

Martin Cleaners  
Database Management System

*Mavs*

*Christopher Kozeny*

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*Erik Eiler*

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*John Manzo*

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*Joe Cremeens*

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*Shafiq Jahish*

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July 8 – August 9, 2019

University of Nebraska at Omaha

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# Milestone 5

**Milestone Manager – Shafiq Jahish**

July 8, 2019 – July 13, 2019

**Milestone 5**

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**Martin Cleaners Database Management System**

## ROLES AND RESPONSIBILITIES MATRIX



**Department:** Operations

**Product/Process:** Inventory, Invoicing, Contractors, Clients

**Document Owner:** Shafiq Jahish

**Project/Organization Role:** Milestone Manager

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Change Description |
| 1.0. | 07/08/2019 | Shafiq Jahish | Initial release. |



| **Title** | **Role** | **Responsibilities** |
| --- | --- | --- |
|  | The Project Manager is responsible for developing, in conjunction with the Project Sponsor, the project charter. The Project Manager ensures that the project is delivered on time, within budget, and to the required quality standards. | * Manage and lead the project team. * Develop and maintain a detailed project plan. |
| CJ Kozeny | CJ will be responsible for Tracking Gantt chart, which will record the “guesstimates” of time frames and record the “actual” time frames. CJ will also work with John to contribute to the ERD. | * Tracking Gantt Chart * Contribute to ERD |
| John Manzo | John will work on the Entity Relationship Diagram and the full relationship diagram. | * Entity Relationship Diagram * Full Entity Relationship Diagram |
| Shafiq Jahish  Milestone Manager | Shafiq is the manager for this milestone. Shafiq will be doing the milestone managing activities. Shafiq is responsible for RRM, and Running Document. Shafiq Jahish will also work with John to contribute to the ERD. | * RRM * Running Document * Contribute to ERD |
| Erik Eiler | Erik manages documentation of the daily workings of the team. He will also work on the Change Log, Email Log and Issue Log. Erik will also work with John to contribute to the ERD. | * Change Log * Email Log * Group Meeting Minutes * Issues Log * Contribute to ERD |
| Joe Cremeens | Joe leads the client documents for this milestone. This includes creation of an opening statement, executive summary, client implications, and items for approval. Contact with the stakeholder is constant and the ability to adapt is essential. Joe will also work with John to contribute to the ERD. | * Client Documents * Contribute to ERD |

## Milestone Change Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Rev. No.** | **Change** | **Reference Sections** |
| 7/9/19 | 1.0 | Created Roles and Responsibilities Matrix | Control Documents |
| 7/9/19 | 1.0 | Created Entity Relationship Diagram | Entity Relationship Diagram |
| 7/10/19 | 1.0 | Created Client Documents | Client Documents |
| 7/10/19 | 1.1 | Reformatted and corrected relationships | Entity Relationship Diagram |
| 7/10/19 | 1.2 | Added the Usage Line and Purchase Line entities | Entity Relationship Diagram |
| 7/10/19 | 1.3 | Removed the Account Receivable and Account Payable entities | Entity Relationship Diagram |
| 7/11/19 | 1.4 | Added Inventory Type attribute to Inventory, added a discriminator to the categorization relationship | Entity Relationship Diagram |
| 7/11/19 | 1.0 | Created Full Relational Database Design | Full Relational Database Design |
| 7/11/19 | 1.1 | Fixed data types, added input masks, added descriptions | Full Relational Database Design |
| 7/11/19 | 1.1 | Rewrote the document descriptions to not include technical jargon, fixed Items for Approval | Client Documents |
| 7/11/19 | 1.0 | Created Project Management Chart | Project Management Chart |
| 7/11/19 | 1.1 | Added missing relationships and tables | Project Management Chart |
| 7/11/19 | 1.2 | Added dates and baselines | Project Management Chart |
| 7/11/19 | 1.3 | Added durations | Project Management Chart |
| 7/11/19 | 1.4 | Minor changes to durations | Project Management Chart |
| 7/12/19 | 1.0 | Created Email Log | Meeting Communications |
| 7/12/19 | 1.0 | Created Meeting Minutes | Meeting Communications |
| 7/12/19 | 1.0 | Created Change Log | Control Documents |
| 7/12/19 | 1.2 | Changed descriptions of ERD and FRDD | Client Documents |
| 7/12/19 | 1.1 | Added a meeting | Meeting Communications |
| 7/12/19 | 1.1 | Added final document changes | Change Log |

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**Martin Cleaners Database Management System**

## Client Documents



### Opening Statement

Milestone 5 for Martin Cleaners Database Management System has been completed. The systems development project continues to remain on time and on budget.

### Executive Summary

Milestone 5 is the beginning of the final half of this project and provides the following documents: Entity-Relationship Diagram, Full Relational Database Design, Project Management Charts, Client Documents, and the Meeting Communications & Control Documents.

**Milestone 5 documents include:**

* **Entity-Relationship Diagrams (ERD)**
  + A diagram that lays the base foundation for the database to be designed. This is where we look at how the business functions from a basic standpoint. For example, you have clients that make appointments. Clients have names, phone numbers, and email addresses. Appointments have start and end times, costs associated with each appointment, and statuses such as incomplete or complete.
* **Full Relational Database Design (FRDD)**
  + The FRDD is where we take the data from the ERD (such as clients and appointments) and create an environment for the data to be stored, used, and reported with in a way that is performed effectively and reliably.
* **Project Management Charts (PMC)**
  + Contains the Gantt Chart, which shows the tasks to be completed and the estimated time of completion. The Tracking Gantt Chart tracks guestimate timeframes (“a best guess start” with “a best guess” finish) and actual timeframes (the actual start and finish times), along with detailing the differences between them (otherwise known as the variance) and who is responsible for each item within a given timeframe.
* **Meeting Communications & Control Documents**
  + Meeting Communications & Control Documents include any communications between team members, along with any changes that arise during the project through a Change Log. Our Roles & Responsibilities matrix is included as well, which details the specific responsibilities of every project member.

