Final Design & Project Report

Fall 2015 CSIS 3275 (Software Engineering)

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30 NOVEMBER 2015 Douglas College

CodeBusters

Contents

Updated Project Plan

Description

We are developing a computerized system and transaction processing system to record activities and sales for the Victory Realty Company. Implementation of this new system requires us to analyze the current system. We will analyze the system and proceed with development based on our findings. We are taking into consideration that there is no current Internal Control System in place. The program is divided into three user spaces; Manager, Agent and HR Manager. Victor Realty Company currently has five agents employed. HR is responsible for adding and/or removing agents from the system. The realty company has more than ten properties for sale and which are already sold. All the properties are listed with a designated agent. There is no property without any agent but there can be agents without properties. The company deals with four types of properties; *Condominium, Townhome, Single-Family home, Single-Family Duplex*. Customers are primarily home owners and no commercial building owners. We are building an agile software system which can be improved in the future. The programming language is C# and we are using MySql as database. The design will be conform the requirements handed over by Victory Realty Company.

Business process: the customer sells a property. The listing agent charges the customer a flat rate of 7% for the first $100,000 and 3% over the remaining balance. The customer pays 5% GST on the subtotal of the commission. Victory Realty Company charges each agent a $1,000 monthly fees plus $250 for the sale transaction of each property.

Customer requirements

The present system is not able to produce the necessary outputs such as transaction reports and the commission slips related to the respective transaction and there is problem to handle a lot of data in the system manually. The system is computerized. We can have a backup of the data and we can save the data for a specific period of time. At this moment, there is no time efficiency and management of the data. This can lead to lost information about properties and can potentially harm the business.

Statement of Work

Team profile

Project title: Victory Realty Transaction Processing System

Group name: THE CODEBUSTERS

We are a team of system developers based in Vancouver. Our main objective is to deliver high quality, low cost software systems to satisfy your business needs and elevate your productivity in your business process. Once our team is summoned you are assured of a timely delivery of your requests. We achieve this by applying our software engineering skills, proper coordination and open communication with our client.

Individual qualifications and strengths:

Jaspreet:
Jaspreet has a Degree in Bachelors of Technology in Computer Science Engineering, and A post Degree Diploma in information and Communication Technology. She also has experience as MM Consultant (SAP). She has a bit of project management background and have always been working on databases. Her Experience with front end is also good, but she mostly worked on the back end, such as Oracle and SQL.
She is also the Team Lead in this Project for the Team “THE CODEBUSTERS”.
And as Team Lead she insures that everybody will deliver the project on time and good in quality.
Programming Level: 3 / 5 Presentation: 4 / 5, Documentation: 5/5, Management and Organization: 4/5

Viresh:
Viresh is a software engineer who is gifted making things work with a snap. Uniquely-equipped for writing effective procedures that run smoothly. Won several awards for his works at baidu. it is his works that made baidu a competitor against google. Earned praised for his work analyzing the algorithms that define baidu today. Spent 2002-2008 studying at MIT. Left MIT due to the lack of skilled professors to guide his potential.

Programming level: 5/5, Design: 3/5, Presentation: 4/5, Documentation: 5/5, Management and Organization 1/5.

Rohit:

I have engineering degree in computer science and technology from Punjabi university Patiala. I have some experience in web designing. I did lot of work in php during my university and training period. I have 1 year experience professionally in IT field I have some of the managing skills too because I helped in managing a huge event in my university.

Programing level: 3/5, Presentation: 4/5, Documentation:5/5, Management and Organization:5/5

Nirmal:

She Completed her Master of Computer Application from HP University Shimla.

She worked as a software Developer in Rural Development Project using C# programming language.Her strengths are that she is curious about learning new things and research unfamiliar terms and always want to work toward completion of task with minimal distraction.

Programming level:2 /3 , Documentation: 3 /5, Design: 3/5, Presentation:3 /5

Andre:

Romero Andre Balaoing is a Software Engineer and Web designer with over fifteen years of professional experience in architecture, design and agile development. Andre is an expert in application development in Cloud architecture and development with HTML5, Cloud Computing, Mongo DB and Android. Andre was one of the top notch students in University of the Philippines who had BS Computer Science in 2000.

Programming level: 2/3, Documentation: 4/5, Design: 4/5, Presentation: 3/5

1.3 Team leader

Jaspreet Kaur is our elected team leader. She shall maintain close contact with our clients and will steer the team in the proper direction.

And she will make sure that all the requirements of clients are met and all the problems that they are facing are solved.

Moreover, we will develop the software in such a sense that there is scope for the improvement, so that if in future any demand changes or there is a change in company's working style there is always a scope of developing the new changes without much cost and manpower upon less time.

And we have planned group meetings and set up an online group where everybody can talk and share his or her point of view in every sense.

Project Scope

Assumptions:

-Users: HR department, Manager and Agents.
-The customers are limited to homeowners.
-Property status is limited to “outstanding” and “sold”.

Additional Assumptions:

- Customer will not cancel agreement. Meaning, properties will not be deleted from the system.
- The system will not keep track of the views of the property.
- Activity of negotiation with customer about the asking price/repairs or improvements will not be discussed. This customer lists the property “as is”. The asking price is finalized in the first meeting.
- The commission is paid when property is sold. There will be never be any outstanding commissions.
- We assume that network connectivity of our client is constant and ensured. There is no need for developing automatic failover or backup database that needs to be synchronized when network connectivity is restored.
- The Real estate listing system will only cover the listing agent in its commission calculations.
- The real estate listing system will only calculate the total fee for each property sold and the number of properties sold per agent.
- All outstanding monthly payments are paid at this point. This has been administered using the conventional paper based system of Victory Real Estate Company.
- Victory Realty Company has a system administration department that is responsible for adding and removing HR Managers and Managers as users.

We basically have to automate the system so that it includes these following features:

- Add new Agents
- Edit new Agents
- Workers Listings
- Able to produce the new customer’s listings
- Report for sales transaction
- Sold or outstanding customer reports
- Produce commission slips for customers
- User friendly interface.
- Able to produce monthly profit reports
- and able to show active or sold listing by month

System requirements

-Microsoft Windows

-Network connectivity

-MySQL Database

On-screen appearance requirements

The software will open in a Windows form application with a log-in screen where the user chooses to log-in as a Manager, Agent or a HR user. The HR user can only enter and change Agent information using one form. The Agent user has three tabs which are Register Property, Properties and Customers. The Manager user will open in two tabs. The first tab is for the registration of sales and creating an invoice. The second tab is for creating a list of sales charged per agent.

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Project Budget

LOC method of estimation		
Total line of code (LOC)	20,132	According to all CS files and Designer Generated CS files.
Labor rate/month	CAD 5,000.00	According to average Software Developer salary in British Columbia, Canada.
Average production/month	2,500.00	According to an estimate of our speed of coding.
Cost per line	CAD 2.00	
Project cost	CAD 40,264.00	
Effort	8 persons	We have 5 persons in our group, but with a bit more effort we produced more LOCs per person.
Planning & Design	30 days	According to the days used to create the second iteration of the Project proposal
Cost of Planning	CAD 4,838.71	
Testing	5 working days	According to the days between the development and the presentation.
Testing cost	CAD 1,166.67	
Maintenance	132 working days	According to number of days stated in GANT chart.
Maintenance cost	CAD 30,800.00	
Summary of costs	**Cost**	
Development cost	CAD 40,264.00	
Cost of planning	CAD 4,838.71	
Testing cost	CAD 1,166.67	
Maintenance cost	CAD 30,800.00	
Total budgeted cost	**CAD 77,069**	

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Diagrams

Functional Decomposition Diagram:

0 - Victory Realty Transaction Processing System

0.1 - View Agent Listings

0.2 - Add agent

 0.2.1 - Process and submit agent information to the system

0.3 - Edit agents

 0.3.1 - Submit changes to agent profile

0.4 - Add new customer's listings

 0.4.1 - Receive property information

  0.4.1.1 - Add property information (number of bedrooms, etc.)

 0.4.2 - assign agent to property

0.5 - Sell property

 0.5.1 Add/Edit Sales transactions

 0.5.2 Change status of property to "sold"

 0.5.3 Selling price

0.6 - View Sold/Outstanding Listings

0.7 - Generate Output reports

 0.7.1 Show commission slips

  0.7.1.1 View Commission slips ordered by agent

  0.7.1.2 View Commission slips ordered by Month/Week/Year

  0.7.1.3 View Commission slips ordered by selling price/type of property

 0.7.2 Show customer sales transactions

  0.7.2.1 Show date property was sold

  0.7.2.2 Show property type/property id

  0.7.2.3 Show Price

0.8 - Payment of the monthly fee

 0.8.1 - view accumulated commissions ordered by agent.

