

PoinTech

Loyalty Rewards System

CIS 3365

Contents

[Project Executive Summary 1](#_Toc133422432)

[Business Case 2](#_Toc133422433)

[Project Approach 5](#_Toc133422434)

[Project Solution 6](#_Toc133422435)

[Testing Process 7](#_Toc133422436)

[Project Improvements 9](#_Toc133422437)

[Project Maintenance Issues 10](#_Toc133422438)

[Lessons Learned 11](#_Toc133422439)

[References 12](#_Toc133422440)

[Project Summary 13](#_Toc133422441)

[Loaded Database Data 14](#_Toc133422442)

# Project Executive Summary

Problem Statement

The Cellar Door is a wine bar located in Katy, Texas, which needs a better way of keeping track of customer information and handling reward points. Currently, this is done manually by hand with forms that a customer prints out, fills out with their information, and turns it in. This is then manually entered into an Excel file.

Objectives

The final goal of this project is to provide an application to give automation for recording customer information and handling customer reward points. Some key features to accomplish this include:

* Using an AWS (Amazon Web Services) Database to handle automated inputting of customer information.
* Designing a UI interface for customers to use when inputting information.
* Also using said AWS Database for keeping track of customer point totals and items points are applicable towards.

Challenges

Some challenges that are noticeable are one main computer that the business uses, and it is slightly outdated.

Database Design Activities

Our group came to our current database solution with the accompanying GUI based on the business rules provided by The Cellar Door and found that using an AWS Database would best suit the business’s needs. We also concluded that using a simple GUI to not confuse customers would be best as well.

# Business Case

|  |  |  |  |
| --- | --- | --- | --- |
| **Project Business Case** | | | |
| **Project Name** | Wine Club Reward Program | | |
| **Project Sponsor** | The Cellar Door | **Project Manager** | Tyler, T |
| **Date of approval** | September 2022 | **Last Revision Date** | March 17, 2023 |
| **Project Scope and Strategy** | The project is to create a customer sign-up page and rewards program for a winery. The sign-up page will be implemented on a website and will allow customers to provide their information. This information will be stored in a database for use in the rewards program. The rewards program will incentivize customers to make purchases at the winery by offering discounts, special promotions, and exclusive access to events. Customers will accumulate points based on their purchases, and these points can be redeemed as rewards. The project team will also be responsible for testing and debugging the system to ensure that it functions properly. Overall, the goal of the project is to create a user-friendly and effective rewards program that encourages customer loyalty and drives sales for the winery. | | |
| **Feasibility Study** | **Technical Feasibility​:**  Existing hardware is sufficient for adequate performance.​    **Operational Feasibility​:**  The new system will be user-friendly.  Member signup will be more efficient and effective.    **Economic Feasibility​:**  Benefits outweigh the total cost of ownership​.  There is no investment cost for hardware​.  Minimal personnel time needed for testing​.    **Schedule Feasibility​:**  The agreed new system will be finalized by May 2023. | | |
| **Project Benefits** | **Efficiency:**  All processes will return to the background. There will also be less human error by automating tasks.    **Sync:**  All data will be synchronized across all devices. Instead of the customer needing to go to the winery to access their information, they will be able to see all the information needed on their mobile device.    **Time/Money Saved:**  Since all data will be automated, staff will not be needed to add/edit all customer info in an Excel sheet. This will give The Cellar Door more time to grow their business instead of spending that time doing manual tasks. | | |
| **Operational & Development Costs** | **Operational Costs:**  **Project Scope:**  This project is not feature rich resulting in a moderate project, resulting in lower time to develop, test and deploy the software.  **Quality assurance:**  Testing and quality assurance will happen periodically over the development process resulting in additional resources and time. Dedicated 4 hours a month at $35 per hour. The resulting total cost is $140 per month.  **Maintenance & Support Cost:**  After the software is deployed, ongoing maintenance and support are required to ensure that it continues to function correctly. Dedicated 10 hours a month at $35 per hour. Resulting total cost is $350 per month.  **Total Operational cost per month = $ 490**  **Development Costs:**  **Team Size:**  We are working with a group of eight individuals all with different specialized backgrounds. Total hours of work per week is 15 hours.  **Labor Cost:**  The average labor cost for a systems/software developer is anywhere from $30-$40 per hour.  **Timeframe:**  This project is to be completed within an eight-month period resulting in Multiple pay period for labor costs of about 15 hours a week.  **Complexity:**  This project could be considered to have a moderate complexity resulting in a fair amount of cost. The complex cost for a project like this could be around $10,000.  **Total Development cost = $24,700** | | |
| **University of Houston Discount** | **Student Labor:**  28 weeks of labor at an average labor cost of $35 an hour for an average of 15 hours a week. Resulting total cost of labor is $14,700.  **Staff:**  32 weeks of labor from staff and 3 hours a week at $40 per hour. The resulting total cost of labor is $3,840.  **Total Discount = $18,540** | | |
| **Total Cost of Ownership** | Operational cost over 5 years = $29,400  Development cost after discount = $6,160  Total cost over 5 years = $35,560 | | |
| **Financial Viability** | The financial viability of the winery's customer sign-up page and rewards program project appears positive, with benefits outweighing the costs. The project is technically feasible and user-friendly, and the development and operational costs appear reasonable. The project is expected to increase customer loyalty and drive sales, potentially making up for the initial costs overall. However, actual costs and benefits may vary depending on numerous factors. | | |
| **Present Findings** | **Benefits**: Efficiency, sync, time/money saved  **Development Cost:** $24,700  **Operational Cost:** $490 per month  **Total Cost of Ownership:** $35,560 over 5 years | | |