### Implications for the Client

Milestone 5 has no additional implications for the client.

### Items for Approval

**Items for approval are:**

* No items to be approved by the client.

# Milestone 6

**Milestone Manager – John Manzo**

July 15, 2019 – July 20, 2019

**Milestone 6**

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**Martin Cleaners**

**Database Management System**

## ROLES AND RESPONSIBILITIES MATRIX



**Department:** Operations

**Product/Process:** Clients, Vendors, Inventory, Invoicing, Reports

**Document Owner:** John Manzo

**Project/Organization Role:** Milestone Manager

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Author** | **Change Description** |
| 1.0 | 07/15/2019 | John Manzo | Initial release |



| **Title** | **Role** | **Responsibilities** |
| --- | --- | --- |
| Dr. van Vliet | The Project Manager is responsible for developing, in conjunction with the Project Sponsor, the project charter. The Project Manager ensures that the project is delivered on time, within budget, and to the required quality standards. | * Manage and lead the project team * Develop and maintain a detailed project plan |
| John Manzo Milestone Manager | John is the manager for this milestone. He will work to keep tasks on schedule, help alleviate any impediments, facilitate collaboration, and compile the running document. John will also complete the RFP document for soliciting vendor bids for hardware purchases and assist Erik with I/O and interface design elements. | * Roles and Responsibilities Matrix * Running Document * Contribute to Computer Architecture Design documents (RFP) * Contribute to I/O and Interface Design elements |
| CJ Kozeny | CJ will be responsible for updating the Project Management Gantt Chart, which will include task assignments, initial estimates of task durations, and end-of-milestone actual task durations. CJ will also document the Project Sponsor’s existing architecture and develop a hardware procurement process. | * Updated Project Management Chart * Contribute to Computer Architecture Design documents (architecture and procurement) |
| Shafiq Jahish | Shafiq will handle all facets of the systems control plan. This includes identifying potential threats, defining specific control processes and policies, and crafting a disaster recovery plan. | * Comprehensive Systems Controls Plan (all sections) |
| Erik Eiler | Erik will document all group communications (meetings and emails), track file versioning throughout the review/approval process, and log any problems the group encounters. He will also complete the I/O and interface design elements with assistance from John. | * Email Log * Group Meeting Minutes * Change Log * Issues Log * Contribute to I/O and Interface Design elements |
| Joe Cremeens | Joe will craft the Client Document specific to this milestone. The document will include an opening statement, executive summary, the milestone’s implications for client operations, and any items which will require explicit Project Sponsor approval. | * Client Document (all sections) |

## Milestone Change Log

| **Date** | **Rev. No.** | **Change** | **Reference Sections** |
| --- | --- | --- | --- |
| 7/15/19 | 1.0 | Created Roles and Responsibilities Matrix | Control Documents |
| 7/17/19 | 1.0 | Created Interface Design | Input/output and Interface Design |
| 7/17/19 | 1.0 | Created Request for Proposal | Request for Proposal |
| 7/17/19 | 1.0 | Created Client Document | Client Document |
| 7/18/19 | 1.1 | Added buttons and a menu, adjusted report for printing | Input/output and Interface Design |
| 7/18/19 | 1.1 | Added description to Computer Architecture, Control Plan, and I/O sections, changed items for approval | Client Document |
| 7/18/19 | 1.1 | Assigned John as intermediary, added the team as the role of developers | Request for Proposal |
| 7/18/19 | 1.0 | Created Computer Architecture | Computer Architecture |
| 7/18/19 | 1.5 | Added Milestone 6 to Gantt chart | Project Management Chart |
| 7/18/19 | 1.0 | Created Control Plan | Comprehensive Systems Control Plan |
| 7/18/19 | 1.1 | Completed the rest of the controls | Comprehensive Systems Control Plan |
| 7/18/19 | 1.2 | Added input masks and data types to data entry controls, Added specifics to software and access controls | Comprehensive Systems Control Plan |
| 7/19/19 | 1.3 | Added the controls associated with having a backup | Comprehensive Systems Control Plan |
| 7/19/19 | 1.0 | Created Email Log | Meeting Communications |
| 7/19/19 | 1.0 | Created Meeting Minutes | Meeting Communications |
| 7/19/19 | 1.6 | Updated times for tasks | Project Management Chart |
| 7/19/19 | 1.0 | Created Change Log | Control Documents |

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**Martin Cleaners Database Management System**

Client Documents



### Opening Statement

Milestone 6 for Martin Cleaners Database Management System has been completed. The systems development project continues to remain on time and on budget.

### Executive Summary

Milestone 6 is the second part of the final half of this project and consists of the following parts: Updated Project Management Chart, Computer Architecture Design, Comprehensive System Controls Plan, Input/Output and Interface Design, and the Meeting Communications & Control Documents.