 0.8.2 - view balance of monthly fees due by agent

0.9 - Generate monthly commission report

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Project plan and status report

Task Name	Duration	Start	Finish	Predecessors
1. Planning the tasks	2 days	Mon 11/2/15	Tue 11/3/15	
2. Dividing the tasks	3 days	Wed 11/4/15	Fri 11/6/15	1
3.User Interface Design(Modeling)	3 days	Mon 11/9/15	Wed 11/11/15	2
4. User Interface Design(Coding)	10 days	Thu 11/12/15	Wed 11/25/15	3
5. Database tables	4 days	Mon 11/9/15	Thu 11/12/15	2
6. Connecting database to front-end	1 day	Fri 11/13/15	Fri 11/13/15	5
7. Define Queries	3 days	Mon 11/16/15	Wed 11/18/15	6
8. Assign Queries	1 day	Thu 11/19/15	Thu 11/19/15	7
9. Fill database with existing information	1 day	Fri 11/13/15	Fri 11/13/15	5
10. Test Application	5 days	Mon 11/30/15	Fri 12/4/15	9,4,8
11. Final Presentation	1 day	Mon 12/7/15	Mon 12/7/15	10
12. Implementation	21 days	Fri 12/11/15	Fri 1/8/16	11
13. Maintenance	132 days	Mon 1/11/16	Tue 7/12/16	12

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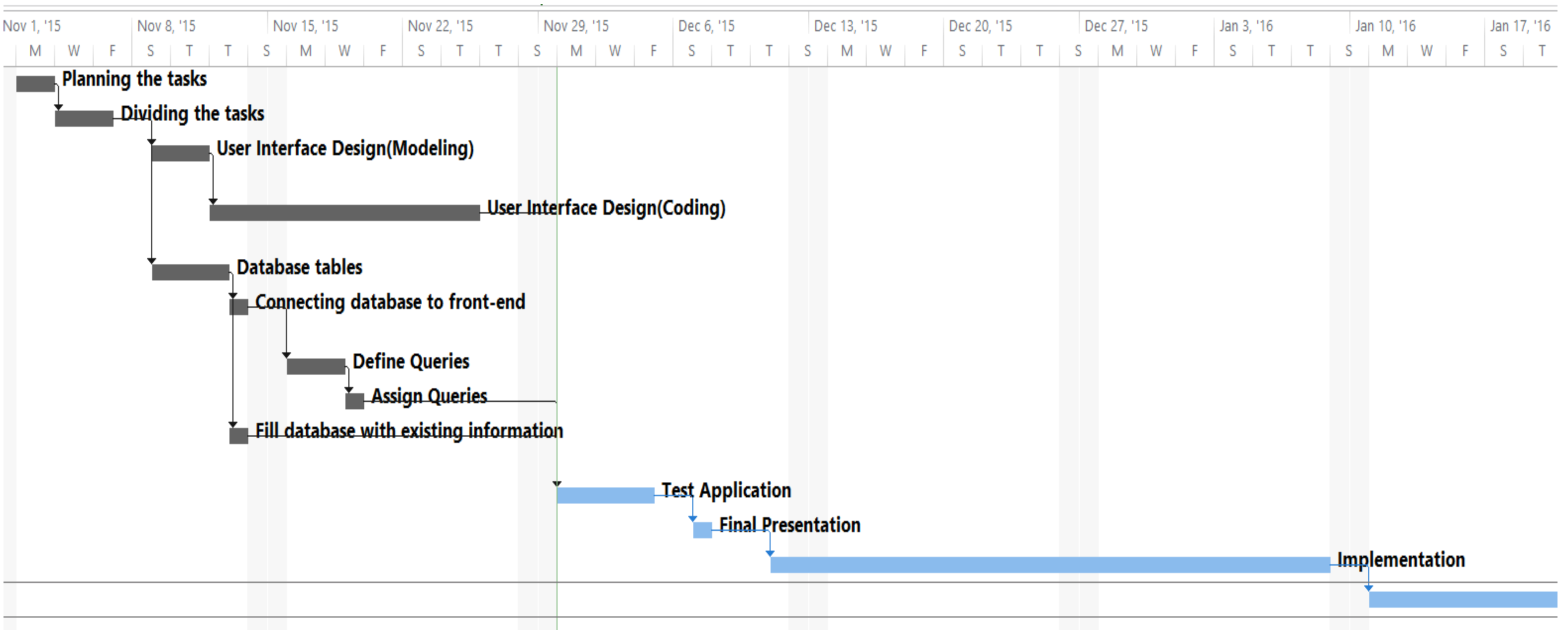
Gantt chart

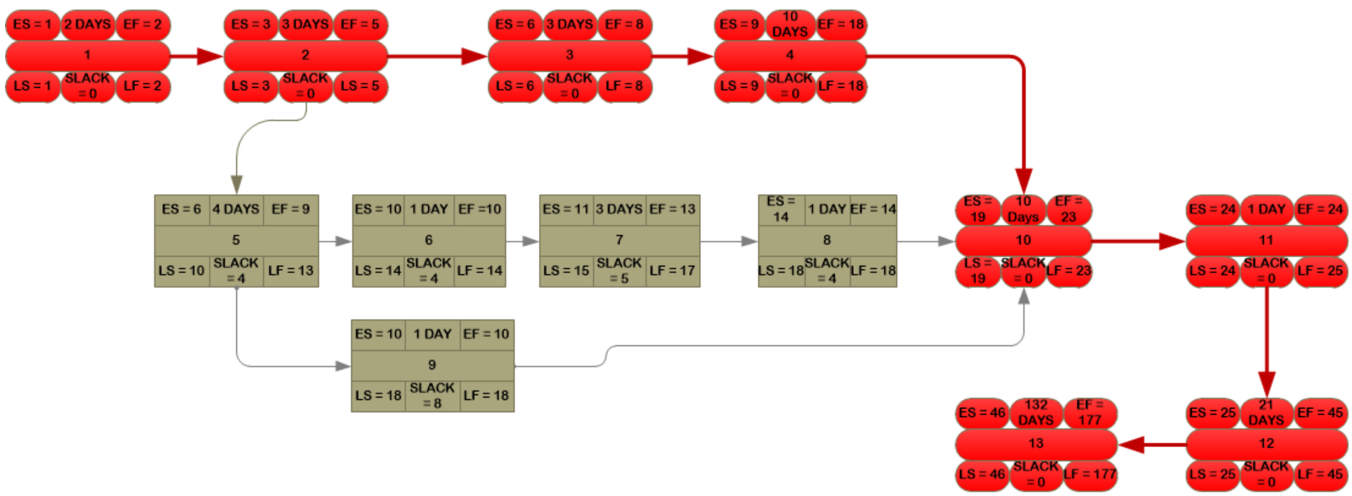


Pert Chart

1. Planning the tasks
2. Dividing the tasks
3.User Interface Design (Modeling)
4. User Interface Design (Coding)
5. Database Tables
6. Connecting database to front-end
7. Define Queries
8. Assign Queries
9. Fill database with existing information
10. Test Application
11. Final Presentation
12. Implementation
13. Maintenance

Legend:

Early Start	Duration	Early Finish
	Task Name	
Late Start	Slack	Late Finish



Critical Path is in red shade

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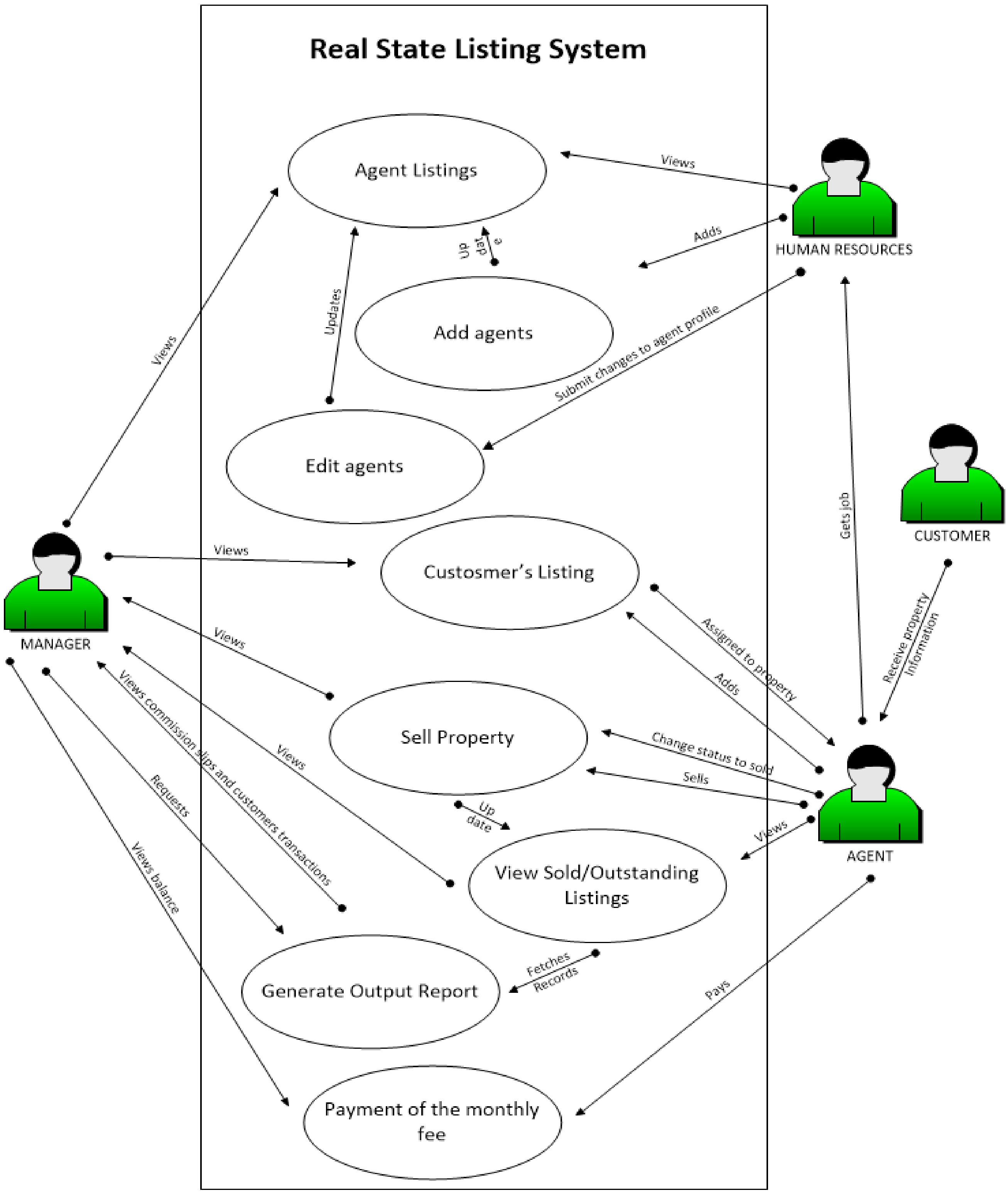
Use Case Diagram



ERD

Registration: Registration table connects Customer with each property. Our assumption is that each customer can have multiple properties registered, meaning that each customer-property combination yields a unique registration ID.