# Project Approach

Our client’s database requirements posed an interesting and challenging approach. The first thing our team did was analyze their current processes, which include using an excel spreadsheet and manually transferring data into it, which is very inefficient. The first major decision we made was, rather than making use of an excel spreadsheet, to use an AWS Database to make keeping track of data more efficient. In addition, using an online app interface for customers to use to fill out their information and submit, where it will be interred in the database in the appropriate table. A similar process will be done for keeping track of customer points, where the employee will input an addition or deduction to a customer’s total through an online app interface that interacts with the database as well. These solutions seemed to be the most appropriate since The Cellar Door stated that they want the process of managing customer information and points to be automated to increase efficiency. Our group has also analyzed the possibility of using other avenues to achieve what The Cellar Door wants, but found these other options to be too costly, time consuming, or complicated for what the business’s needs are.

# Project Solution

How we met the cellar doors needs/ requirements for the database:

PoinTech designed the database based on the requirements we received from The Cellar Door by making use of an AWS Database as compared to a local Excel file like what they are using at present. In addition, providing an easily accessible online interface for customers to use.

Describe all required documents/forms/reports and explained how we met these needs:

One key document The Cellar Door needs and makes use of is their sign-up sheet, which is used for getting a customer set up with a membership. To meet this need, we are making use of an online form submission interface to take that info and insert it directly into the database.

We also had to take into account all the reports needed to gather information about customers, cashiers, point transactions, popular purchasable items, and the relationships between them. To meet this need, we are using query functions to generate the reports needed for the business to make informed economical decisions.

Describe some of the key database design decisions we made, and our thought processes throughout the project (more than 5):

* Creating 21 Tables – PoinTech found this to be an adequate number of tables to satisfy the needs of The Cellar Door.
* Creating a Point Totals table separate from Customers – This helps to keep point tracking clear and distinguished from the Customer table.
* Creating separate tables for each redeemable item – This helps to allow easier access to each item the wine bar offers, along with other relevant information to each item.
* Creating a table for point adjustments by cashiers – A table specifically to help not only make sure each point adjustment is accurate, but also to see which cashier carried out a point adjustment.
* Creating two tables for the wine club membership tiers and benefits – Intended to provide the information for both customers and staff about the various tiers and the associated benefits.
* Creating a table for database administrators – While not meant for customers, owners and other managerial staff members can see a list of the administrators that interact with the database, updating item information and other functions.

Create a detailed and ranked/ prioritized problems and requirements list:

Mandatory Requirements:

* The foundation of the database will be AWS.
* Train current staff and managers on how to use our system.
* Set a unique primary key to every member of the wine club such as ID.
* Make sure the rewards points are accumulated every month
* The system must be able to read and write Excel documents.
* Manipulation of customer points and discounts must be allowed only to manager level users.
* Migration of data from old system to new system.
* Membership registration must be available online.
* Customer must have the ability to input their information such as Phone number or name through the form of keyboard.
* When a customer is prompted to input information at the store his relevant data must be called properly.
* Create and test the system before putting the system into place.
* Automation of the member signup process.
* Automate the calculations of points earned and points rolled over to next month.
* Must have a user input interface for those with the permissions allowed to create and insert new discounts and offers as they wish.
* Computer analysis of client to determine if it can sustain our system.
* Build a database on premise in the form of mini server.
* System needs to have permission-based roles assigned to all users of system.
* Once a user submits information in the sign-in section of the website information must be stored on the database.
* All data needs to be stored safely and securely.

