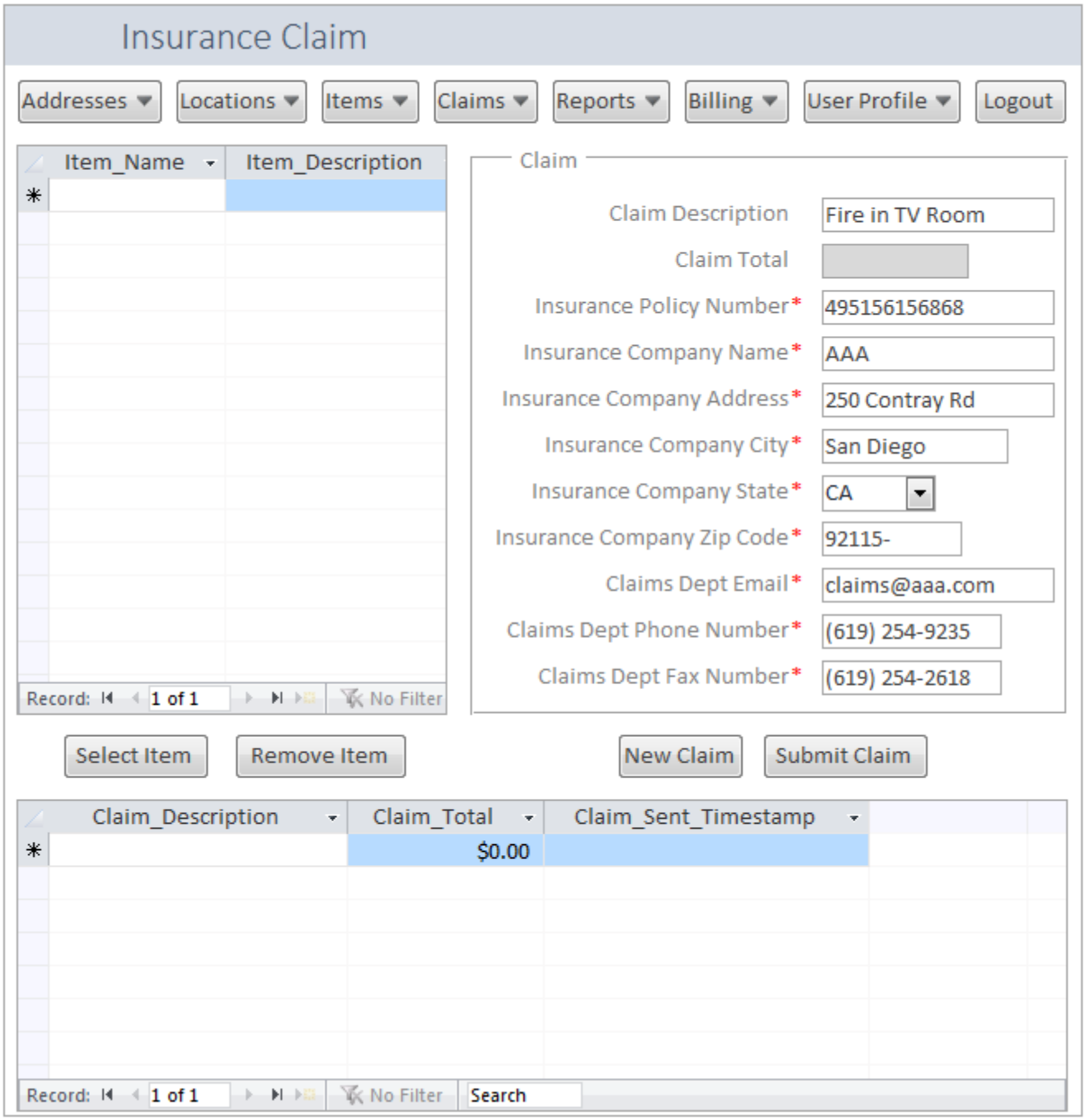
3.2.5 Manage Item



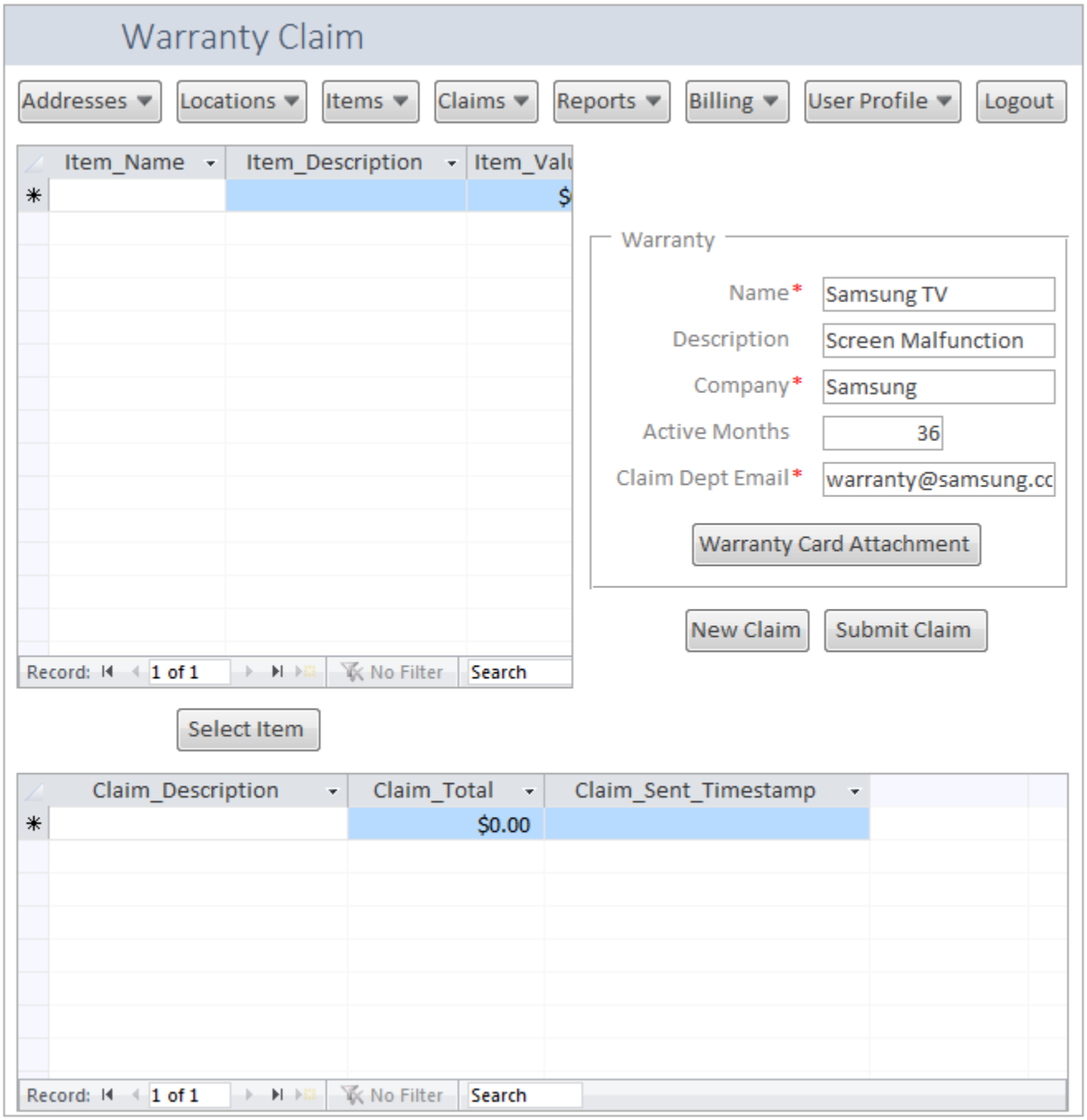
3.2.6 Return Item



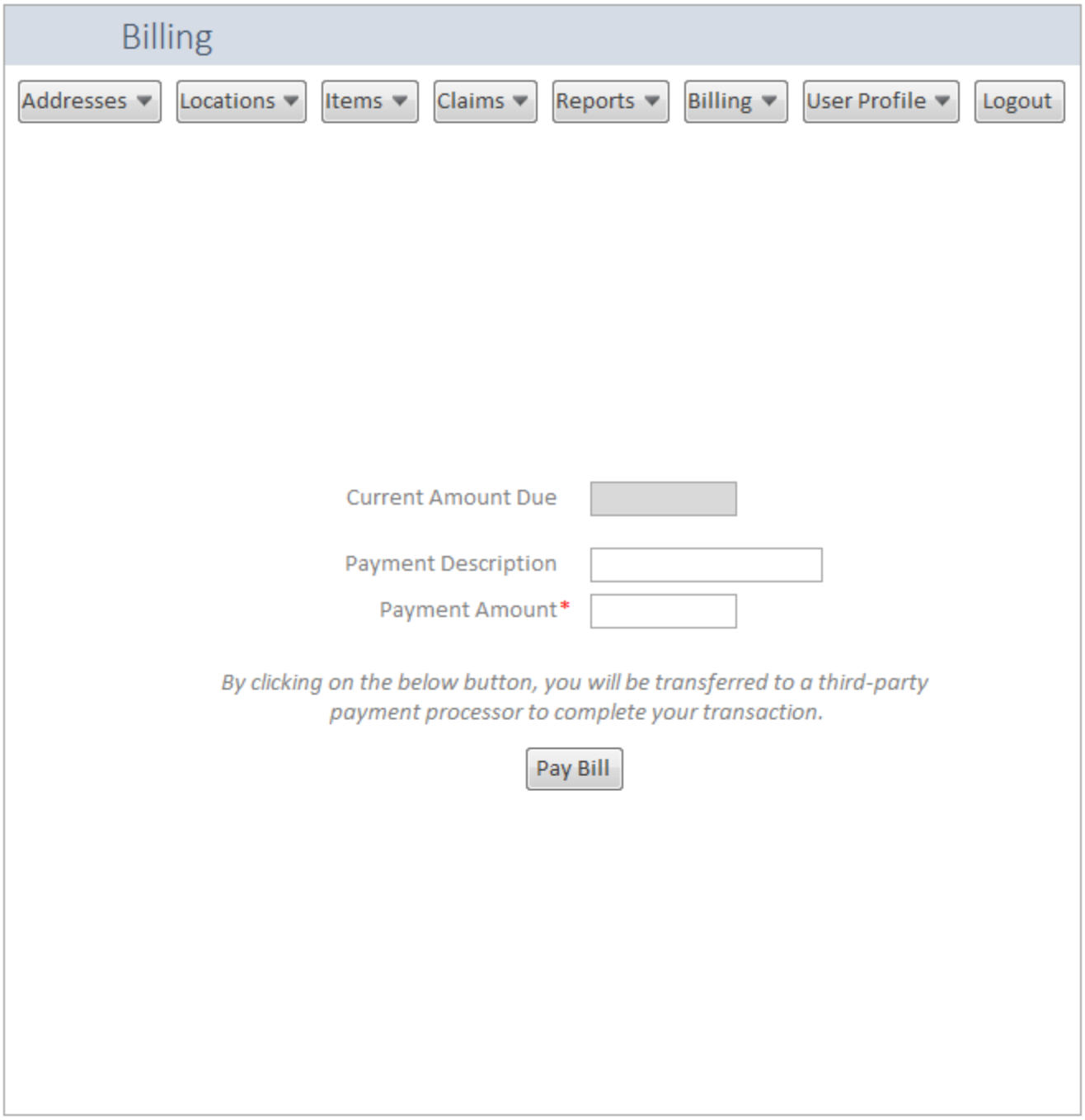
3.2.7 Create Insurance Claim



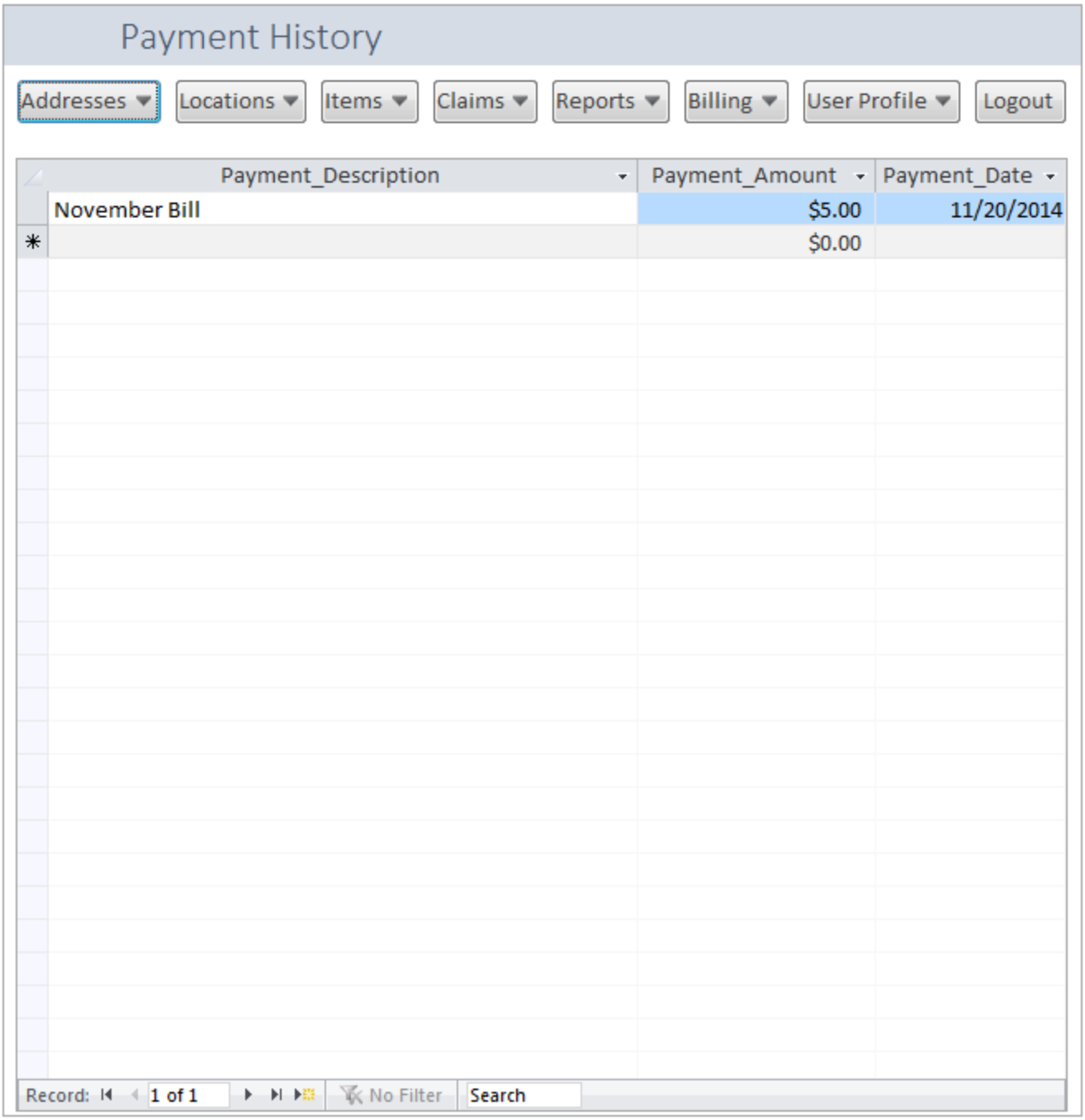
3.2.8 Create Warranty Claim



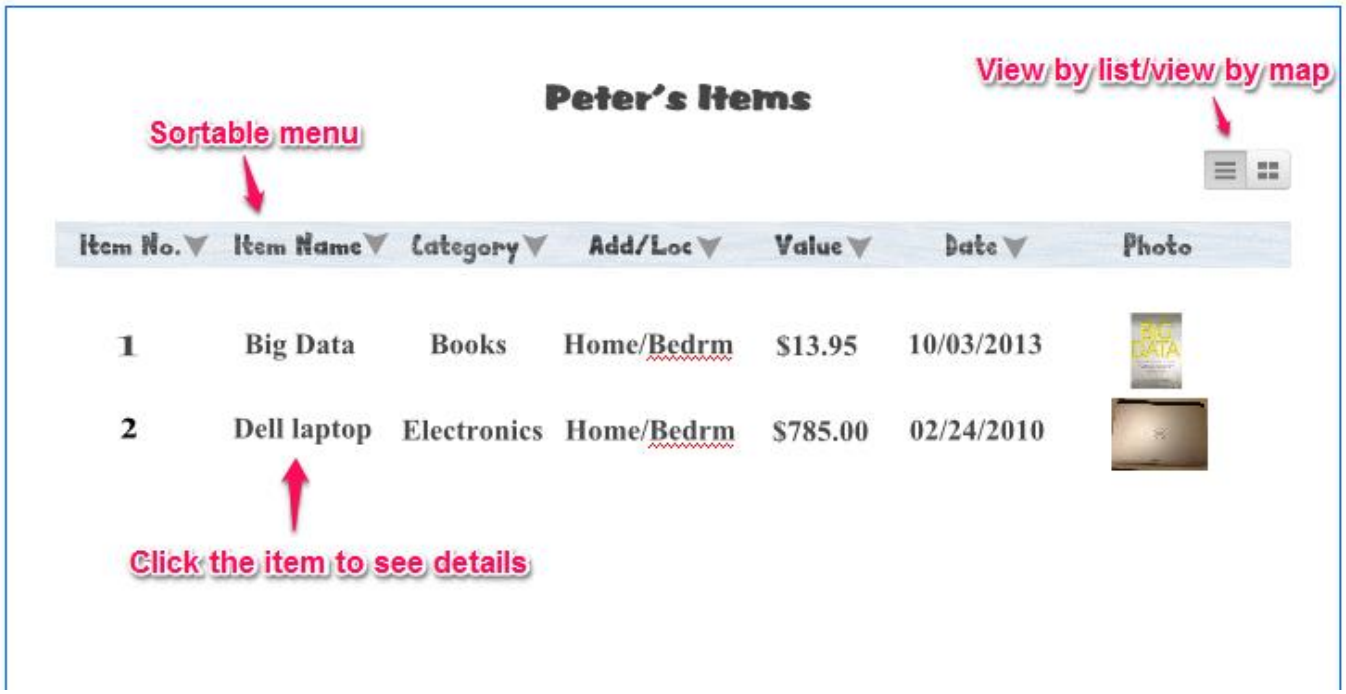
3.2.9 Current Bill



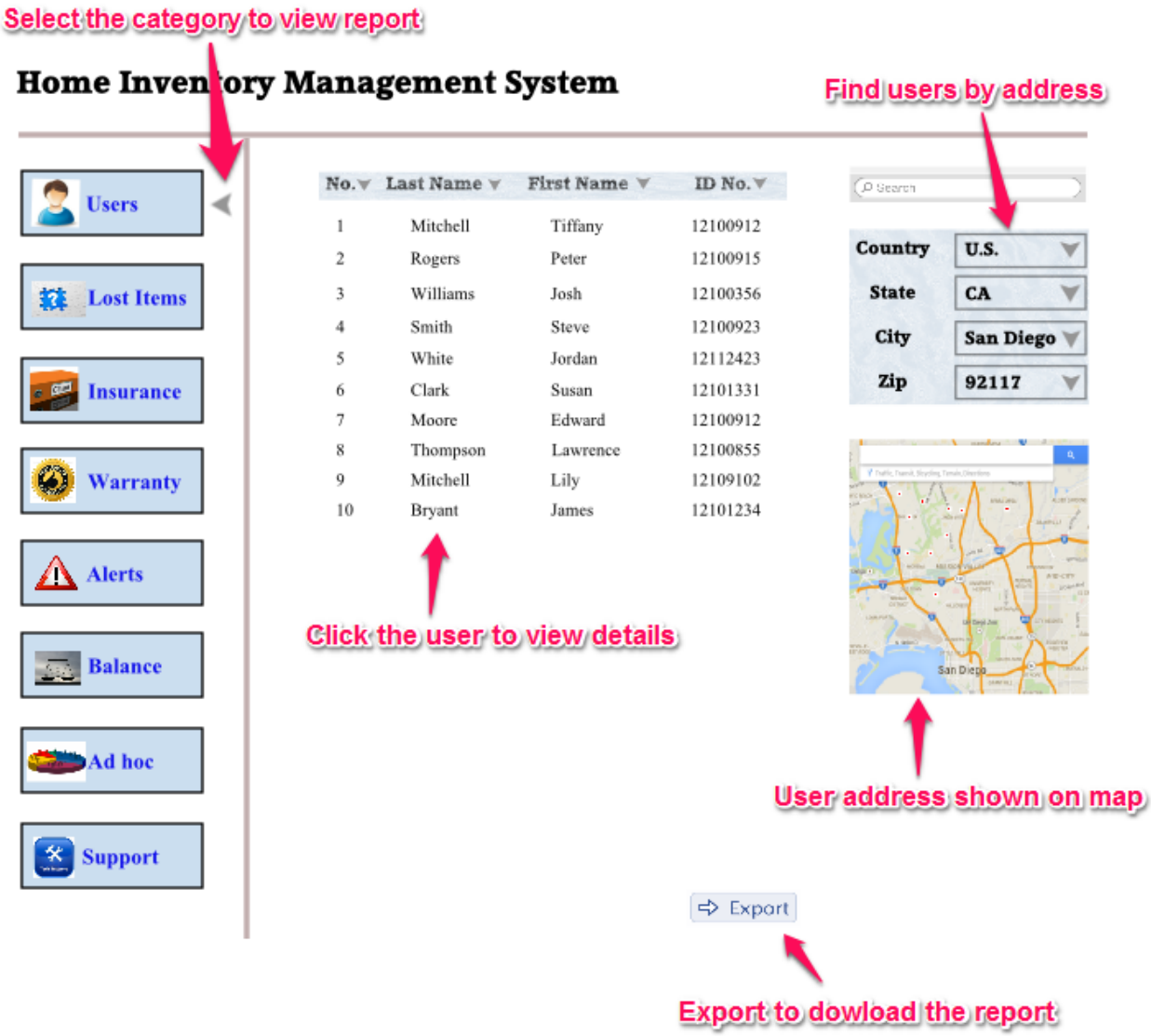
3.2.10 Payment History



3.2.11 Batch Reporting

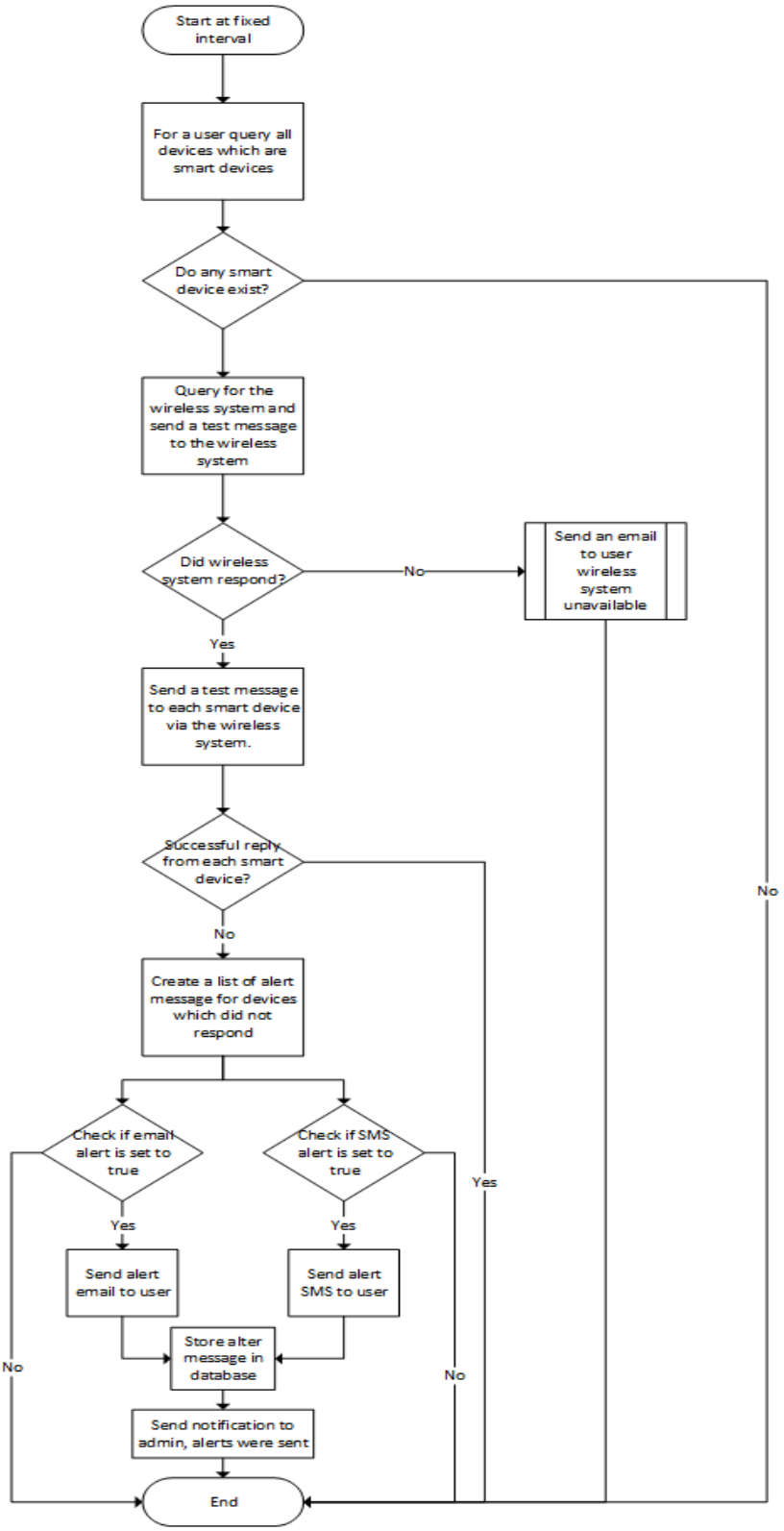


3.2.12 Adhoc Reporting



3.3 Module Detail Design

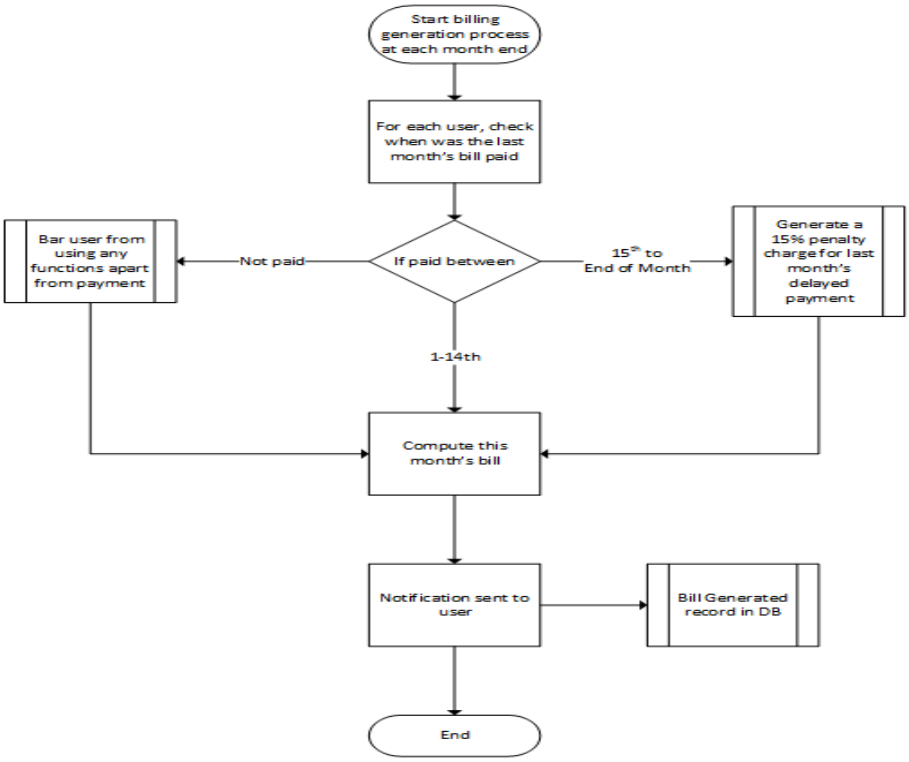
3.3.1 Track Items Design

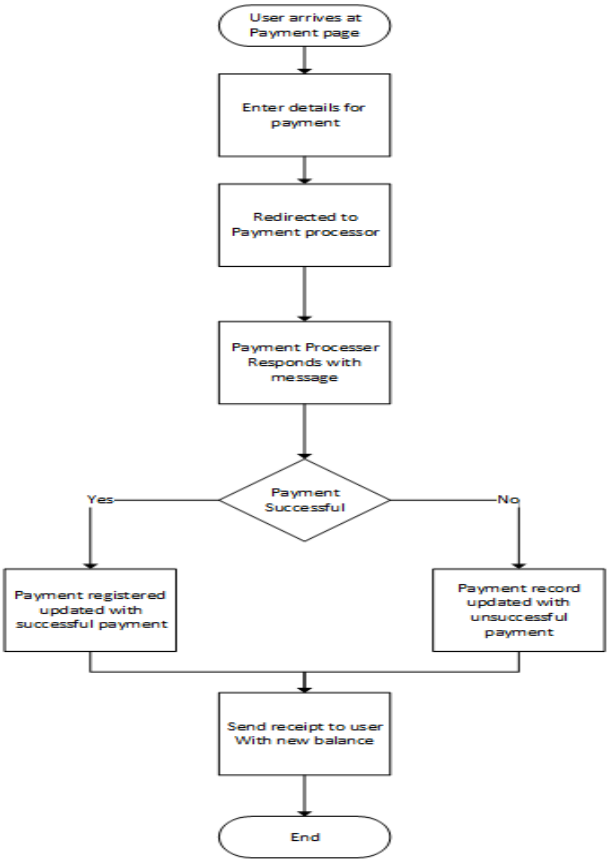


The above process will populate the alert table.

Column Name	Data Type	Nulls	Description
Alert_ID	AutoNumber	No	This will get auto generated when an alter is sent.
Item_ID	Integer(Long)	No	The item for which alter was sent.
Alert_Type_ID	Integer(Long)	No	Alter type, whether it was SMS or email.
Alert_Text	Text(255)	No	The alert text generated by the system.
Alert_Timestamp	Timestamp	No	Timestamp of the alert.

3.3.2 Billing


Start billing generation process at each month end