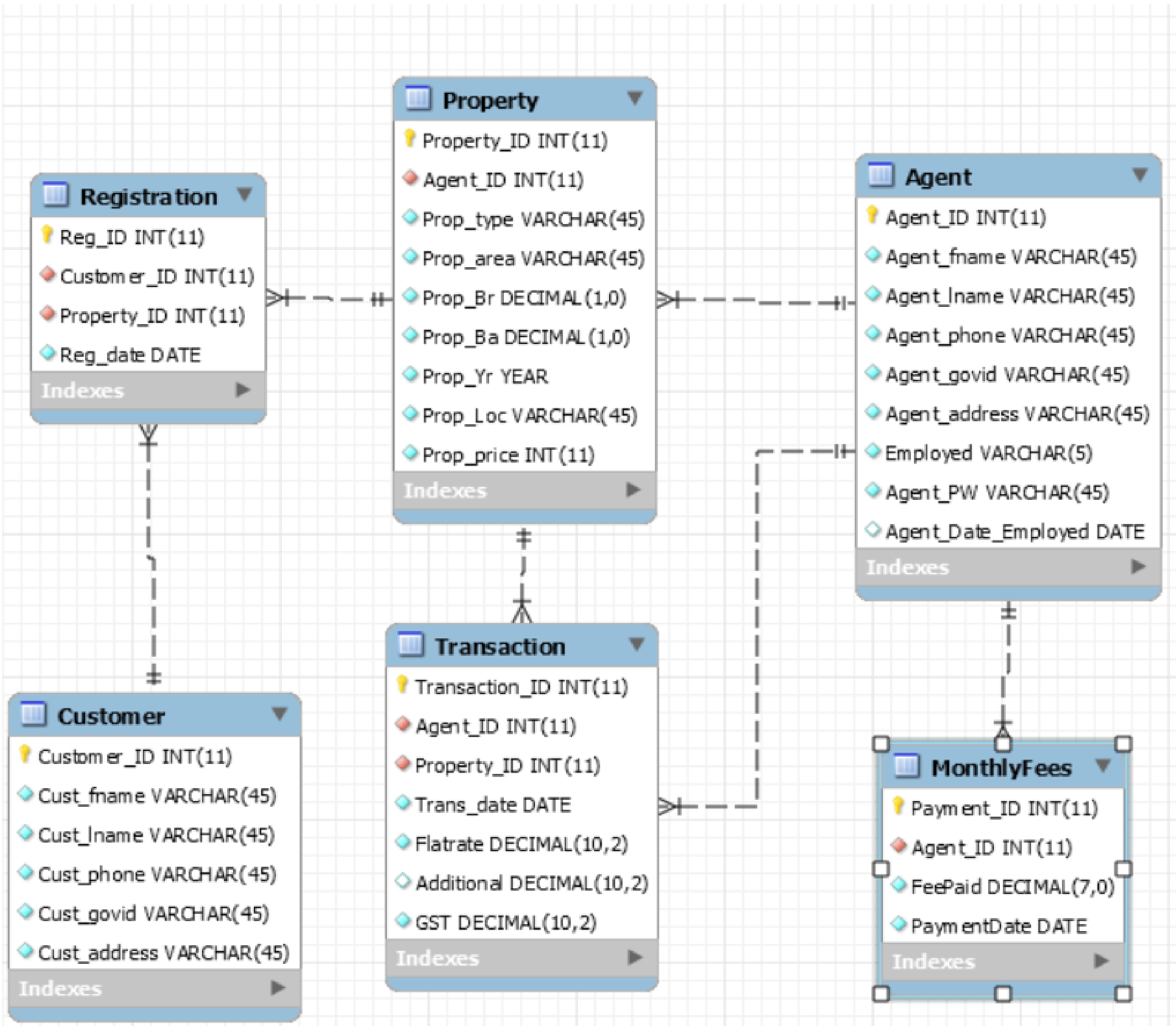
- Customer: Customer table contains the personal information and contact information along with his government ID. This will ensure that all registered customers are unique throughout the system and no duplicates are possible.

- Property: Property table connects the registered property with the Assigned agent. Also, The property Attributes can be recorded in this table.

- Agent: Agent table Contains the personal information and contact information along with his government ID. This will ensure that all registered Agents are unique throughout the system and no duplicates are possible. There is another record available for his employment status and his employment date.

- Transaction: Transaction table connects each Property to the Agent. This Agent-Property combination gets unique Transaction ID assigned. The record is made when a property is sold. The transaction consists of The transaction date and a breakdown of the commission fees, Flat rate (7%), Additional rate (3%) and the GST.

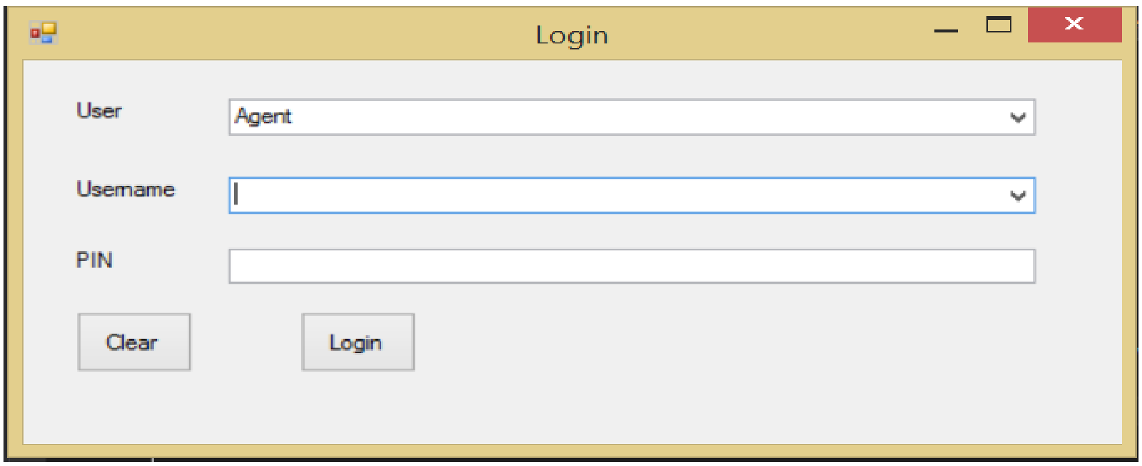
- Monthly fees: Monthly fees table contains the monthly fees that each agent has to pay. By keeping track of the employment date in the Agent table along with his Employment status, it is possible to generate a payment table each month. This table is created for future implementation of this feature which will be upgraded during the implementation phase.


Property
Property_ID INT(11)
Agent_ID INT(11)
Prop_type VARCHAR(45)
Prop_area VARCHAR(45)
Prop_Br DECIMAL(1,0)
Prop_Ba DECIMAL(1,0)
Prop_Yr YEAR
Prop_Loc VARCHAR(45)
Prop_price INT(11)
Indexes
Registration
Reg_ID INT(11)
Customer_ID INT(11)
Property_ID INT(11)
Reg_date DATE
Indexes
Agent
Agent_ID INT(11)
Agent_fname VARCHAR(45)
Agent_lname VARCHAR(45)
Agent_phone VARCHAR(45)
Agent_govid VARCHAR(45)
Agent_address VARCHAR(45)
Employed VARCHAR(5)
Agent_PW VARCHAR(45)
Agent_Date_Employed DATE
Indexes
Transaction
Transaction_ID INT(11)
Agent_ID INT(11)
Property_ID INT(11)
Trans_date DATE
Flatrate DECIMAL(10,2)
Additional DECIMAL(10,2)
GST DECIMAL(10,2)
Indexes
Customer
Customer_ID INT(11)
Cust_fname VARCHAR(45)
Cust_lname VARCHAR(45)
Cust_phone VARCHAR(45)
Cust_govid VARCHAR(45)
Cust_address VARCHAR(45)
Indexes
MonthlyFees
Payment_ID INT(11)
Agent_ID INT(11)
FeePaid DECIMAL(7,0)
PaymentDate DATE
Indexes