**Milestone 6 documents include:**

* **Project Management Charts (PMC)**
  + Contains the Gantt Chart, which shows the tasks to be completed and the estimated time of completion. The Tracking Gantt Chart tracks guestimate timeframes (“a best guess start” with “a best guess” finish) and actual timeframes (the actual start and finish times), along with detailing the differences between them (otherwise known as the variance) and who is responsible for each item within a given timeframe. Updated tasks and estimates are provided for milestone 6.
* **Computer Architecture Design (CAD)**
  + The CAD phase includes the Request for Proposal (RFP) for vendors and the process of procuring the client’s hardware for the system’s architecture. The architecture for the system is based on what’s needed to get the system up and running. In this case, the client’s computer is enough for the Access database that we’re working on for this project.
  + **Request for Proposal (RFP)**
    - The RFP is the process of the client asking vendors for the best architecture for their system’s needs. It’s not the necessarily the best architecture available, so it won’t be too costly, it’s only the best architecture that sufficiently meets all the needs for the system and the business to function correctly.
* **Comprehensive System Controls Plan (CSCP)**
  + The CSCP is an outline that details various problems that the system might run into, including software threats, access threats, and hardware threats. Each threat is met with a control aimed at dealing with each respective threat. How do you deal with physical threats to the system (such as weather or fire damage)? How do you deal with unauthorized access (either through theft of the system or through someone somehow gaining unauthorized access)? We take into consideration these possible threats and make sure there is a control in place to handle situations such as those.
* **Input/Output and Interface Design (I/O & ID)**
  + The I/O & ID is the interface for the system, that takes in information from the user and outputs any relevant information back to the user. Information that can be taken from the user include things like appointment information and customer information. Information that can be outputted back to the user can include things such as supplies remaining and cost of supplies. The interface will be designed in such a way that the user shouldn’t have any issues operating it, while being able to perform any needed operations that the system has to offer. To this end, the interface will be designed in such a way that it will be easy to operate and understand the functions of each menu item, while reducing the opportunity to input incorrect data into the system through the use of pre-defined options (drop-down menus for example).
* **Meeting Communications & Control Documents**
  + Meeting Communications & Control Documents include any communications between team members, along with any changes that arise during the project through a Change Log. Our Roles & Responsibilities matrix is included as well, which details the specific responsibilities of every project member.

### Implications for the Client

Milestone 6 has no additional implications for the client.

### Items for Approval

**Items for approval are:**

* Feedback on the design of the system’s interface

**A close up of a logo

Description automatically generated**

**Martin Cleaners**

Computer ARCHITECTURE Design



### Actual Architecture

Martin Cleaners currently does all of its record keeping and record management either on paper or on centrally located, single workstation. Their current architecture design consists of a single Windows machine, operating on the latest Windows 10 operating system. The specifications of the hardware seem to be on par with or exceeding the requirements needed for the newly implemented database management system. The current unit boasts a 2.7 GHz, 6-core processor with 16 GB of RAM. There is over 400 GB of available storage on the machine, and the company uses a display monitor with 1920x1080 resolution.

Additional components may be needed in order to support the system update. The requirements of the system to be implemented are not terribly extensive. The minimum requirements are as follows:

* 1 Workstation
* 1.6 GHz, 2-Core Processor
* 4 GB of RAM
* 4 GB of Internal Storage
* 1 TB of External Storage
* Display Resolution of 1280x768

### Hardware Procurement Process

In terms of hardware, Martin Cleaners will have a need for additional External Storage. The formal process for Martin Cleaners in obtaining new hardware is straight forward and easy to manage. Being a one-woman team, she typically goes to the closest chain tech store and purchases what she needs. In this instance, only needing a single external hard drive, we will likely follow the same procedure in acquiring this device.



**Martin Cleaners**

### REQUEST FOR PROPOSAL



#### Introduction

Martin Cleaners (“The Client”) is a commercial and residential cleaning service based in Omaha, Nebraska. The Client is preparing to implement a database management system (DBMS) application to manage all facets of their daily operations and permanently store their business data. The Client’s operational needs include tracking customer, service appointment, inventory, receivables and payables, and vendor information. Additionally, the Client will periodically generate a variety of reports to gauge their performance over time.

The DBMS application is being developed by a group of five University of Nebraska at Omaha students known as “The Mavs.” John Manzo is a member of this group and will serve as the intermediary between bidding vendors and the Client.

This Request for Proposal (RFP) document is an invention to submit a bid to the Client by way of their intermediary and with the intent to enter into a contract with Client for providing a hardware system and an ongoing support/service solution capable of meeting their processing, storage, usage, and communications demands and accommodating anticipated annual growth throughout the proposed system’s lifecycle.

The subsequent sections of this RFP detail the client’s timetable, proposal ground rules, technical and service requirements, the bid evaluation process, and proposal submission instructions.



#### Standards and Instructions

Martin The schedule of events leading to a contract with the client is as follows:

RFP Date of Issue: 20 July 2019

Vendor Bid Deadline: 27 July 2019

Contract Award Date: 03 August 2019

Date of System Implementation: 10 August 2019

Prior to the vendor bid deadline, vendors may contact the Client’s intermediary, John Manzo, with any questions specific to this project. Manzo may be reached by email at [jmanzo@unomaha.edu](mailto:jmanzo@unomaha.edu) or by telephone at 402-555-1234 on weekdays from 9am-5:30pm CST.

The client only assumes financial responsibility for any hardware and support/service agreement cost associated with this RFP. The bidding vendor assumes all other costs, including but not limited to, proposal preparation and bid overruns exceeding 10 percent of the bid estimate.

Vendor proposals will be accepted in PDF format by the Project Manager via email. Proposals must include itemized pricing, hardware brand names and model numbers, the expected system lifecycle (in years), annual pricing for ongoing hardware support and service, and a payment schedule for the Client. Vendors may submit multiple bids.

The vendor whose bid is selected is expected to enter into a binding contract with Client. The terms of the contract will include vendor delivery on all agreed to hardware and services, payment terms to be honored by the Client, and will initially extend for six months (until 03 February 2020) before being considered for renewal.

Vendors must include no fewer than three references, with phone and email contact information, from customers they have serviced in the past six months. Vendor references should comprise customers that have entered into similar agreements as the one they are proposing to the Client. Vendors should expect the Project Manager to contact these references. Proposals which do not include references will not receive consideration.