For each user, check when was the last month's bill paid
If paid between
Not paid
Bar user from using any functions apart from payment
15th to End of Month
Generate a 15% penalty charge for last month's delayed payment
1-14th
Compute this month's bill
Notification sent to user
Bill Generated record in DB
End


User arrives at Payment page
Enter details for payment
Redirected to Payment processor
Payment Processer Responds with message
Payment Successful
Yes
No
Payment registered updated with successful payment
Payment record updated with unsuccessful payment
Send receipt to user With new balance
End

3.4 Output Report Design

Out reports will consist of adhoc and batch reports. Adhoc reports can be customized by administrators and ran upon command. Batch reports are periodically ran reports that can viewed by administrators and general users. Reports can contain any information that is relevant in the system. Some batch reports will be created during build, but administrator's adhoc reports may be converted to batch reports later.

Reports will be created in a tabular form where columns are attributes and rows are records. Initial reports will be created in HTML so that users can see them in the system. Reports will be able to export to Excel and PDF as well. Reports may also contain maps and attachments.

3.5 Concurrency Control, Cursor Design

Optimistic locking approach will be used. Row level locking will be applied. Using this configuration and the built-in functions of the DBMS, concurrency control will be achieved.

'Record' level locking will be used for database.

If any deadlock occurs, the timeout of 3 second will be set.

'Keyset' cursor type will be used. Since we do not require real time updates. But if a user refreshes a page, new data added should be visible. Hence the user of 'keyset' cursor is justified.

3.6 Backup and Recovery Design

Backup of the database will be done every night at low activity period. Checkpoints will be created so as to facilitate better recovery mechanisms.

Using backup and maintained transaction logs the recovery process will be supported.

3.7 Interface Design

The layer designing needs to be such that there are separate layers for presentation, application and data layers. Changes in one layer should not affect the other layer.

The user will be logged out of the system after 30 minutes of no activity.

The user will only be allowed to type the maximum characters allowed for each column in the text box provided.

Database rights will be provided through the application code and will be used only by the code to perform data querying and manipulation operations. Indexes will be created for faster access on tables that are not frequently updated and generally few rows of data are required from the table.

4 DATA DESIGN

4.1 Data Decomposition

The section presents how the data are presented by showing the application prototype screens.

4.1.1 Login Page Data Description

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
Username	This is username the user logins in with.	Textbox	Mandatory, Accepts a min 5 to max of 10 characters
Password	This is the password field, the field will be not be displayed to user.	Password	Mandatory.