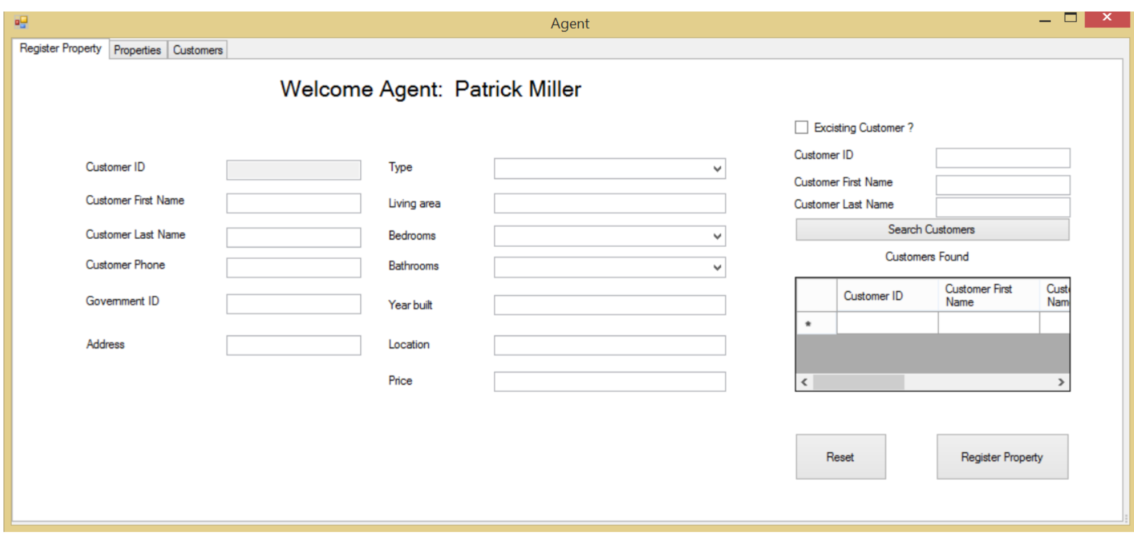
Input and Output Design

User interface design

This is the first Page of the application in which we have three types of users: HR, Managers and Agents. When you select the user type the usernames will automatically be synchronized to the Username Area and then you can enter the PIN and logon to the system. In this If we login to the system as Agent then Three tabs Appear: Register Property, Properties and Customers.

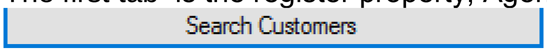


In Register Property we can add the property info and customer and search for the customer if the customer is existing then we have a separate button for that if is new then separate.

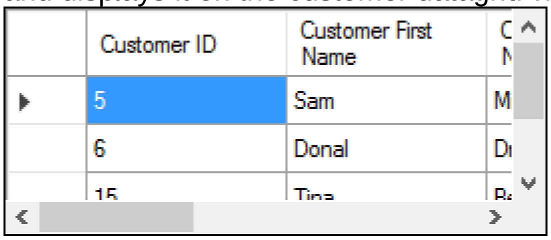


The purpose of this tab (Register Property) is to register customer's property information for a new customer or register new selling house for an existing customer.

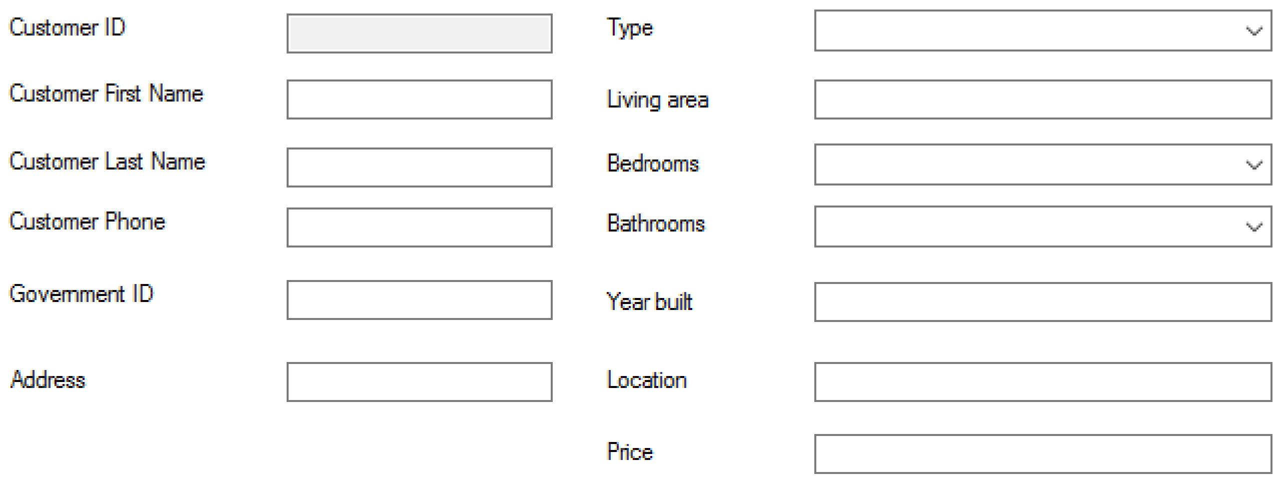
The first tab is the register property, Agent can search all Customer's info by clicking the

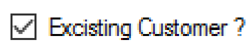


and displays it on the customer datagrid view



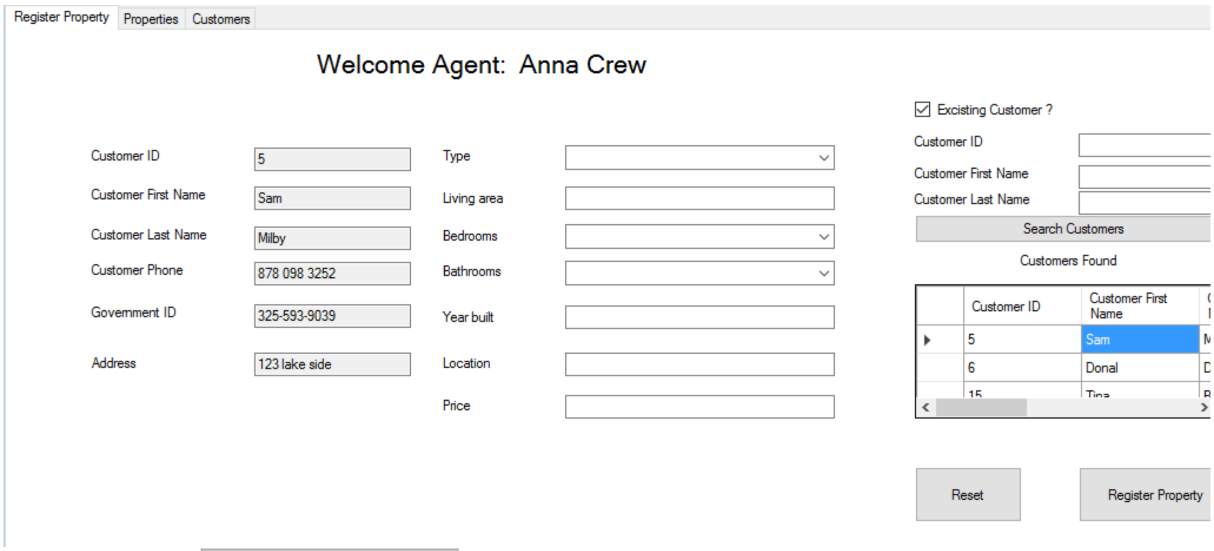
if agent wants to register a new customer, he/she has to input all the customer's information including the for sale house information on the textboxes



However, if a customer is already exists, agent needs to check the 

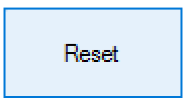
checkbox and have to click the customer's name on the customer's datagrid view and it will automatically populates the customer's id, name, phone address and government ID but needs to input the information of the new selling townhouse.

Second Tab is the Property tab, in this The Agent can add and edit the properties and can also mark the property sold or not if sold then can put on the date on which the property was sold. The Search Property will search all the existing Properties sold or not.



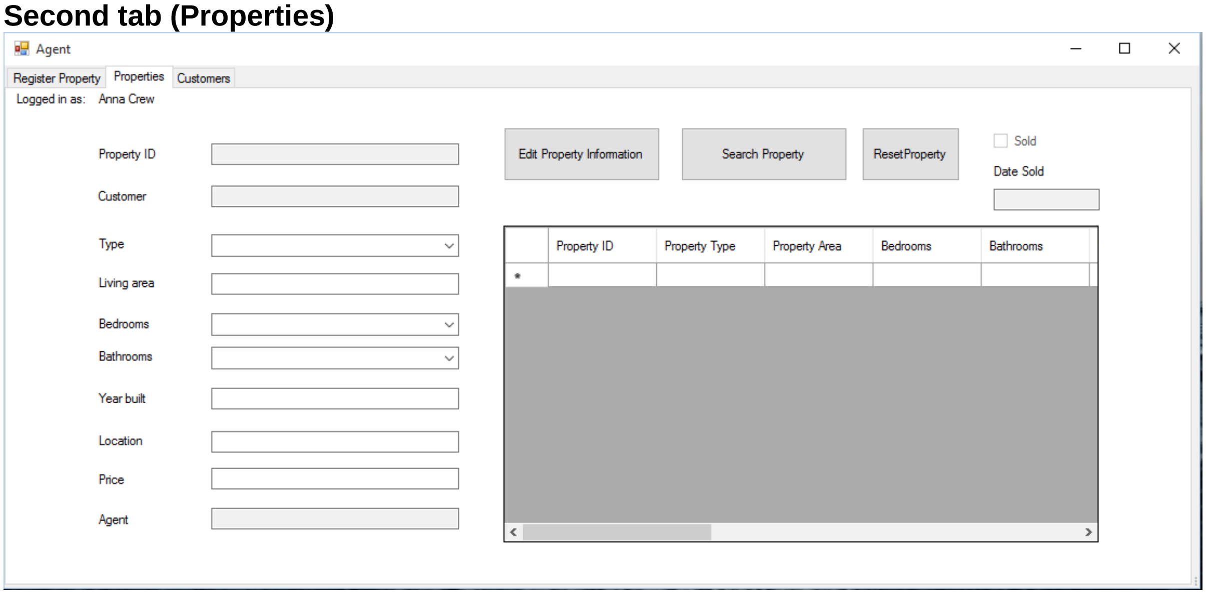
Then click the 

button to registers the new selling house.