Additionally, any products the Client purchases must be accompanied by their respective OEM user and technical manuals.



#### Requirement and Features

Proposed hardware solution(s) must meet the following criteria:

**Processing Volume**

The Client conducts an average of 10 DBMS transactions per eight-hour workday and anticipates a 10% annual growth rate each year for the next three years.

**Storage Volume**

The Client currently requires 100 KB of raw data storage and anticipates an annual growth rate of 110% each year for the next three years.

**Usage Volume**

The proposed system needs to support a one user at a time.

**Communications Volume**

The Client’s DBMS application generates an average of four 50 KB email communications per eight-hour workday.

**Software Compatibly**

The proposed system must be compatible with 64-bit versions of Microsoft Windows 10 Home Edition and Microsoft Access 2019.

**Services**

The proposed system must include a 30-day vendor return policy and one-year manufacture (or vendor) warranties for all components. Acceptable ongoing system support methods should include phone, email, and remote desktop access. Any system service or repairs must be conducted at the Client’s workplace in Omaha, Nebraska.



#### Bid Evaluation

Martin Vendor bids will be evaluated using the following criteria:

**Technical Evaluation**

A proposed system must be capable of responding to transaction requests in 0.1 seconds of less. The system must be able to backup all Client’s data externally each day. The Client must be furnished with step-by-step data backup and recovery instructions. The system’s anticipated lifespan should be no less than three years. In addition to meeting the software compatibility needs detailed in the previous section, the system should also accommodate word processing, spreadsheet, and web browsing functions, with negligible performance lag, while the Client’s DBMS application is simultaneously running.

**Vendor Evaluation**

The vendor must be physically located in the Greater Omaha, Nebraska metropolitan area, been in business for a minimum of three years, and have an A+ rating from the Better Business Bureau. On-going support and service agreements, if outsourced, must be through organizations that meet those same requirements. Vendor bids will receive favorable consideration if they offer return policies and and product warranties exceeding the minimum lengths specified in the previous section.



#### Conclusion / Call to Action

Martin Vendors are invited to bid any time between the receipt of this RFP and the bidding deadline. Bids received after 27 July 2019 will not receive consideration.

Bids are to be sent via email to the Client’s intermediary, John Manzo, in PDF form. Manzo’s email address is [jmanzo@unomaha.edu](mailto:jmanzo@unomaha.edu).