Key Requirements:

* Create a clean and simple user interface for both members and employees for ease of use and minimize mistakes
* Implement input, processing, and output controls (data validation). Test to ensure basic data validation is in place (for example, member phone number field should only accept numerical values).
* Out of scope – Allowing wine club members to log on to the website and update their credit card information on file.
* Define backup procedures. Database backups and offline backups. How often will database backups run; will they be run automated or manually.
* Ensure system has a user activity audit trail, a system log of all administrative and user actions that have occurred. This will be helpful when troubleshooting.
* The system must have tags to represent each discount.
* Present the different membership types and their benefits received to the customer, along with the spent dollar point earned ratio.
* Maintenace schedules for maintaining the program.
* Build resilience into our system to make sure all data is kept safe and accessible.
* Only required information such as customer Address, Email, Phone Number, Name should be asked for. No additional information pertaining to the customer must be stored.
* Get customers to keep coming back.
* Analyze the general business functions and their database needs.
* System user management and authentication - Create separate user accounts for the winery employees to login. Different levels of role access may be used by different employees. (For example: admin, super user, and user). Define user login parameters: password requirements (minimum length, complexity, how often it needs to be changed).
* Work to retain existing customers.
* The business side of the system must have a proper design for navigation.
* Identify all data types that are going to be used and how to use them to our advantage.
* Allow the system to be able to be changed or added to with relative ease.
* Create a system strong enough to be able to handle multiple users signing up and accessing data simultaneously.
* Evaluate where, how and where we can improve our system.
* Build positive relationships.

Desirable Requirements:

* Allow membership cancelation from users account as an option.
* Track customer birthdays and send coupons as birthday gifts to encourage business.
* Get the winery name out to more potential customers.
* Coupon Management System to motivate customers to return.
* Use customer data to send reminders of events that may be held at the winery.
* Allow 24/7 access for customers and employees to access user accounts.
* Send redeemable items to loyal customers that have held membership status for some time.
* Have built in analytics to show reports regarding customer subscription and other metrics.
* Built in marketing system to allow members to be reminded of rewards/offers they have.
* Develop reports – 1) Member listing by membership level, 2) Member listing by location, 3) List of members whose membership is ending soon, or their credit card is expiring
* Sign-up authentication from users such as digital signature as a precaution.
* Implement a member referral link system that current members can share and both the member and recipient both get benefits from.
* Counter or tracker that shows the age of membership status.
* In-store sign-up Kiosk
* Digital receipt of points accumulated and used.
* Use customer data to put the most popular redeemed rewards as the first thing seen by the customer.
* Have filtered views for any metrics and information.
* The theme of the overall system must match the business desired color scheme.

# Testing Process

Our main testing methodology included the data, queries, and the GUI (graphical user interface).

**Testing Data**

Testing the data for accuracy, completeness, and validity was our primary focus. We compared the ERD and the data dictionary to our database tables and configuration. The existing data was stored on an Excel spreadsheet. The old wine customer loyalty system, an Excel spreadsheet, can export data in an acceptable format (ODBC) for the new database. To load the data, we copied the excel file on the external hard drive. Then we used SQL commands and the SQL Server import wizard to load the data from Excel spreadsheet file to the database.

During the data load process, input controls were maintained to ensure that data remains reliable. For example, member name, mailing address, email address, and phone number would be best as data type “string.” Other fields such as birthdate and credit card expiration date should remain in a “date” format, or else the data will become useless. Some fields may require “integer” data type, such as the member’s number of points they must redeem wine. In addition, the developers will put controls in place to ensure that The Cellar Door member data remains secure and that only developers should have access to this data during the conversion process. Since this system is hosted on AWS (Amazon Web Services), the security protocols are already established ensuring the data is safe. Leaking member information would be a huge risk to The Cellar Door’s reputation with their members and potential future customers.