Button is basically to clear all the textboxes and datagridview table.

Second tab (Properties)



The purpose of this tab (Properties) is to edit the information of the selling house of the customer and to look up if the property is already sold.

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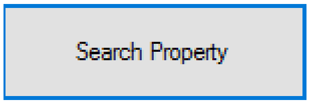
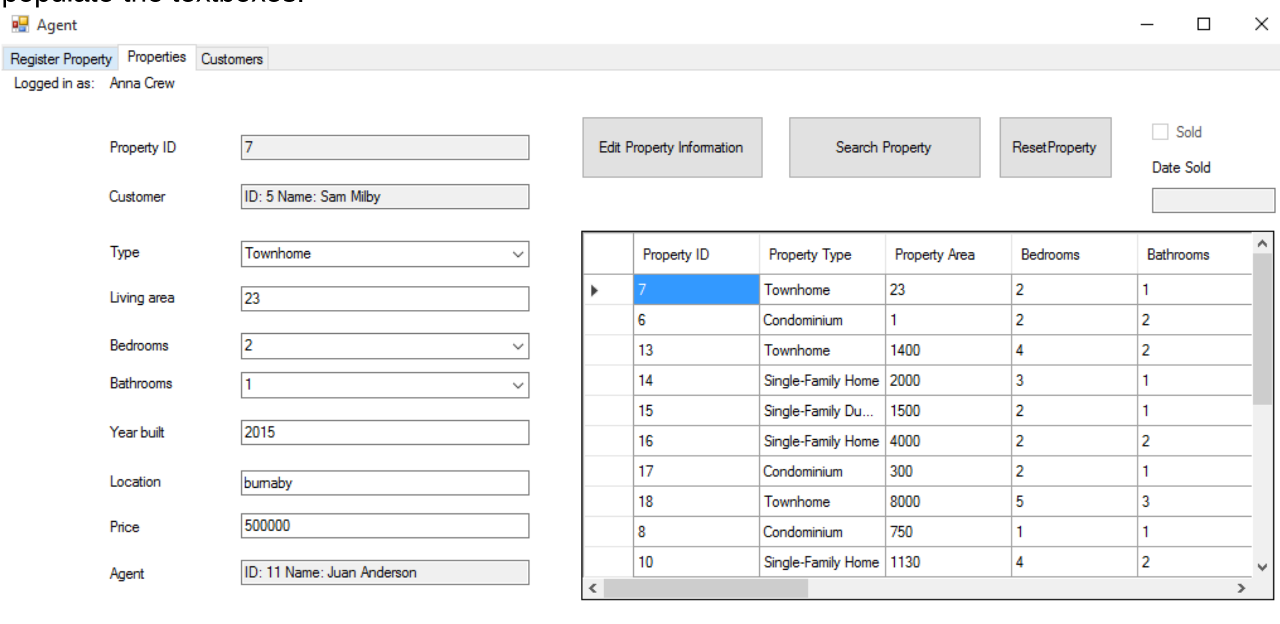
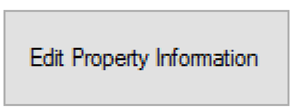
By clicking 

button will retrieved the query list of all the customer's property information including the agent who is handling the selling property of the customer from the server and generates it on the property list datagrid view.

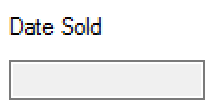
To edit the customer's property information. The agent must click the customer's property ID to populate the textboxes.



Then by clicking the 

I will save any changes.

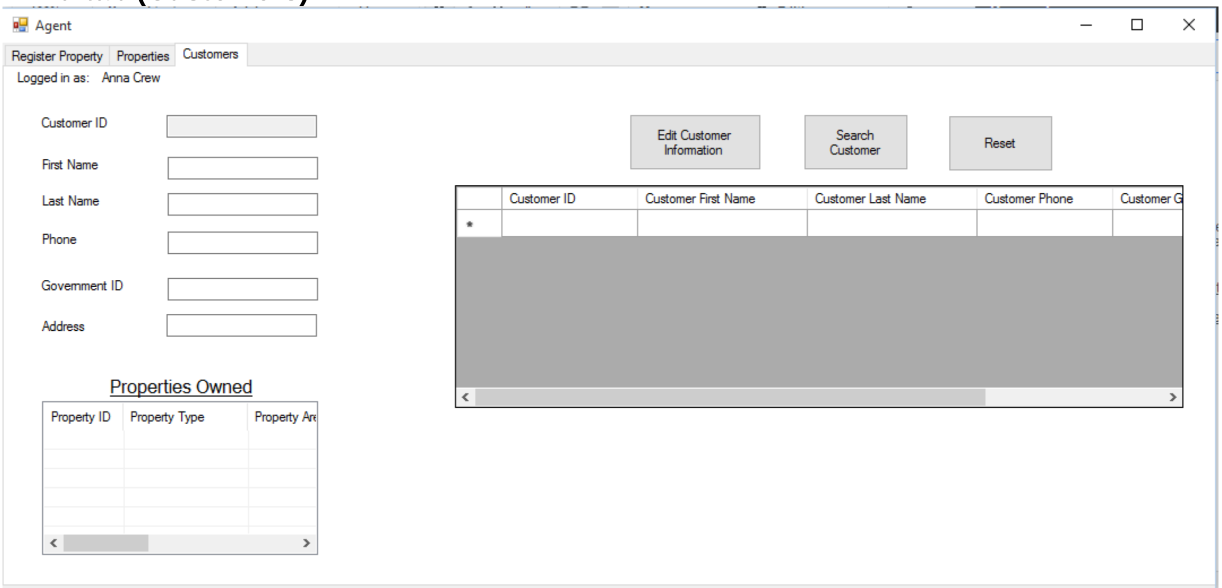
The checkbox 

and the textbox 

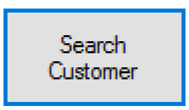
will be populated if the selling property is sold.

Button is to clear the textboxes and the datagridview table.

Third tab (Customers)

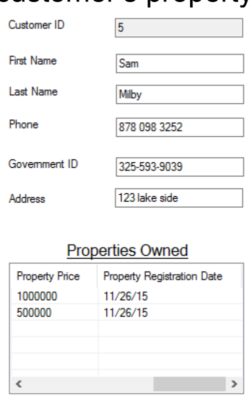


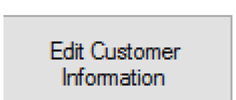
The purpose of this tab (Customers) is to edit the information of the customer.

The 

button is to retrieve the customer's information from the server and generates it on the customer's datagrid view.

To edit customer information, customer ID must be click once to populate the textboxes and to list the customer's property owned on the Properties Owned table.