**Martin Cleaners**

Comprehensive Systems Control Plan



* Introduction
  + Purpose of control plan is having a quality product that will meet the end user needs and requirements. This control plan will explain different threats that the user of the application might face, and the plan will explain different ways of how to control these threats. A threat is any type of activity or incident that leads to data loss through disruption of normal business operations. In the next sections we will explain common threats such as data entry threats, output threats, database threats, access threats, software threats, hardware threats, and the control plans for these threats.
* Data Entry Controls
  + Data entry is an important part of every organization. One of the biggest threats that data entry can face is typo. We all sometimes have those fat fingers that make mistakes while entering data.
  + Typos happen when employees are overloaded and there are long and complex words so we can have drop down boxes for common data entry options that can be selected from a list. We can also limit each box to specific data types to be entered in each field. Before processing the data, make sure you double check the data to see that they are accurate.
  + Another data entry threat is skipping a required field. We are always in a hurry when entering data or completing a form.
  + Associated data entry control. Put requirements on the fields that needed to be completed. Make sure that users can’t submit their forms unless all fields are complete.
* Output Controls
  + Output threat is who has access to the output. For example, where are the printouts laying? These printouts might be an invoice, or payment receipt that will contain and individual or business personal information such name, address, phone number, credit card number, etc. Your computer screen is also a threat so make sure you don’t let anyone look at it.
  + Associated output control is that we have to make sure that the printers are located in a secure place so that customers or other individuals don’t walk by them and have access to them. Since Martin cleaner is a one-person business, make sure the printer and all printed paperwork is located near the owner so that she is the only person that can access them. Computer screens can be protecting by where you set in the office. Make sure that the screen is facing the wall and there is no window behind you.
  + Another output threat is the large number of printouts that organization needs to send them out. For example, Martin Cleaners would be printing large number of invoices every two weeks or at the end of the month.
  + Associated output control. These printouts have to be stored in locked cabinets and if there are printouts that are no longer needed, we would need to shred them. Make sure you don’t through invoices and other papers with personal information into the trash can, because there are people who come around and collect your trash in order to acquire personal information and use them for identity theft and wrongdoing purposes.
* Database Controls
  + Limited security expertise and education is a huge threat for users that don’t know a lot about technology or don’t stay up to date with cyber security threats.
  + Associated database control for this threat will be to have an education and awareness for Sheri Martin. We will be able to talk to Sheri about security threats that might be a risk for the database management system. Since previously most of the client information was on paper based, she was only concerned about the physical loss of the data, but we will now educate her about cyber security threats that might result in the loss of data.
  + Another database threat is what if a security threat hits the system or if someone steals the computer or the building is on fire so there will be a data loss? We should have a plan B to make sure we have the data.
  + Associated database control for this threat will to regularly backup data. Backup can be done on daily basis if there are many transactions every day or you can backup your data on weekly basis if there are only a few transactions every week. The backup data must be stored in a separate place away from where the database is located, because if the building burns down, you should have another way to recover the data from where the backup is. Since Martin Cleaners doesn’t have a lot of transactions on daily basis, a weekly backup will be enough to make sure all data is safe. Since this is standalone business, the owner will be responsible to backup the data to a hard drive at the end of the week since she doesn’t have a lot of transaction happening on daily basis. Since Sheri is running the business from her house and she doesn’t have an office to keep the database at one place and the backup at another place, we wanted to go with cloud storage such as a Google drive. Her database will be only a few MBs so she can easily put it to Google drive free of any charge.
* Access Controls
  + Access threat is someone illegitimate and unauthorized gets access to the system.
  + Associated access control for this threat will be for user to have log in to access the computer and the database. This will be two layers of authentication to have separate log in for the computer and user ID and password to access the database. They would need to pick a strong password and change it regularly.
  + Another access threat is that who is legitimate in the organization that can have access to the database system and to what extent.
  + Each employee should have limitation on their access to the database and they should have enough access to the database to perform their assigned tasks with it. Since Martin Cleaner is a standalone business and will be run by one person, so access to the database has to be granted to only one person.
* Software Controls
  + One of the biggest threats facing software these days is hacking. We all could see that there is new hacking news every day. You might be thinking that hackers are after big companies, but there are small hackers that target small businesses such as Martin Cleaners.
  + In order to control this threat, you would need to update the software regularly to make sure the software patches are updated and there are no vulnerabilities in the software. Be aware of these threats and don’t fall in for the scammers that would want to get access to your system.
  + Software can be target for all types of malicious actions. For example virus, worm, Trojan horse, malware, spyware, etc. These might happen to you by installing malicious software from the internet. You might be thinking that I have this free software and I should install, but be careful with it.
  + Associated software control for these threats will be to have an updated antivirus, firewall is set up to block any cyber security attacks, and make computer is regularly scanned for these threats. Sheri currently has a NAT firewall on her router. She also uses the windows firewall and windows defender on her computer. Sheri has to make sure that she doesn’t install free software that she doesn’t know where they come from, because most likely they are used for malicious purposes.
* Hardware Controls
  + Hardware physical attacks are the biggest threat against any hardware. People could physically attack your hardware and try to comprise, destroy or steal your computer.
  + Associated hardware control for this threat is to make sure that the computer containing the database and other data is under your supervision at all times. When leaving your workplace, make sure the computer is locked and secured and no one has access to it in order to steal or damage the computer.
  + Another hardware threat is a malicious or careless damage. This happens when someone accidently or deliberately delete or change a file on your PC when you are not around. You might not notice what have changed in your computer while you were gone, and it might be unintentional by someone close to you that didn’t mean to do so.
  + Associated hardware control is to lock your computer in a safe room so that no one can use it while you are not there. If you are the administrator user, never run a guest account in that same computer. Make sure that computer is only used for your business purposes.
* Disaster Recovery
* Contention plan is what to do as the disaster happens. Sheri Martin has a laptop that she will be using for her business. In addition to having a backup, she can take the laptop with her and run away if a disaster happens and she is able to reach to her laptop. If it is impossible to get your laptop, you don’t have to worry about it because you will backup of your database.
* Contingency plan is what to do while the system is not available. Sheri has been doing her business without the database management system for a few years now, so she has a clear understanding of what to do when the system is unavailable. She can manually write or type data and enter them to system once it is available.
* Recovery plan: since you already have the database backup, after the disaster you can easily connect your hard drive to another computer and would be able to access your data. Finding the software such as Access 2016 is not an issue if we have the database in hand.

Comprehensive Systems Control Plan Outline



**Martin Cleaners**

Input/Output and Interface Design



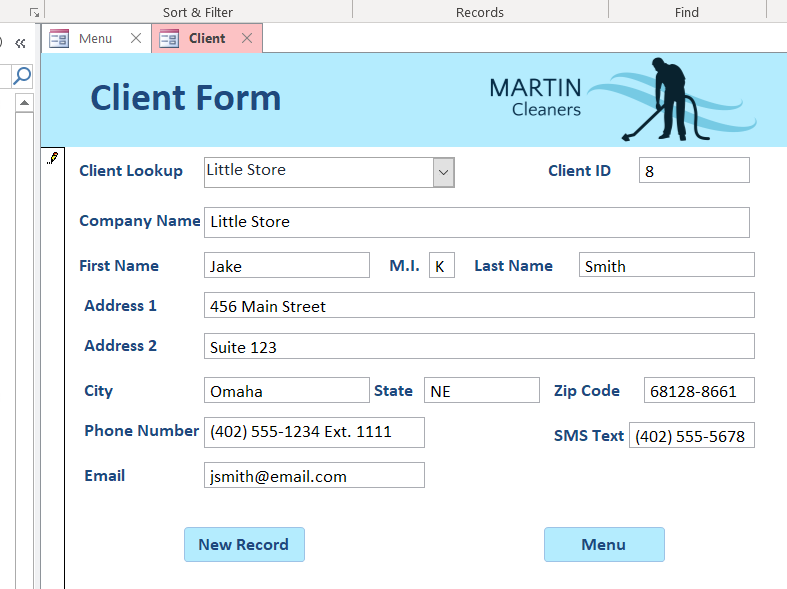
### Menu

This is the initial design for the DBMS application’s main menu. Additional navigation options for various forms and reports will added throughout the design and development process.