We reviewed the data to determine what data cleanup needs to be performed. For example, if the member's first name and last name are in the same cell, we separated them into separate cells. In addition, we reviewed the data to ensure there were no non-printable characters. We also looked to make sure all the phone numbers are integers and not letters, etc. After importing the data into the database, we reviewed data integrity to ensure that all the data is correct, complete, valid, and properly restricted. Any errors identified were investigated and corrected. We compared the two data sources (spreadsheet and database) to ensure that they match. We also looked for any missing data and corrected it. These steps are particularly important to ensure the new system has accurate, error-free data. After completing data cleanup, we converted the data into relational tables and normalized the data.

**Testing Queries**

Our next step was to create queries based on the data and ensure that the reports were correct and showed the desired result. When we initially ran the queries, we ran into numerous errors and duplicate data. This was an indication that our table joins were not set up properly. Once we corrected the primary keys, foreign keys, field names, and joins, the query results were accurate.

**Testing GUI**

Our third step was to test the GUI and make sure it was user friendly. We tested the main screen to ensure all the buttons and links worked.

**Results of Testing**

Testing the data did not reveal many issues with the data. However, testing the queries uncovered many issues with the configuration of the tables and the joins. The SQL commands had to be rewritten, to specify joins within the tables. One of the tables had one data field with the wrong data type, it had a different data type than the connecting table. We met together as a team to review the ERD and our intended results in the reports. We corrected the foreign keys to ensure all the tables were connected correctly. After correcting all the issues identified by testing, the reports ran correctly, and the GUI was smooth and easy to use.

# Project Improvements

**High Priority Improvements:**

The most critical improvements for The Cellar Door revolve around streamlining customer data management and reward point tracking. Implementing a robust, cloud-based database solution like AWS will enable efficient data storage and retrieval, eliminating manual data entry and reducing the risk of errors. Additionally, designing a user-friendly interface for customers to input their information directly will significantly reduce the burden on staff and minimize data entry mistakes. Integrating the reward points system with the database will ensure accurate tracking of customer point totals, making it easier for customers to redeem points and encouraging repeat business.

**Medium Priority Improvements:**

After addressing the primary concerns of data management and reward points, The Cellar Door should consider improving customer engagement by implementing a mobile app or responsive web app. This would provide customers with a convenient way to access their rewards account, view their point balances, and receive personalized offers. Additionally, offering a digital menu with up-to-date inventory and wine recommendations based on customer preferences could enhance the overall user experience and foster customer loyalty.

**Low Priority Improvements:**

Once the high and medium priority improvements are addressed, The Cellar Door could focus on refining its operational efficiency and aesthetics. Upgrading the business’s main computer system would improve overall performance and facilitate smoother integration with the new customer management system. Furthermore, investing in a modern, visually appealing design for the UI and in-house digital displays could elevate the brand image and create a more cohesive, enjoyable experience for customers. These low priority improvements would serve to further differentiate The Cellar Door from competitors and solidify its reputation as a premier wine bar destination.

**Optional Priority Improvements:**    
   
To end most improvements needed, The Cellar Door could also improve the operating systems on all their devices and ensure everything is updated to make final improvements and ensure the best transition possible.

# Project Maintenance Issues

**Data Cleanup Issues:**

When it comes to the life of our reward system that we have made for our client there are many things that must be maintained for it to function as planned, one of them being data clean-up. With any database data is the most important thing and over time data can become messy and unreliable without the proper care and maintenance. As we work to transfer all their current data from their legacy system we plan to scrub through the data and clean as we go fixing all imperfections. Along with the cleaning of the data we aim to format the data to fit our database and tables that we created to allow for a seamless and functional transfer of data.

**Data Backup and Recovery Issues:**

Data can be anything and everything, this data can be used in countless ways to help gain insight thus making data a precious resource that should have many fail safes in place in case of a catastrophe. With this in mind, we plan to allow the database to be backed up for safety reasons. We aim to have a main back-up that is on a local device in the store that will back up daily to insure safe keeping of the data. Along with the daily backups that happen locally we also plan to have weekly backups that back up into a private cloud to allow for redundance in the back-up process. With these two backups in place if any issue were to happen to the system in any way it would be easy for a recovery of data to take place.