4.1.2 Registration Page Data Description

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
UserID	Auto generated user id. This is not visible on the screen, but gets stored in the database as soon as the user is registered.	Hidden	
First Name	First Name of the User.	TextBox	Mandatory, Maximum 30 characters
Last Name	Last Name of the User.	TextBox	Mandatory, Maximum 30 character
Email Address	User's Email Address.	TextBox	Mandatory, Maximum 60 characters. It should include a '@'
Username	This is username the user logins in with.	Textbox	Mandatory, Accepts a min 5 to max of 10 characters
Password	This is the password field, the field will be not be displayed to user.	Password	Mandatory, Minimum of 8 character. Mix of numbers and characters and at least one special characters of '@,_,$'
Cell Phone	This is the cell phone number of the user, primarily used to send alerts.	Drop Down of valid cell phone area codes, Textbox taking only numbers(7 digits)	Mandatory. Validation for number needs to enter a exactly 7 digits.

Birthdate	This captures the birth date of the user.	DatePicker	Mandatory. Validation on the date of the registration birth date cannot be future dated. Allowed year range1900-2030.
Email Alert Preference	This field is used to describe if the user want to receive alerts via email.	Checkbox	Mandatory
SMS Alert Preference	This field is used to describe if the user want to receive alerts via SMS.	Checkbox	Mandatory
Report Frequency	If the user selects a value from the list, he/she will receive auto generated batch reports for his data pertaining to inventory, claims, billing history.	DropDown	Optional, Values include: Daily, Weekly, Bi-Weekly, Monthly, Quarterly, Half-Yearly, Yearly
Credit Card Number	This information is captured and sent to bank for validation. This information is not stored in HIMS.	4 text boxes	Mandatory. Each text box takes 4 numbers.
Credit Card Expiry Date	This information is captured and sent to bank for validation. This information is not stored in HIMS	2 drop downs. One for month Jan-Dec. One for year 2014-2020	Mandatory
Credit Card Name	This information is captured and sent to bank for validation. This information is not stored in HIMS	Textbox	Mandatory, Maximum of 60 characters.

4.1.3 Address Page Data Description

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
AddressID	Auto generated address id. This is not visible on the screen, but gets stored in the database as soon as the address is stored.	Hidden	
State	This is the state of the address.	Dropdown	Mandatory, 2 character list of states. E.g. 'CA', 'MH' etc.
City	This is the city of the address. It gets populated on the basis of the state selected.	Textbox	Mandatory, list of cities
Zip Code	This is the zip code of the address.	Textbox	Mandatory, User can enter either 5 or 9 numbers.
Address Line1	This is the street address, building, apt number etc.	Textbox	Mandatory, Maximum of 30 characters
Address Line2	This is additional info, if required.	Textbox	Optional, Maximum of 30 characters
WirelessSystemID	Auto generated wireless system id. This is not visible on the screen, but gets stored in the	Hidden	

	database as soon as the wireless system is stored.		
AddressID	This will be get populated according to the all the addresses the user has added. The address will be visible to the user, but address id will be stored in the wireless system table.	Drop down	Mandatory. Maximum of one wireless system can be associated with an address.
Wireless System Description		TextBox	Optional, Maximum of 255 characters.
Wireless System IP Address		4 text boxes.	Mandatory, Each text box will have 3 numbers. Each will range from 0 -255
Wireless System MAC Address		6 text boxes each with 2 char length	Mandatory, Only numbers and characters upper case A-F will be allowed.

4.1.4 Location Page Data Description

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
LocationID	Auto generated location id. This is not visible on the screen, but gets stored in the database as soon as the location is stored.	Hidden	
AddressID	This will be get populated according to the all the addresses the user has added. The address will be visible to the user, but address id will be stored in the wireless system table.	Drop down	Mandatory.
Location Name		Dropdown	Mandatory. Values include Living Room, Master Bedroom, Bedroom, Kitchen, Garage, Bathroom,
Location Description		TextBox	Mandatory, Needs to be unique for locations under an address.

4.1.5 Item Page Data Description

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
ItemID	Auto generated item id. This is not visible on the screen, but gets stored in the database as soon as the item is stored.	Hidden	
Item Name		Text	Mandatory, Should be unique for a location.

Address ID	This will get populated according to the all the addresses the user has added. The address will be visible to the user. But this will not get stored in the item table. This is just captured to populate the location list.	Drop down	Mandatory.
Location ID	This will be get populated according to the address the user has selected. The location description will be visible to the user, but location id will be stored in the item table.	Drop Down	Mandatory.
Description	Description about the item	Text box	Optional, Maximum 255 characters.
Item Value	Item value in USD.	Textbox	Mandatory, Takes only numbers with 2 digits after decimal point. Maximum of 12 digits
Item Type	Item type.	DropDown	Mandatory, Pre populated list of possible item types. With 'others' as a value too.
Item Serial Number	Serial number of item, if any	Textbox	Optional, Maximum 255 characters.
Item Manufacturer	Item's manufacturer	Textbox	Optional, Maximum 255 characters.
Item Model	Model number of the item	Textbox	Optional, Maximum 255 characters.
Item Purchase Location	Location of the item purchased.	TextBox	Optional, Maximum 255 characters.
Item Purchase Date	Timestamp of the item purchased.	DatePicker	Optional
Is Smart Device	User can select if this is a smart device.	CheckBox	Mandatory
Smart Device IP Address	IP address of the smart device.	4 text boxes.	Mandatory, Each text box will have 3 numbers. Each will range from 0 -255
Smart Device MAC Address	MAC address of the smart device.	6 text boxes each with 2 char length	Mandatory, Only numbers and characters upper case A-F will be allowed.
Bill Receipt Attachment	A jpeg, bmp, png or pdf can be uploaded here. The attachment id will be auto generated and stored in the attachment table along with item id.	Upload Button	Optional, Maximum of 2MB.
Warranty ID	Auto generated warranty id. This is not visible	Hidden	

	on the screen, but gets stored in the database as soon as the warranty is stored.		
Item ID	The item id will be stored in the warranty table when warranty fields are added.	Hidden	
Warranty Name	Name of the warranty	Text box	Mandatory. if any warrant field is populated. Maximum of 255 characters
Warranty Description	Any description if needed.	Text box	Optional. Maximum of 255 characters
Warranty Company	The name of company providing warranty.	Text box	Optional. Maximum of 255 characters
Warranty Months	The warranty period in months.	Dropdown	Optional, Maximum 3 digits
Warranty Card Attachment	A jpeg, bmp, pnf r pdf can be uploaded here. The attachment id will be auto generated and stored in the attachment table along with item id.	Upload Button	Optional, Maximum of 2MB.
Attachment	Extra Attachment can be used upon user's choice	Upload Button	Optional, Maximum of 2MB.

A user can share items with other users. An item can be shared with multiple users. This will be handled through a pop-up on the Items page.

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
Item Share ID	Auto generated item share id. This is not visible on the screen, gets stored in the database as many times as the as the number of users it is shared with.	Hidden	
Table of users		Hidden	
User ID		Text box	Mandatory, At least one user name has to be added to create an item share record. Needs to be a valid username and cannot be the same as the person who entered the item in the system.

4.1.6 Manage Return Items Page Data Description

For the manage return item page, the user can select an item from his inventory using the search options. Once the item is selected, the system will read the item purchase location, if it was entered and pass this information to the maps integration provided. The possible return location will show up on the maps screen. And user can select any branch of retailer for return. Once the item is returned, the user can mark it as returned on the screen. The 'Item Returned' is the only field updated in this transaction.

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
ItemID	Auto generated item id. This is not visible on the screen, but gets stored in the database as soon as the item is stored.	Hidden	
Item Name		Text	Mandatory, Should be unique for a location.
Item Returned	This field describes if the any item is returned to the retailer.	Checkbox	Mandatory

4.1.7 Manage Insurance Claim Page Data Description

For the "manage insurance claim page", the user can select items from his inventory using the search options. Once the items are selected, the system will allow the user to select any insurance policies on which a claim was done earlier to his profile. If no claims were done the user can add new insurance policy information and use it to send the insurance claim. This information along with user profile details will be sent to the insurance company's email address entered.