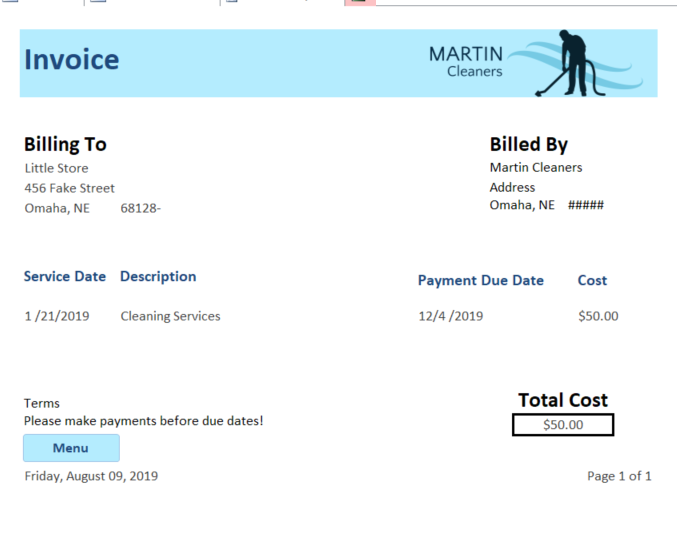
### Form

This is an example one of the DBMS application’s forms, which allows users to look up and edit existing clients and create new client records. Forms for additional tables, such as Vendor and Appointment, will added throughout the design and development process.



### Report

This is an example invoice from the DBMS application, showing an invoice made to the client for services rendered. The invoice shows client information, description of services, cost, service date, and payment due date, with a button linking back to the main menu.



# Milestone 7

**Milestone Manager – Christopher Kozeny**

July 22, 2019 – July 27, 2019

**Milestone 7**

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**Martin Cleaners Database Management System**

## ROLES AND RESPONSIBILITIES MATRIX



**Department:** Operations

**Product/Process:** Inventory, Invoicing, Contractors, Clients

**Document Owner:** Christopher Kozeny

**Project/Organization Role:** Milestone Manager

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Change Description |
| 1.0. | 07/22/2019 | Christopher Kozeny | Initial release. |



| **Title** | **Role** | **Responsibilities** |
| --- | --- | --- |
|  | The Project Manager is responsible for developing, in conjunction with the Project Sponsor, the project charter. The Project Manager ensures that the project is delivered on time, within budget, and to the required quality standards. | * Manage and lead the project team. * Develop and maintain a detailed project plan. |
| CJ Kozeny  Milestone Manager | CJ will be responsible for Tracking Gantt chart, which will record the “guesstimates” of time frames and record the “actual” time frames. CJ will also work with John to contribute to the CRUD Table and Running Doc. | * Tracking Gantt Chart * RRM * Running Document * CRUD Table |
| John Manzo | John will work on the Structure Chart and the CRUD Table for this milestone. | * Structure Chart * CRUD Table |
| Shafiq Jahish | Shafiq is primarily responsible for the 4 necessary Run Sheets. Shafiq will also work with the team to contribute to the CRUD Table. | * 4 Run Sheets * CRUD Table |
| Erik Eiler | Erik manages documentation of the daily workings of the team. He will also work on the Change Log, Email Log and Issue Log. Erik will also work with the team to contribute to the CRUD Table. | * Change Log * Email Log * Group Meeting Minutes * Issues Log * CRUD Table |
| Joe Cremeens | Joe leads the client documents for this milestone. This includes creation of an opening statement, executive summary, client implications, and items for approval. Contact with the stakeholder is constant and the ability to adapt is essential. Joe will also work with the team to contribute to the CRUD Table. | * Client Documents * CRUD Table |

## Milestone Change Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Rev. No.** | **Change** | **Reference Sections** |
| 7/23/19 | 1.0 | Created Roles and Responsibilities Matrix | Control Documents |
| 7/24/19 | 1.0 | Created Structure Chart | Proprietary Software Component (Structure Chart) |
| 7/24/19 | 1.0 | Created Client Documents | Client Documents |
| 7/24/19 | 1.1 | Fixed the Equipment and Supplies Modules, Replaced Inventory Form | Proprietary Software Component (Structure Chart) |
| 7/24/19 | 1.0 | Created Commercial Software Component | Commercial Software Component |
| 7/24/19 | 1.0 | Created Members, Tasks, and Approach | Proprietary Software Component (Members, Tasks, and Approach) |
| 7/25/19 | 1.1 | Rewrote the tasks and approach sections | Proprietary Software Component (Members, Tasks, and Approach) |
| 7/25/19 | 1.1 | Rewrote milestone document descriptions to be less technical | Client Documents |
| 7/25/19 | 1.0 | Created CRUD Table | Proprietary Software Component (CRUD Table) |
| 7/25/19 | 1.1 | Fixed CR typo | Proprietary Software Component (CRUD Table) |
| 7/26/19 | 1.2 | Added the approach, added clarity to CRUD and Structure Chart descriptions | Client Documents |
| 7/26/19 | 1.2 | Fixed Equipment and Supplies sections | Proprietary Software Component (CRUD Table) |
| 7/26/19 | 1.0 | Created Runsheets | Proprietary Software Component (Runsheets) |
| 7/26/19 | 1.1 | Fixed reports to not touch tables, Fixed query to only read | Proprietary Software Component (Runsheets) |
| 7/26/19 | 1.0 | Created Email Log | Meeting Communications |
| 7/26/19 | 1.0 | Created Meeting Minutes | Meeting Communications |
| 7/26/19 | 1.0 | Created Change Log | Control Documents |

****

**Martin Cleaners Database Management System**

## Client Documents



### Opening Statement

Milestone 7 for Martin Cleaners Database Management System has been completed. The systems development project continues to remain on time and on budget.

### Executive Summary

Milestone 7 is the third part of the final half of this project and consists of the following parts: Updated Project Management Chart, Commercial Software Component, Proprietary Software Component, and the Meeting Communications & Control Documents.