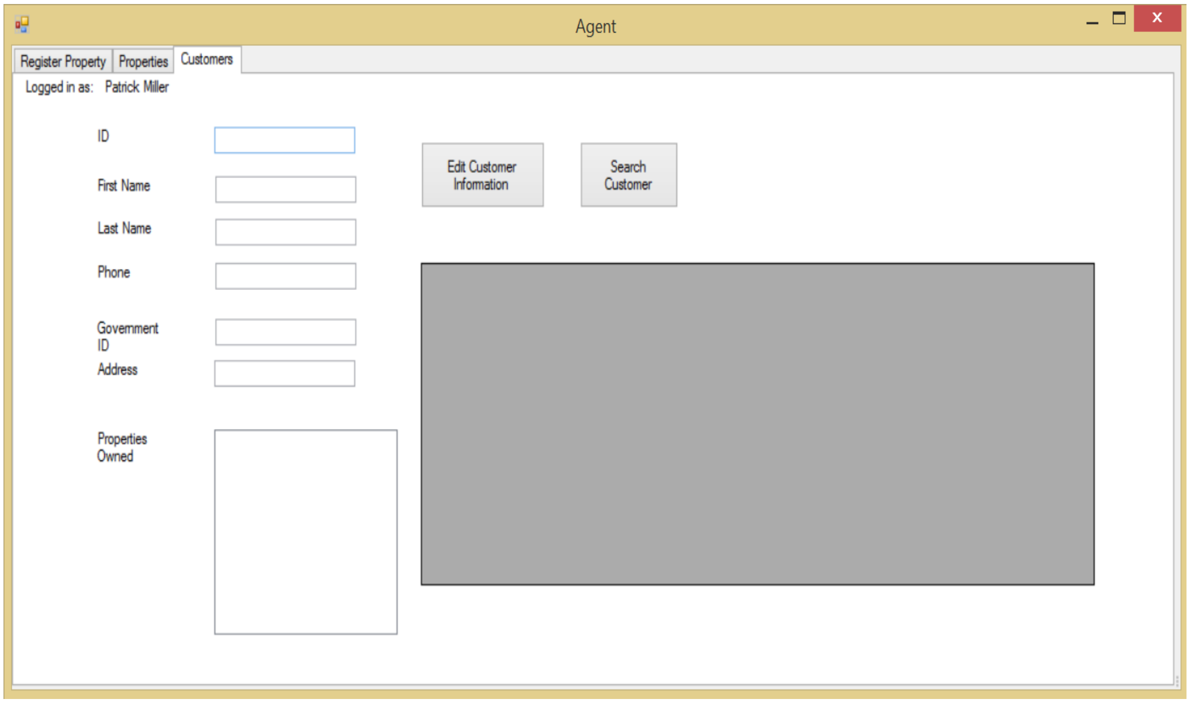


By clicking the 

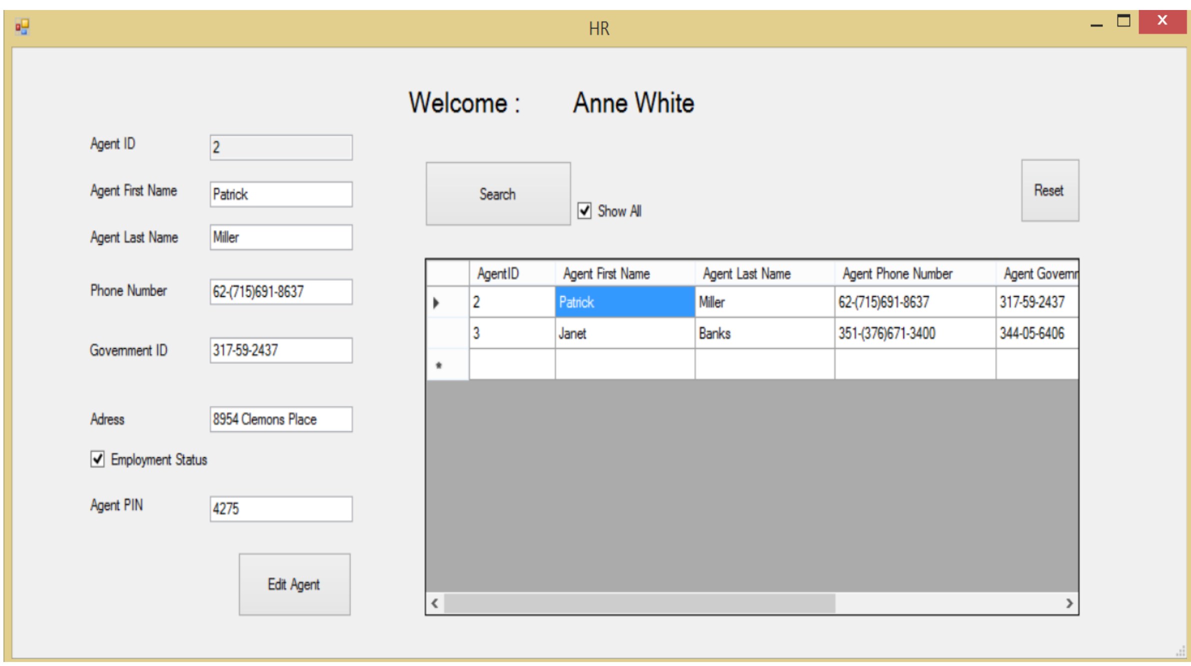
button will save any changes.

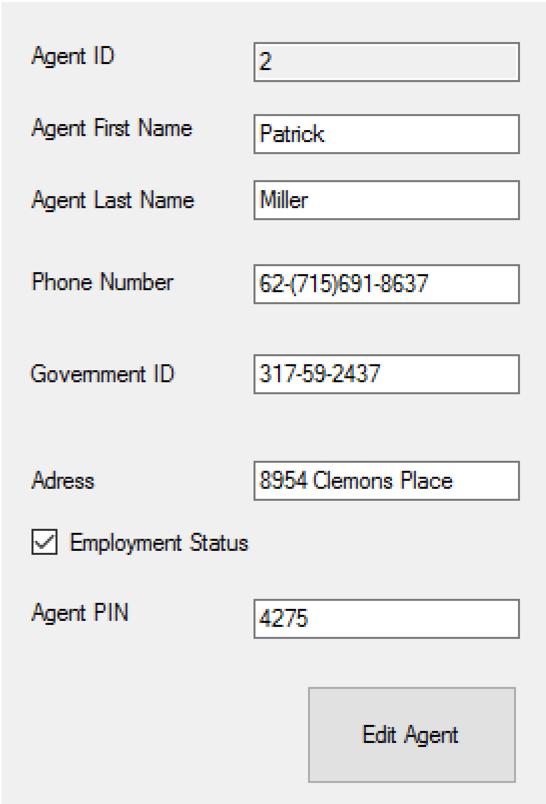
The 

button is used to clear all textboxes and datagridview

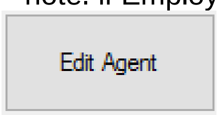


If we Login as HR this is the first page which appears, in this screenshot we are logged in as Anne White, we cannot add the Agent ID. We can Add and Edit the Agent. We can also search the Agent. And view the Agents that are stored in the database.

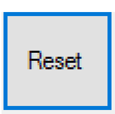




**note. if Employement status is checked the agent employement status will be considered hired if

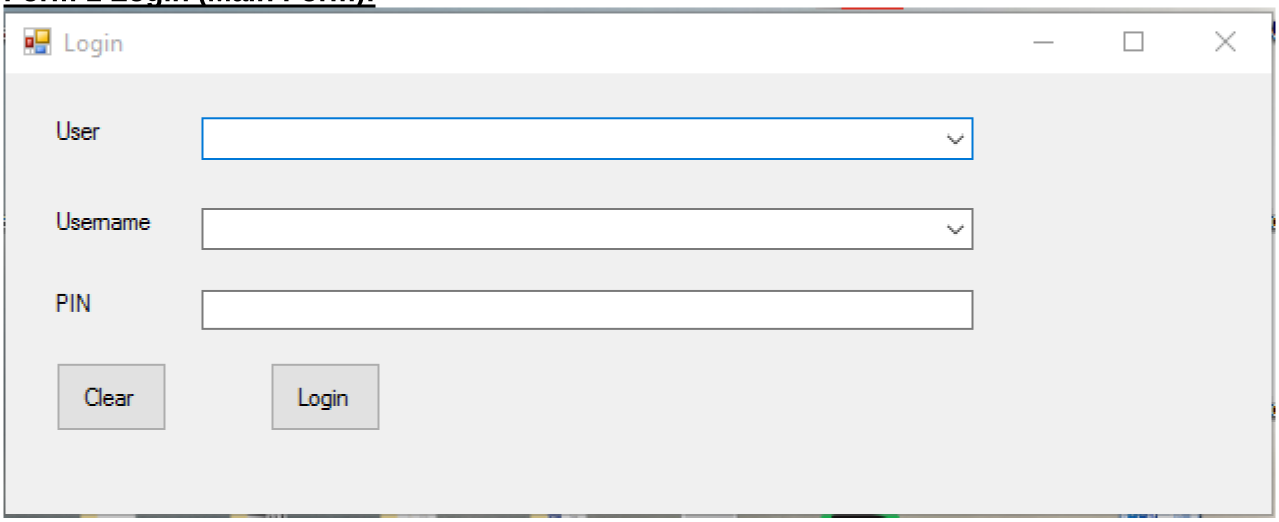


is clicked.



Reset button will simply clear all the textboxes and datagrid view.

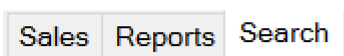
Form 1 Login (Main Form):

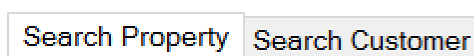


Log in as Manager

User drop down list: Manager
Username: list of Manager Names
PIN: enter corresponding password for Agent
Click Login

**note.. Only Managers can access this form to generate commission of each agent and register sales property.

Opens the manager tabs 

Under the Search Tab, there is another sub tabs 

The Search Property is for the manager to search the property id of the customer.