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
Claim ID	Auto generated claim id. This is visible on the screen, gets stored in the database as soon as the claim is stored.	Display	
Claim Description	Additional description about the claim	Text box	Optional, Maximum of 255 characters
Claim Total	This field keeps getting updated as the user selects the items for the claim, using the item value field.	Display	
Claim Sent Timestamp	This is a display field stored in the database when the claim is submitted	Display	
Insurance ID	If an existing insurance policy is used, the user can select it here.	DropDown	Mandatory, Either a existing policy is selected or a new one is added is visible here.
Claim Detail ID	This is the detail information about the claim, which involves the unique claim ID and the item ID of the selected items.	Hidden	
Table of Items			
Item ID	This is the list of items selected to add in the claims.	MultiSelectCheckBox	Mandatory. At least one should be selected.
Insurance_ID	Auto generated insurance id. This is not visible	Hidden	If an existing policy is

	on the screen, but gets stored in the database as soon as the claim with a new policy added stored.		not used then insurance details are mandatory.
Policy Number	Insurance Policy number.	Textbox	Mandatory, Maximum of 60 character restricted to number and alphabets.
Company Name	Name of the insurance company	Textbox	
Company Address	Street address of the insurance company	Textbox	
Company State	This is the state of the insurance company	Dropdown	Mandatory, 2 character list of states. E.g. 'CA', 'MH' etc.
Company City	This is the city of the insurance company. It gets populated on the basis of the state selected.	Textbox	Mandatory, list of cities
Company Zip Code	This is the zip code of the address.	Texbox	Mandatory, User can enter either 5 or 9 numbers.
Claims Dept Email	The email address of the insurance company where the claims information will be sent.	Textbox	Mandatory, Maximum 60 characters. It should include a '@'
Claims Dept Phone Number	The phone number of the claims department	Drop Down of valid phone area codes, Textbox taking only numbers(7 digits)	Mandatory. Validation for number needs to enter exactly 7 digits.
Claims Dept Fax Number	The fax number of the claims department.	Drop Down of valid phone area codes, Textbox taking only numbers(7 digits)	Mandatory. Validation for number needs to enter exactly 7 digits.

4.1.8 Manage Warranty Page Data Description

The user will select an item id. The warranty information will get populated on the basis of the item id. The user needs to add warrant provider's email address and press submit, so information is sent to the manufacturer.
If warranty information is not stored for a item id. On selection of item id a message will pop saying, warranty information not maintained.

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
ItemID/Item Name	Dropdown of key value pair. With key as Item ID and value of each select item as Item Name	DropDown	Mandatory,
Warranty Name	Will get populated on basis of Item ID	Display	Mandatory. if any warrant field is populated. Maximum of 255 characters
Warranty Description	Will get populated on basis of Item ID	Display	Optional. Maximum of 255 characters
Warranty Company	Will get populated on basis of Item ID	Display	Mandatory. Maximum of 255 characters
Warranty Months	Will get populated on basis of Item ID	Display	Optional, Maximum 3 digits
Warranty Card Attachment	Will get populated on basis of Item ID	Display	Optional, Maximum of 2MB.
Warranty Provider Email	The email address of the warranty provider where the claim information will be sent.	Textbox	Mandatory, Maximum 60 characters. It should include a '@'

4.1.9 Payment Page Data Description

When the payment transaction is to be done the user adds any optional description if he needs to and then user is forwarded to payment processor website.

DATA FIELDS	DESCRIPTION	FIELD TYPE	VALIDATIONS
Payment ID	Auto generated payment id. This is not visible on the screen, gets stored in the database as soon as the payment is stored.	Hidden	
User ID	The user id of the payer, automatically in the payment table.	Hidden	
Payment Description	This is a optional payment description.	Text box	Optional, Maximum of 255 characters
Payment Amount	Automatically computed amount.	Display	
Payment Timestamp	A time stamp will be created when the payment is realized and stored in the system.	Display	

4.2 Data Dependencies

The purpose of this section of the SDS is to describe the dependencies required by each data design entity. Dependencies describe the relationships (usually in the form of constraints) of the data entity with other data entities in the design.

Refer to Appendix R for the HIMS Project Entity Relationship Diagram.

4.3 Data Detailed Design

The purpose of this section of the SDS is to describe the details for each data design entity. The details describe the table name, column names, column data types, column length (or precision & scale for numeric values), and nulls allowed indicator for each data design entity.

4.3.1 Users

Column Name	Data Type	Nulls	Description
User_ID	AutoNumber	No	Auto generated User ID
User_First_Name	Text(255)	No	First Name of the User
User_Last_Name	Text(255)	No	Last Name of the User
User_Login	Text(255)	No	User's Login
User_Password	Encrypted Text(255)	No	Password for the user
User_Cell_Phone	Integer(11)	Yes	Cell Phone number of the user used to send alerts account
User_Birth_Date	Date	No	Birth date of the user for verification
Email_Alerts	Integer(1)	No	Does the user want to receive alerts via email
SMS_Alerts	Integer(1)	No	Does the user want to receive alerts via SMS (Cell Phone)
Report_Frequency	Text(255)	No	The frequency of auto generated batch reports for user data pertaining to inventory, claims, and billing history
User_Active	Integer(1)	No	Is User active in the system
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.2 Address

Column Name	Data Type	Nulls	Description
Address_ID	AutoNumber	No	Auto generated Address ID
User_ID	Integer(Long)	No	User ID for which the Address belongs to
Address_Line_1	Text(255)	No	Street Address
Address_Line_2	Text(255)	Yes	Street Address Building, Apt Number
Address_City	Text(255)	No	City of the Address
Address_State	Text(2)	No	State of the Address
Address_Zip_Code	Integer(9)	No	Zip Code of the Address
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.3 Locations

Column Name	Data Type	Nulls	Description
Location_ID	AutoNumber	No	Auto generated Location ID
Address_ID	Integer(Long)	No	Address ID for which the Location belongs to
Location_Name	Text(255)	No	Name of the Location
Location_Description	Text(255)	Yes	Description of the Location
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.4 Wifi_Systems

Column Name	Data Type	Nulls	Description
Wifi_System_ID	AutoNumber	No	Auto generated Wireless System ID
Address_ID	Integer(Long)	No	Address ID for which the Wireless System belongs to
Wifi_System_Name	Text(255)	No	User given name of the Wireless System
Wifi_IP_Address	Integer(12)	No	IP Address of the Wireless System
Wifi_MAC_Address	Text(12)	No	MAC Address of the Wireless System
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.5 Items

Column Name	Data Type	Nulls	Description
Item_ID	AutoNumber	No	Auto generated Item ID
Location_ID	Integer(Long)	No	Location ID for which the Item belongs to
Item_Name	Text(255)	No	User given name of the Item
Item_Description	Text(255)	Yes	Description of the Item
Item_Value	Currency	Yes	Current market or user given value of the item
Item_Type	Text(80)	No	Category of the type of Item. Examples include Appliance, Electronic, Clothing, etc.
Item_Serial_Number	Text(255)	Yes	Serial Number of the Item
Item_Manufacturer	Text(255)	Yes	Manufacturer of the Item
Item_Model	Text(255)	Yes	Model Name and/or Number of the Item
Item_Purchase_Location	Text(255)	Yes	Description, Name or Address of the Purchase Location of the

			Item. Used to find nearby locations for Item Returns
Item_Purchase_Date	Date	Yes	The Purchase Date of the Item
Is_Smart_Device	Integer(1)	No	If the Item is a Smart Device then the system will trigger this field
Smart_Device_IP_Address	Integer(12)	Yes	The IP Address for the Smart Device/Item
Smart_Device_MAC_Address	Text(12)	Yes	The MAC Address for the Smart Device/Item
Item_Returned	Integer(1)	No	If the item is returned.
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.6 Attachments

Column Name	Data Type	Nulls	Description
Attachment_ID	AutoNumber	No	Auto generated Attachment ID
Item_ID	Integer(Long)	No	Location ID for which the Item belongs to
Attachment	BLOB	No	The complete Attachment loaded as a binary file in the database
Attachment_Name	Text	No	This is the attachment type, ‘Bill’, ’Warranty’, ’Optional’
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.7 Warranties

Column Name	Data Type	Nulls	Description
Warranty_ID	AutoNumber	No	Auto generated

			Warranty ID
Item_ID	Integer(Long)	No	Location ID for which the Item belongs to
Warranty_Name	Text(255)	No	User given name for the Warranty
Warranty_Description	Text(255)	Yes	Description of the Warranty
Warranty_Company	Text(255)	Yes	Company providing the Warranty
Warranty_Months	Integer(10)	Yes	The number of the Months the Warranty is active for
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.8 Claims