**Milestone 6 documents include:**

* **Project Management Charts (PMC)**
  + Contains the Gantt Chart, which shows the tasks to be completed and the estimated time of completion. The Tracking Gantt Chart tracks guestimate timeframes (“a best guess start” with “a best guess” finish) and actual timeframes (the actual start and finish times), along with detailing the differences between them (otherwise known as the variance) and who is responsible for each item within a given timeframe. Updated tasks and estimates are provided for milestone 7.
* **Commercial Software Component (CSC)**
  + The commercial software components of this project include Windows Home 64bit and Microsoft Access 2019. Windows Home 64bit is the operating system for which the Access 2019 system will run. Any updated versions of Access 2019 post-production should be tested for use by professionals, as there could potentially be incompatibilities with the system that’s currently being developed.
* **Proprietary Software Component (PSC)**
  + The PSC encompasses the following: Members, Tasks, & Approach of Software Design Team, Structure Chart, the 4 Run Sheets for Individual Modules, and the CRUD Table.
    - **Members, Tasks, & Approach of Software Design Team**
      * This document entails who the members of the project are, the tasks that each of us are primarily responsible for, and the approach that we will take to handle these tasks. John Manzo is responsible for software design, Erik Eiler and Cj Kozeny are responsible for coding the database, and Shafiq and I are responsible for relaying information to the client regarding the design of the system. We’re taking a structured approach to our design, which allows us to design everything conceptually before we move onto coding the database system.
    - **Structure Chart**
      * The Structure Chart is a diagram that breaks down each individual task the system is intended to perform (such as being able to enter in customer information, searching for customer information, searching for vendor information, and more) into modules (such as client forms, client queries, vendor queries, and more) starting from the main menu of the system. The Structure Chart is responsible for providing the birds-eye view of the entire system, while the following documents will go into further detail that each module is intended to perform.
    - **4 Run Sheets for Individual Modules**
      * The 4 run sheets will identify the functions of 4 specific modules from the Structure Chart, and go into explicit detail as to what their purpose is and what tasks they’re attempting to accomplish, along with if they require any input from the user, if they provide any output to the user, what fields are involved in that module, and more. An example would be the Client Form, which writes customer information. The user can enter in and edit customer information, such as addresses and names, and will be outputted a save prompt upon exiting this form.
    - **CRUD Table**
      * CRUD stands for Create, Read, Update, Delete. The CRUD Table categorizes each module of the system (such as client queries and vendor queries) with records (inventory records, purchase records, client records) and identifies whether that module creates, reads, updates, or deletes those records. For example, a client query will only read client records. A vendor query will only read vendor records. Client forms or vendor forms, however, are the modules are will create and/or update client records and vendor records.
* **Meeting Communications & Control Documents**
  + Meeting Communications & Control Documents include any communications between team members, along with any changes that arise during the project through a Change Log. Our Roles & Responsibilities matrix is included as well, which details the specific responsibilities of every project member.

### Implications for the Client

Milestone 7 has no additional implications for the client.

### Items for Approval

**Items for approval are:**

* No items require the client’s approval during this milestone.

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**Martin Cleaners**

## Commercial Software Component



### Operating System

The operating system used in this information system is Microsoft’s Windows 10 Home (64-bit). This operating system provides Windows Defender and Windows Firewall, which are the security programs being used for this system.

### Commercial Package

The commercial package used in this information system is Microsoft Access 2019 (64-bit).

### Upgrades

A specialist will be brought in to check for backwards compatibility and stability before upgrading to newer versions of software.

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Proprietary Software Component



### Members

The members listed below make up the Martin Cleaners Database Management production team. This team will be imperative to the final design and implementation of the new system:

* John Manzo
* Cj Kozeny
* Erik Eiler
* Joe Cremeens
* Shafiq Jahish
* Paul Van Vliet (Project Manager)

### Tasks

Tasks will be subdivided evenly based on experience and general know-how. John Manzo will implement the software design and ensure that the coding aspects follow the design plan. Erik Eiler and Cj Kozeny will primarily lead the coding development of the database. Joe Cremeens will be in charge of any documentation for the system as it progresses as well as documentation on the finished product. The above team members are comfortable with the implementation platform and are confident in their ability to produce a quality product for the customer. When the system is completed, Shafiq will oversee the testing portion of the application, which will focus on creating records, testing input masks and relational constraints, form usability, main menu testing and query testing - just to name a few.

### Approach

The approach of the team will be very dynamic as the process continues. All team members are capable of the aforementioned tasks, so duties every week will be dependent on the application and team needs. We will implement a top-down, structured design approach to see the project from start to finish. This is a fitting development approach for this type of system for a number of reasons. Decisions can be made and implemented very quickly, and all of the planning and detail has been laid out before a line of code has even been written. With such a small, single-user system, this seems to be the most useful and efficient approach to developing our system.

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**Martin Cleaners**

RUN SHEETS



|  |  |
| --- | --- |
| Module Name: | Client Form |
| Location: | Development Environment |
| Programmer(s): | Erik Eiler |
| Date Completed: | July 24, 2019 |
| Project Name: | Martin Cleaners |
| Client: | Sheri Martins |

|  |  |
| --- | --- |
| Module Objectives: | Look up client  Edit Client Record Create Client Record |
| Manual Input: | User Enters Client Information  User Edits Client information |
| Files/Tables Used: | Client: Read & Write |
| Fields Used: | Client.ClientID: Read & Write  Client.CompanyName: Read & Write Client.FirstName: Read & Write  Client.Middle Initial: Read & Write  Client.LastName: Read & Write  Client.Address1: Read & Write  Client.Address2: Read & Write  Client.City: Read & Write  Client.State: Read & Write  Client.ZipCode: Read & Write  Client.PhoneNumber: Read & Write  Client.Email: Read & Write  Client.SMS Text: Read & Write |
| Output: | New records added to Client table  Records Updated in Client Table |
| Hardware  Requirements: | 1 workstation, 1.6 GHz, 2-Core Processor, 4 GB RAM, 4 GB Internal Storage, 1TB External Storage, Display Resolution of 1280X768. |
| Program  Messages: | There is a save prompt upon exit to menu |
| Controls: | Mandatory Fields  Client ID is unique  Data Types  Input Masks |