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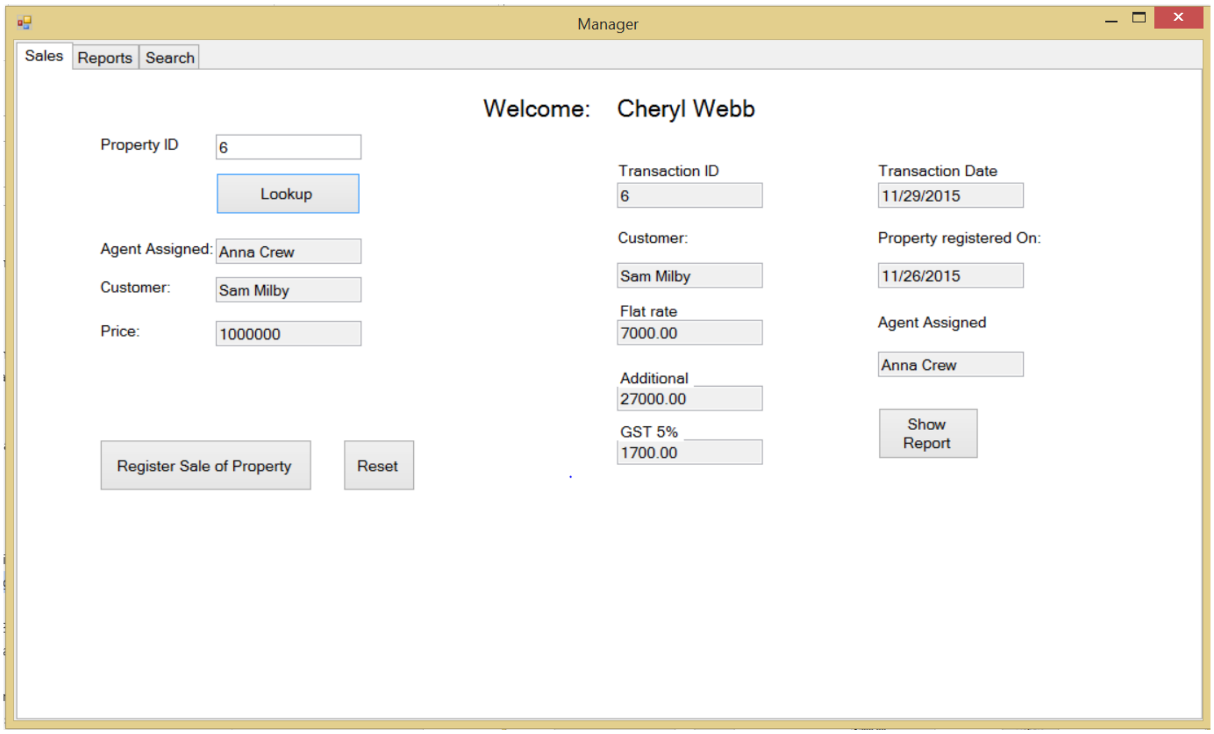
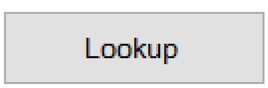
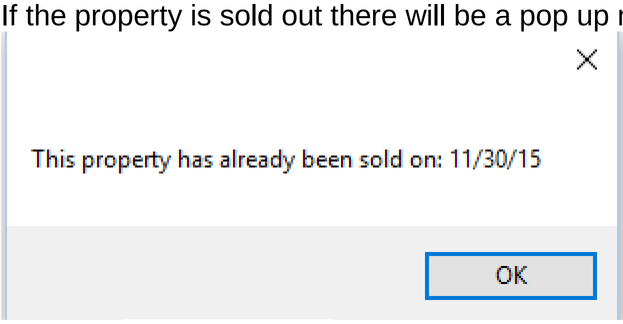


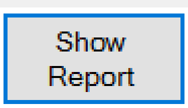
This tab works if the manager has to register the property of the customer as being sold. First the manager searches for the property id then input the property id in the textbox

.

And click the 

button if the property is sold out already or still for sale. If the property is sold out there will be a pop up message notification.



Also, the 

button will work to open the printable invoice of the property sold.

This form page provides the manager the option to view sales per agent by given timeframe using the date selectors. “Generate Report” button will produce the following invoice

CodeBusters

Victory Realty Company		Transaction Date:	11/29/2015 12:00:00 AM
101 W 99th Ave, Vancouver, Canada		Invoice Number:	6
XXX YYY		Customer ID:	5
Phone 999-999-999			
Fax 999-999-999			

Bill To:

Sam

Milby

123 lake side

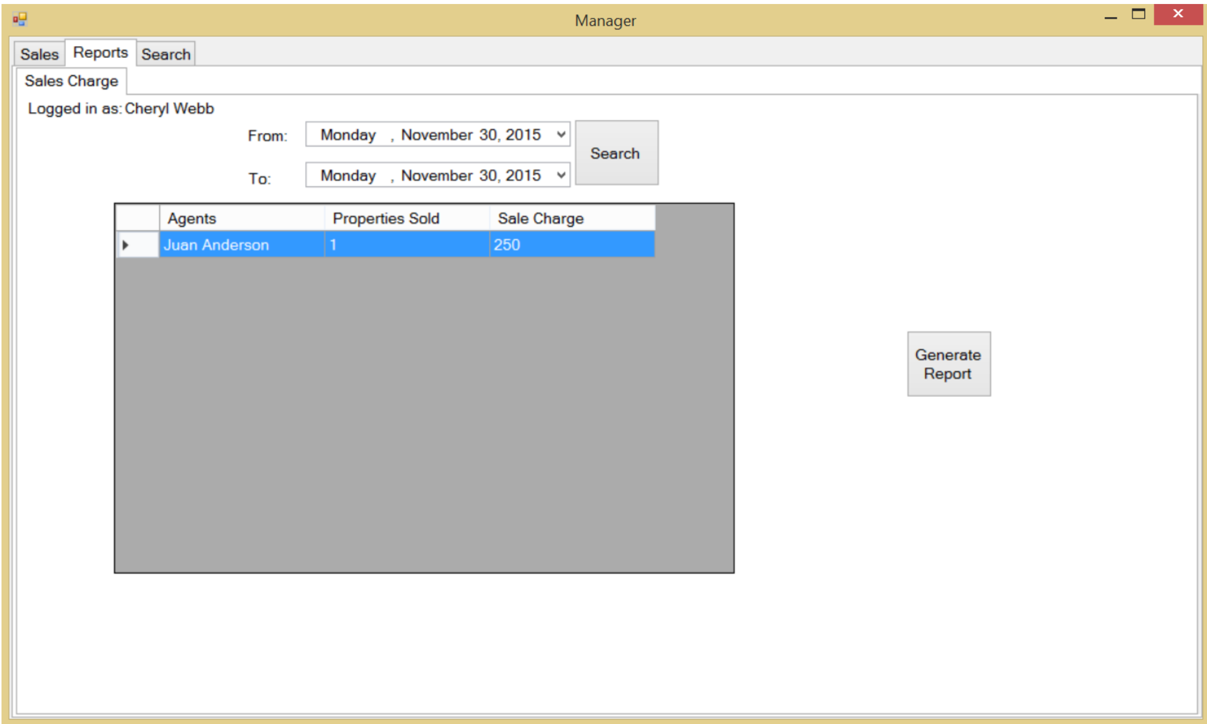
878 098 3252

Description	Amount
Flat rate 7% Commission	$7,000.00
Additional 3% Commission	$27,000.00

1. Total payment due in 30 days
2. Please include the invoice # on your check/transaction

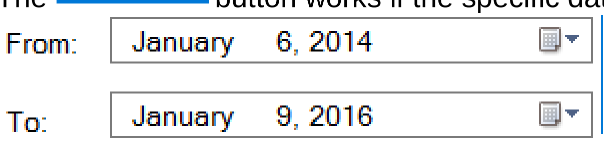
Subtotal	$34,000.00
GST Tax Rate	5%
Tax Due	$1,700.00
Total Due	$35,700.00

This invoice contains the transaction date, invoice number and Customer ID in the top right corner. On the left side the customer information is displayed. The flat rate is calculated according to the Property Price retrieved from the database: 7% over the first CAD100,000. The additional rate of 3% is calculated on the remaining Property Price after deducting CAD100,000. This results in a subtotal, which is then used to calculate the TAX Due, The Total Due is the Subtotal + Tax.



This tab will let the manager look for the total sales report of all the agents' base on the specific date the manager wants to search for.

The 

button works if the specific datetime picker


is populated.
The result will be generated on the report datagridview

The 

button produces the following report that can be printed and exported to excel or PDF. As this is in the Manager Form only the manager is able to create this report.

Output Report

The “Generate Report” produces the following report that can be printed and exported to excel or PDF. As this is in the Manager Form only the manager is able to create this report.

Sales Charge Report

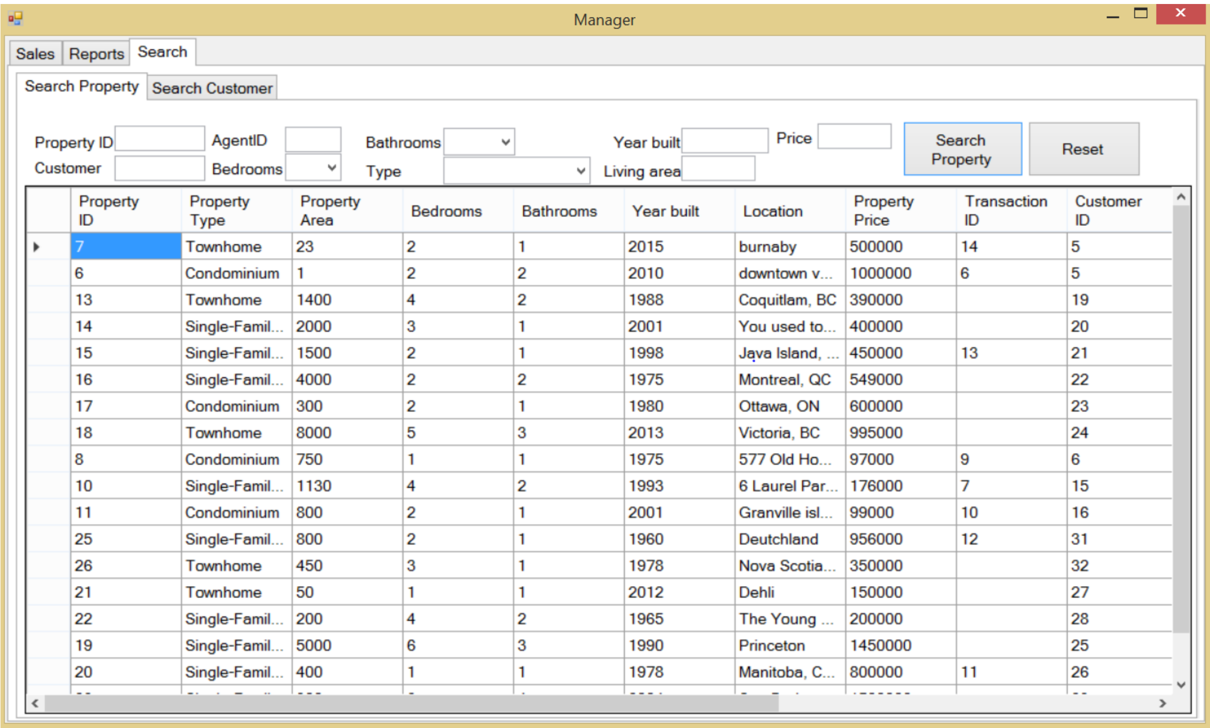
Prepared On: 11/30/2015

Agent First Name	Agent Last Name	Properties Sold	Sale-Charge
Anna	Crew	2	$500.00
Mike	Aizen	1	$250.00
Dora	Explora	2	$500.00
Nicole	Scherzinger	1	$250.00
Chocolate	Apple	1	$250.00
	Total	7	$1,750.00