Column Name	Data Type	Nulls	Description
Claim_ID	AutoNumber	No	Auto generate Claim ID
Insurance_ID	Integer(Long)	No	Insurance ID of the Insurance Company used for the Claim
Claim_Description	Text(255)	Yes	Description of the Claim
Claim_Total	Currency	No	Calculated Total of all Item Values
Claim_Sent_Timestamp	Timestamp	Yes	Timestamp that the Claim was sent to the Insurance Company
Claim_Send_By	Text(20)	No	Method of submission used to send the Claim to the Insurance Company
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.9 Claim_Items

Column Name	Data Type	Nulls	Description
Claim_Item_ID	AutoNumber	No	Auto generated Claim Item ID
Claim_ID	Integer(Long)	No	Claim ID for which the Item is attached to
Item_ID	Integer(Long)	No	Item ID for which the Claim is attached to
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.10 Insurance Companies

Column Name	Data Type	Nulls	Description
Insurance_ID	AutoNumber	No	Auto generated Insurance ID
Company_Name	Text(255)	No	Name of the Insurance Company
Company_Address	Text(255)	Yes	Street Address for the Insurance Company
Company_City	Text(255)	Yes	City of the Insurance Company
Company_State	Text(2)	Yes	State of the Insurance Company
Company_Zip_Code	Integer(9)	Yes	Zip Code of the Insurance Company
Claims_Dept_Email	Text(255)	No	Email Address for the Claims Department at the Insurance Company
Claims_Dept_Phone_Number	Integer(11)	Yes	Phone Number for the Claims Department at the Insurance Company

Claims_Dept_Fax_Number	Integer(11)	Yes	Fax Number for the Claims Department at the Insurance Company
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.11 Alerts

Column Name	Data Type	Nulls	Description
Alert_ID	AutoNumber	No	Auto generated Alert ID
Item_ID	Integer(Long)	No	Item ID for which the Alert belongs to
Alert_Type_ID	Integer(Long)	No	Alert Type ID for which the Alert relates to
Alert_Text	Text(255)	No	The Message sent to the User
Alert_Timestamp	Timestamp	No	Timestamp that the Alert was sent to the User
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.12 Alert_Type

Column Name	Data Type	Nulls	Description
Alert_Type_ID	AutoNumber	No	Auto generated Alert Type ID
Alert_Name	Text(255)	No	System Name for the Type of Alert
Alert_Message	Text(255)	No	Default Message send to the User
Alert_Active	Integer(1)	No	Whether this Alert Type is Active in the System
Change_Timestamp	Timestamp	No	Timestamp of the

			last change to a record

4.3.13 Payments

Column Name	Data Type	Nulls	Description
Payment_ID	AutoNumber	No	Auto generated Payment ID
User_ID	Integer(Long)	No	User ID for which the Payment belongs to
Payment_Description	Text(255)	Yes	User provided Description of the Payment
Payment_Amount	Currency	No	The total Amount of the Payment
Payment_Timestamp	Timestamp	No	Timestamp that the Payment was made in the System
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

4.3.14 Item_Shares

Column Name	Data Type	Nulls	Description
Item_Share_ID	AutoNumber	No	Auto generated Item Share ID
Item_ID	Integer(Long)	No	Item ID for which the Item Share is related to
Shared_With_User_ID	Integer(Long)	No	User ID of the User receiving the Share Item request
Share_Active	Integer(1)	No	Whether the Item is currently shared with the receiving User or if the owning User has removed this Item Share or completely removed the Item
Change_Timestamp	Timestamp	No	Timestamp of the last change to a record

5 Security

5.1 Employee Hiring and Termination Process

The employees will be hired after a background check and will be required to take information security classes every year. Employees will be terminated if tampering with customer data or misuse of confidential data occurs. The main group of employees this applies to is system administrators, but also applies to any employees with read level access to HIMS, including the project team.

5.2 Virus Checks

The HIMS systems will run daily virus scans and will scan all incoming attachments.

5.3 Database Design

Database access rights will be created in the application code and revoked after the transaction is executed. Database views will be created so that only required information is visible.

5.4 Network Access Control

The HIMS web servers will be located within the LRD DMZ. There will be a firewall between the Internet and the LRD that allows only HTTP traffic across the SSL port 443. All information sent across the Internet will be considered confidential, so SSL will be used. The database will reside on the intranet with another firewall between the web servers and the database. This firewall will only allow specific access to the database across port 1521. All servers will reside in the company's data center which is a secured facility with limited access to infrastructure administrators. The data center will used advanced monitoring software to validate customer connections and search for hacking attempts and unauthorized access.

Employees found to be misusing data center or HIMS server resources will be immediately terminated.

User Validation will be required for access to all pages/screens in HIMS. If a user is not validated, the system will force the user to the login page.

Credit Card information captured while registration will be encrypted when sending it to the bank for validation.

5.5 System Access Control

All users will be required to login to HIMS in order to use the website and mobile application. A password length of 8 characters and with at least three of the four types of characters will be required. Passwords will expire every 120 days.

To recover the password a text box to enter the username and a next button will appear. When that button is clicked the system asks for the security question and a text box appears for the user to enter the answer. If the user correctly answers the security question, then an email will be sent to

the user's email address with a secure link to a password registration page.

System rights will be granted by user group upon login to HIMS. General users will be granted access to data linked to their User ID. Administrators will be granted full system access. The system will user session validation to ensure that client machines are validated upon each page/screen. Sessions will be removed upon log-out or time-out.

5.6 Interface Design

All fields will be validated for correct data types and will remove all SQL injection. Input masks will be used to ensure that data is in the correct format when being sent to the database. All inserts and updates to the database will be validated against the User ID before committing to ensure that the authorized user is only making changes to their own data. All select statements from the database will be validated against the User ID to ensure that the authorized user is only seeing data they are allowed to view.

5.7 Backup Recovery

Backups of the web servers will be taken every night so as to mitigate any loss of data. Backups will also be stored at a remote locations, so as to take care of physical loss of backup servers. Databases will maintain standby systems to ensure little loss of data. Synchronization between the main databases and these standby servers will occur every couple of minutes.

Transaction logs will be created for all queries against the database. Transaction logs will be used if standby databases fail or certain portions of data need to be recovered in disaster situations.

5.8 Data Retention Policy

User information will be maintained until the user requests their account to be removed or until 5 years of inactivity. Alerts will be stored for 1 year and then will be moved to historical tables. The historical data will be stored outside the system, so that the data is never completely deleted from the system. All data removed from HIMS will be moved to these historical databases for future reference and legal safety.

5.9 Facility Protection

The servers will be placed in main computer system vault which has a physical authentication mechanism so only authenticated people can enter the room. The entire room will have its own fire suppression and climate control systems. During a fire, all air will be evacuated from the room to suppress common fires. All power will be shutoff to the systems affected as well. Climate control systems will monitor system temperatures and will move heat to specific areas in the room. If a computer systems temperature reaches unsafe levels, the system will immediately being shutdown sequences. There will be a main universal power backup for a run-time of 1 hour for power outages. After 45 minutes of no power, all servers will begin shutdown sequences. In all of these circumstances, infrastructure personnel will be notified of issues occurring in the data center.

5.10 Redundant Network and Data Center

The company will use its existing network infrastructure, which has some level of redundancy so that if a particular link goes down, another one can be activated automatically, since the network

switches have Spanning Tree Protocol activated.

HIMS will use the existing company data center services located across the US to host web server and databases. Load balancers will ensure users are connected to the least busy, active server. Data centers will contain independent power supplies with backups so that multiple servers do not rely on a single power source and have a backup if the primary power supply fails. Databases across all data centers will be continually synchronized using Oracle DataGaurd. Each web server will connect to the database hosted at the same data center.

5.11 Non-Volatile Storage

All web servers will host critical web services files on a network array storage system using mirroring raid drives. Databases will be built on Oracle RACs to mirror data across the different RAC servers. High volume hard drives will be used for backup of critical web services and database files. These drives will be held at the data centers for 3 months and then will be sent to Iron Mountain for an extended time period.