**Database Index Repair Issues:**

As with any software the longer it runs the more bugs pop up and maintenance needs to be done, with the implementation of our system we are allocating time specifically for this issue. As bugs in the system show their face, we plan to look at the bugs to see how we can fix them and if we cannot see how we can work around them to allow for the system to work properly. This data base is also going to use to run ass sorts of queries to gain business insight which means data retrieval operations on database tables is going to be a primary use case of our system. Once a large amount of data in acuminates the run time for data retrieval is going to go up, this is where data indexes come in., we plan to allocate for this in advanced but if this every become a pressing issue we will perform maintenance and work on the data indexing.

**SLA Issues:**

Service level agreements is something that we have talked about with our client, we have come to the decision that we will allocate time to training all users of the system. This includes all functions needed in daily tasks and the harder tasks like queries. We are also allocating time for technical support beyond the initial training in case of any questions or concerns that our client has about our system.

# Lessons Learned

**What Worked:**

The implementation of an AWS database proved to be an effective solution for The Cellar Door's customer information and reward points management. The user-friendly interface simplified the data input process and reduced errors from manual data entry. Additionally, integrating the reward points system with the database significantly improved tracking accuracy and enhanced the customer experience, leading to increased repeat business and loyalty.

**What Did not Work:**

One challenge faced during the project was the integration of the new customer management system with the business's outdated main computer. This issue led to occasional performance bottlenecks and limited the efficiency gains from the new system. Moreover, while the simple GUI design catered to the customers, it did not entirely align with the upscale aesthetics of the wine bar, which could impact brand perception.

**What Would Be Done Differently:**

What we oversaw as a team was how it would have been beneficial to prioritize upgrading the main computer system before implementing the new customer management solution. This would have ensured seamless integration and better system performance. Additionally, a more concerted effort to align the GUI design with The Cellar Door's brand identity would have resulted in a more cohesive and visually appealing customer experience.

# References

“Design and Prototyping Tool for Web and Mobile Apps.” *Justinmind*, <https://www.justinmind.com/?k=justinmind&a=295677078132&adg=23874442871&cmp=323175791&match=e&adposition=&utm_medium=cpc&utm_source=google&utm_campaign=323175791&utm_term=justinmind_e&gclid=CjwKCAiA7IGcBhA8EiwAFfUDsQtBQtxQR8OGtP_9iZz-F6UnUgGRB3vvazI0lR6HlXQ5Ny14G27BjRoCDSoQAvD_BwE>.

 “Log in to Access the Lucid Visual Collaboration Suite.” *Lucid Visual Collaboration Suite: Log In*, <https://lucid.app/users/login?returnUrlOverride=%2Flucidchart%2F4e9dc74b-e017-413f-ad26-20860cf40bd3%2Fedit%3FinvitationId%3Dinv_feaa4f57-45d8-4122-8cdd-83de453baff8%26page%3D0_0#/login?referredProduct=lucidchart>.

*Free Design Tool: Presentations, Video, Social Media | CANVA*. <https://www.canva.com/>.

 “At Creately, We Help More People Work and Collaborate Visually.” *Creately*, 17 July 2020, <https://creately.com/about-us/>.

*Rules for data flow diagram* (no date) *GeeksforGeeks:*

<https://www.geeksforgeeks.org/rules-for-data-flow-diagram/>.

# Project Summary

At the start of this project, we were tasked with finding a local company and conducting a business analysis of the company to find out what current process the use could be hindering their ability to function better. We found many companies that fit the picture but finding a company that was willing to cooperate was much more difficult until we found The Cellar Door.

  We tasked ourselves with developing a customer rewards program for The Cellar Door. The current rewards program was operated manually, which made it inefficient and time-consuming for the staff to manage. Our team's goal was to develop a new program that was automated, more efficient, and user-friendly for the customers.

  To achieve this goal, your team designed a new rewards program that was based on a point system. The customers could earn points for various actions, such as purchasing wines, attending events, or referring friends to the winery. The customers could then redeem their points for rewards, such as discounts on future purchases, exclusive events, or wine tastings.

  To support the new rewards program, your team also created a database using MySQL. The database allowed for the program to run automatically and track the customers' points and rewards. It also enabled the winery staff to manage the rewards program more efficiently and effectively, as they could easily access the customer data and update the points and rewards as needed.

  Overall, your team's project resulted in a new customer rewards program that was more efficient, automated, and user-friendly than the previous one. The database also made it easier for the winery staff to manage the program, saving them time and effort. The winery could now provide a better customer experience with the new rewards program, which could help increase customer loyalty and drive sales.

# Loaded Database Data