CodeBusters

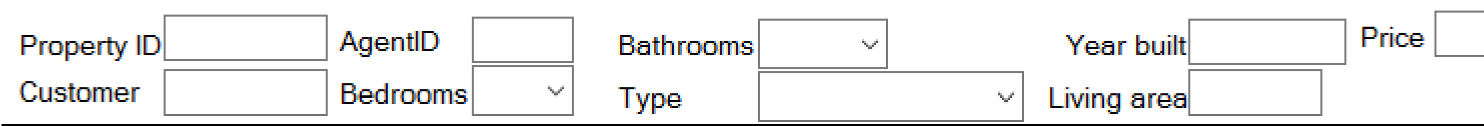
Additional Manager Search Features

The manager has the option to perform Search on the Properties according to the parameters given in below screenshot. This is similar to the Agent's Search function, but without the edit option.

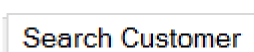


Property ID	Property Type	Property Area	Bedrooms	Bathrooms	Year built	Location	Property Price	Transaction ID	Customer ID
7	Townhome	23	2	1	2015	burnaby	500000	14	5
6	Condominium	1	2	2	2010	downtown v...	1000000	6	5
13	Townhome	1400	4	2	1988	Coquitlam, BC	390000		19
14	Single-Famil...	2000	3	1	2001	You used to...	400000		20
15	Single-Famil...	1500	2	1	1998	Java Island, ...	450000	13	21
16	Single-Famil...	4000	2	2	1975	Montreal, QC	549000		22
17	Condominium	300	2	1	1980	Ottawa, ON	600000		23
18	Townhome	8000	5	3	2013	Victoria, BC	995000		24
8	Condominium	750	1	1	1975	577 Old Ho...	97000	9	6
10	Single-Famil...	1130	4	2	1993	6 Laurel Par...	176000	7	15
11	Condominium	800	2	1	2001	Granville isl...	99000	10	16
25	Single-Famil...	800	2	1	1960	Deutchland	956000	12	31
26	Townhome	450	3	1	1978	Nova Scotia...	350000		32
21	Townhome	50	1	1	2012	Dehli	150000		27
22	Single-Famil...	200	4	2	1965	The Young ...	200000		28
19	Single-Famil...	5000	6	3	1990	Princeton	1450000		25
20	Single-Famil...	400	1	1	1978	Manitoba, C...	800000	11	26

If the manager wants to search for an specific customer property, he/she will just have to input text on the textboxes

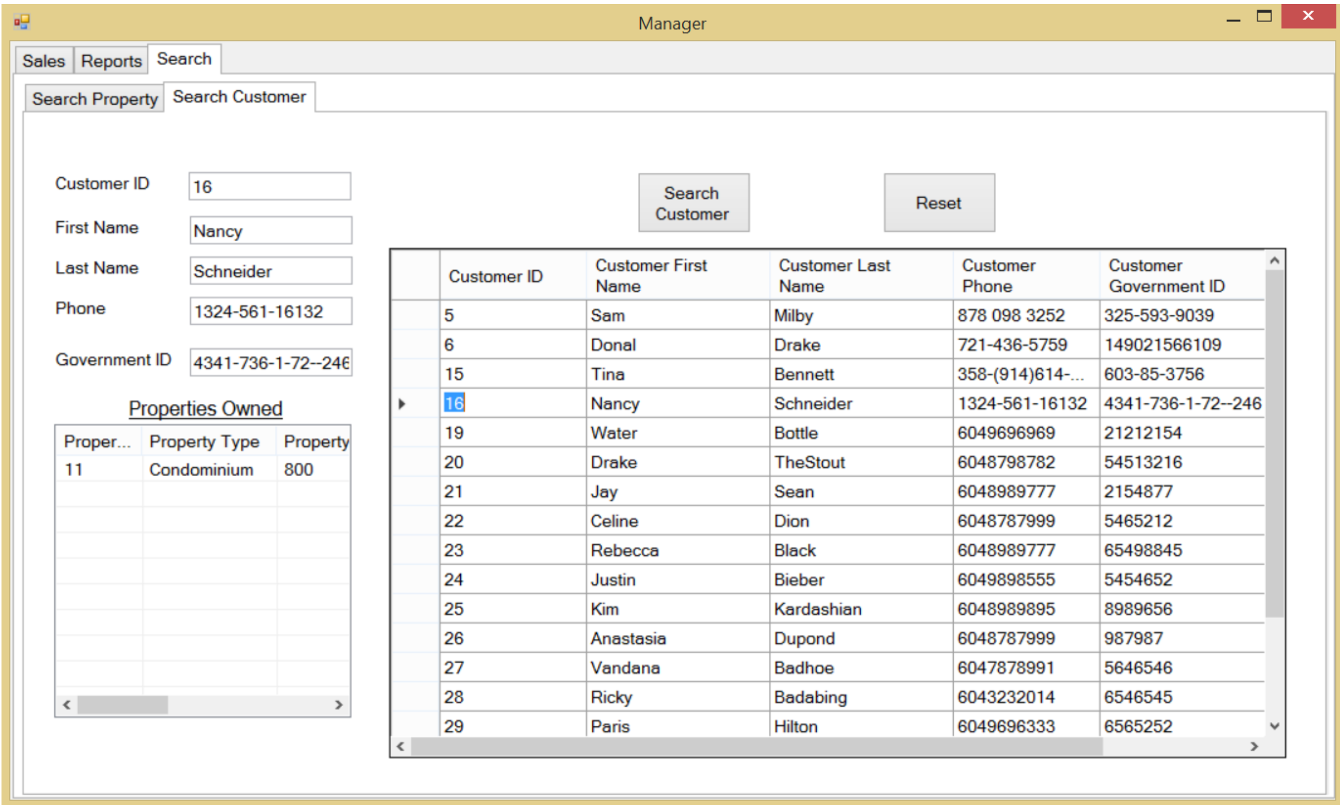


Then click the search property button to display it on the property datagridview.
The reset button will simply clear all the textboxes and datagridview.

The sub tab 

is for the manager to look up all the customers' property information.

The manager has another option to search for Customers according to the parameters visible. Clicking on the results will give some more information about the properties that belong to that client.



Implementation and Backup Plan

Implementation Plan

During our Implementation Phase we will apply the feedback given at the final presentation. Victory Real Estate Company does not have an IT system at the moment. This means that we can apply the *direct changeover method* for the implementation. The forms in the Victory Real Estate Listing system are designed to be simple and self-explanatory. Mechanisms are in place to prohibit users from performing erroneous actions such as entering a record twice. There will be no training given to the staff. The staff will have access to comprehensive documentation

The implementation phase can be broken down into the following tasks:
-applying corrections to the mechanics and user interface.
-performing an integrity check.
-deploying the program.

Maintenance

Maintenance phase starts as soon as the program has been deployed. During the maintenance phase the staff will use the system normally in their production environment. Feedback will be given by the staff to our team. This feedback will result in a monthly update and this will continue for six consecutive months. After this period the system will be considered mature and this project will be completed.

Project Backup Plan

If maintenance timeframe projected is not sufficient to complete maintenance activities:
We would like to propose an additional risk percentage for the budget plan to cover this unfavorable event.

Backup the database

Database backup has to be done by Victory Real Estate Company. We will provide a SQL script of the database structure and this can be exported to a Private server at a Datacenter of your choice. The Datacenter will be responsible for making backups and providing high availability to your data. We will not be held responsible for any data loss that may occur with failure of equipment at the datacenter.

Project Write-up and Reflection

Project objectives

- Increase the efficiency of Victory Realty Company's ERP
- create sustainable Internal Control System to track and report on occurring events properly.
- create a system that serves the agency to the fullest potential (user interface is friendly in usability)
- follow ups made possible when maintenance has to be implemented
- ensure segregation of duties.

Reflection

This Project has created an opportunity to experiment with individual programming skills and to experience the walkthrough of the development phases. A significant amount of online research was necessary to generate a program that can satisfy the requirements set by our potential client and possible changes or updates.

Reflection on design and development phase

Critical choice had to be made with regard to the ERD. These choices were important as they would minimize optimal flow of the program. We had to design stored procedures at the server side to decrease the load on the network instead of running SQL queries from the client. For some options this was not a big problem. Working in a test environment with limited data records resulted this problem to be easily overlooked and thus options had to be carefully considered. Imagination was needed to put the assumption in place. Many scenarios had to be considered to decrease to project size from ambitious to feasible.