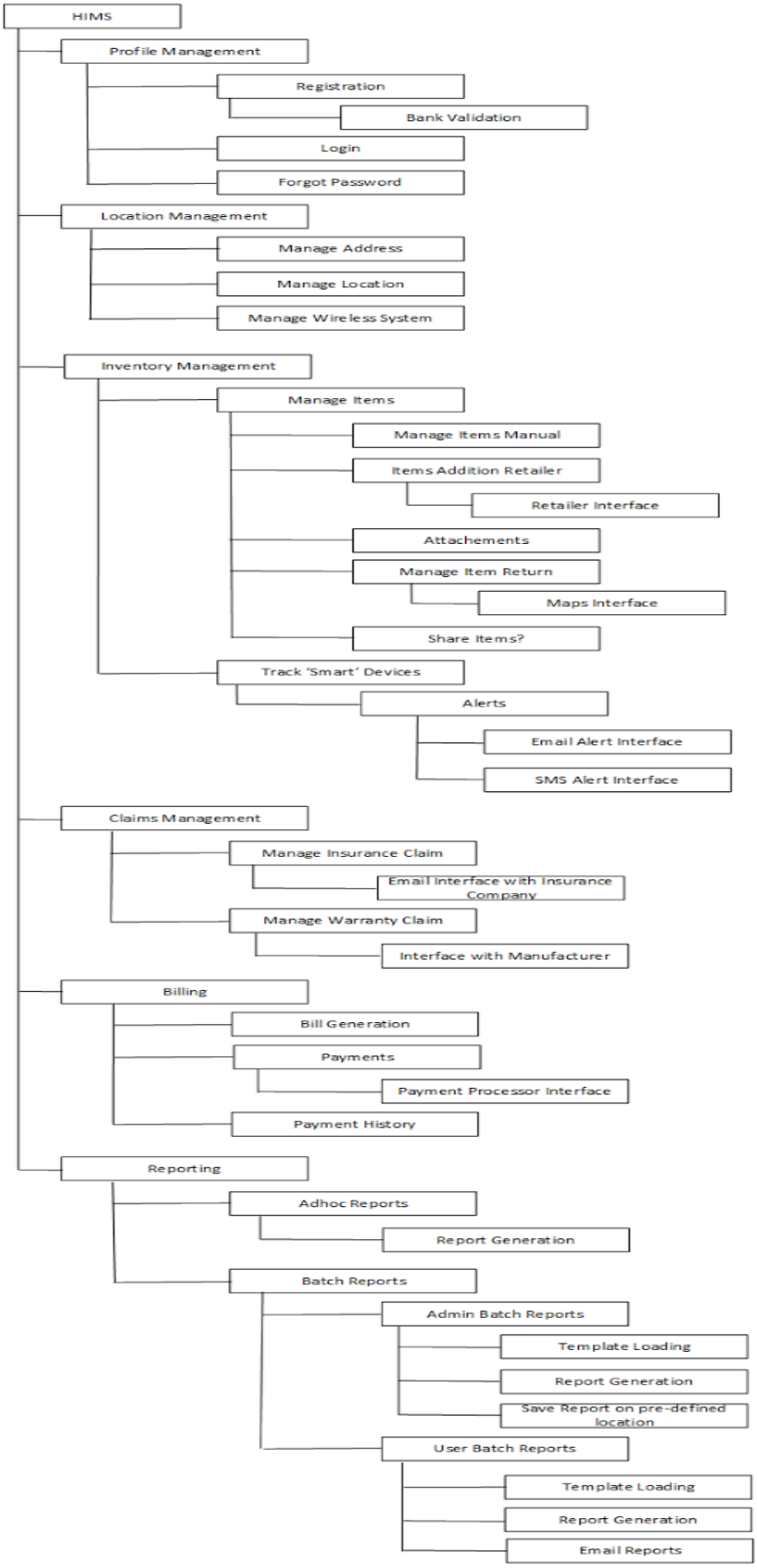
5.13 Disaster Recovery Plan

An Information Technology Service Continuity Plan (ITSCP) will be created to describe how web services, databases, servers, networks, and other critical resources will be recovered and restored during a disaster. Disasters considered will be single data center failures and nation-wide data center failures. Plans will required to be tested every year to ensure that procedures do not require change. Any infrastructure changes or critical system changes that require changes to the ITSCP will need to validate the new plan before the changes are moved into production.

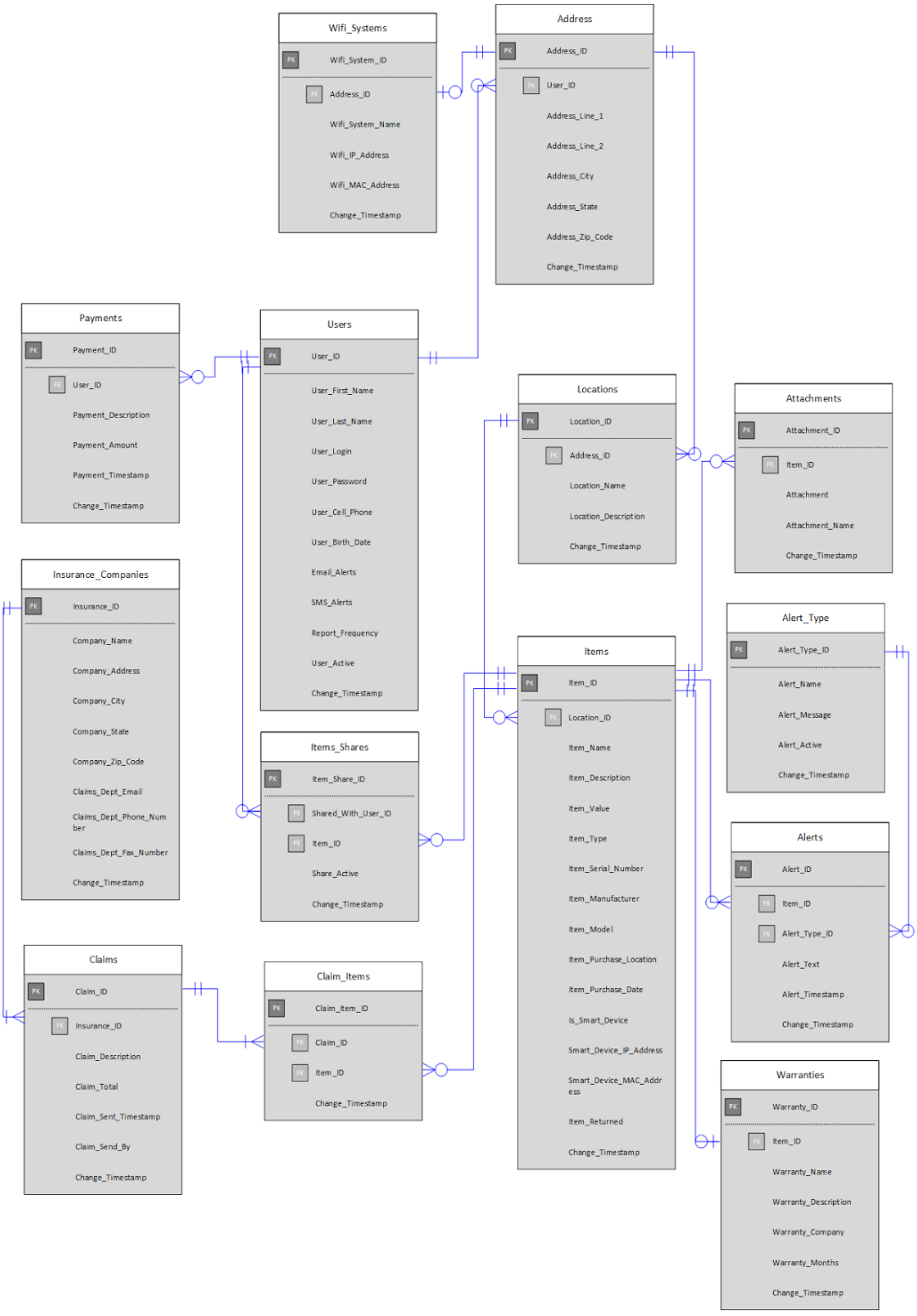
6 Appendices

A. HIMS Decomposition Chart
B. Project Work Development Process

APPENDIX A – HIMS Decomposition Chart



APPENDIX B - HIMS Entity Relationship Diagram



Although there is a cyclic dependency between users - address - location - items - item shares - user. This is needed since the user who has added the item, might want to share the item with users (mostly of the family). So we have a relationship between item-user via the items share table.