|  |  |
| --- | --- |
| Module Name: | Profit/Loss Report |
| Location: | Development Environment |
| Programmer(s): | Erik Eiler |
| Date Completed: | July 25, 2019 |
| Project Name: | Martin Cleaners |
| Client: | Sheri Martins |

|  |  |
| --- | --- |
| Module Objectives: | Generate Profit/Loss Report |
| Manual Input: | None |
| Files/Tables Used: | None |
| Fields Used: | None |
| Output: | Profit/Loss Report |
| Hardware  Requirements: | 1 workstation, 1.6 GHz, 2-Core Processor, 4 GB RAM, 4 GB Internal Storage, 1TB External Storage, Display Resolution of 1280X768. |
| Program  Messages: | There is a save prompt upon exit to menu |
| Controls: | None |

|  |  |
| --- | --- |
| Module Name: | Main Menu |
| Location: | Development Environment |
| Programmer(s): | Erik Eiler |
| Date Completed: | July 26, 2019 |
| Project Name: | Martin Cleaners |
| Client: | Sheri Martins |

|  |  |
| --- | --- |
| Module Objectives: | To Direct to all forms |
| Manual Input: | None |
| Files/Tables Used: | None |
| Fields Used: | None |
| Output: | None |
| Hardware  Requirements: | 1 workstation, 1.6 GHz, 2-Core Processor, 4 GB RAM, 4 GB Internal Storage, 1TB External Storage, Display Resolution of 1280X768. |
| Program  Messages: | None |
| Controls: | None |

|  |  |
| --- | --- |
| Module Name: | Client Query |
| Location: | Development Environment |
| Programmer(s): | Erik Eiler |
| Date Completed: | July 26, 2019 |
| Project Name: | Martin Cleaners |
| Client: | Sheri Martins |

|  |  |
| --- | --- |
| Module Objectives: | Reads Client |
| Manual Input: |  |
| Files/Tables Used: | Client: Read |
| Fields Used: | Client.ClientID: Read  Client.CompanyName: Read  Client.FirstName: Read  Client.LastName: Read |
| Output: |  |
| Hardware  Requirements: | 1 workstation, 1.6 GHz, 2-Core Processor, 4 GB RAM, 4 GB Internal Storage, 1TB External Storage, Display Resolution of 1280X768. |
| Program  Messages: | None |
| Controls: | None |

**Martin Cleaners Database Management System**

**CRUD TABLE**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Legend  C = Create  R = Read Only  U = Update  D = Delete | Record Type | | | | | | | | |
|  | Client | Appointment | Inventory | Usage Line | Supplies | Equipment | Purchase | Purchase Line | Vendor |
| Main Menu | - | - | - | - | - | - | - | - | - |
| Client Form | CU | - | - | - | - | - | - | - | - |
| Client Query | R | - | - | - | - | - | - | - | - |
| Appointment Form | - | CU | - | - | - | - | - | - | - |
| Supplies Usage Line Subform | - | - | - | CU | - | - | - | - | - |
| Appointment Submit Query | - | - | R | - | U | - | - | - | - |
| Supplies Query | - | - | R | - | R | - | - | - | - |
| Equipment Query | - | - | R | - | - | R | - | - | - |
| Vendor Form | - | - | - | - | - | - | - | - | CU |
| Vendor Query | - | - | - | - | - | - | - | - | R |
| Purchase Form | - | - | - | - | - | - | CU | - | - |
| Supplies Purchase Line Subform | - | - | - | - | - | - | - | CU | - |
| Purchase Submit Query | - | - | R | - | U | - | - | - | - |
| Supplies Form | - | - | CU | - | - | - | - | - | - |
| Supplies Subform | - | - | - | - | CU | - | - | - | - |
| Equipment Form | - | - | CU | - | - | - | - | - | - |
| Equipment Subform | - | - | - | - | - | CU | - | - | - |
| Invoice Report | - | - | - | - | - | - | - | - | - |
| Parameter Form | - | - | - | - | - | - | - | - | - |
| Invoice Query | R | R | - | - | - | - | - | - | - |
| Invoice Report Definition | - | - | - | - | - | - | - | - | - |
| Appointment Report | - | - | - | - | - | - | - | - | - |
| Appointment Query | R | R | - | - | - | - | - | - | - |
| Appointment Report Definition | - | - | - | - | - | - | - | - | - |
| Purchases Report | - | - | - | - | - | - | - | - | - |
| Purchases Query | - | - | R | - | R | R | R | R | R |
| Purchases Report Definition | - | - | - | - | - | - | - | - | - |
| Profit/Loss Report | - | - | - | - | - | - | - | - | - |
| Profit/Loss Query | R | R | - | - | - | - | R | - | - |
| Profit/Loss Report Definition | - | - | - | - | - | - | - | - | - |

# Milestone 8

**Milestone Manager – Erik Eiler**

July 29, 2019 – August 3, 2019

**Milestone 8**

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**Martin Cleaners Database Management System**

**ROLES AND RESPONSIBILITIES MATRIX**



**Department:** Operations

**Product/Process:** Inventory, Invoicing, Contractors, Clients

**Document Owner:** Erik Eiler

**Project/Organization Role:** Milestone Manager

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Change Description |
| 1.0. | 07/30/2019 | Erik Eiler | Initial release. |



| **Title** | **Role** | **Responsibilities** |
| --- | --- | --- |
|  | The Project Manager is responsible for developing, in conjunction with the Project Sponsor, the project charter. The Project Manager ensures that the project is delivered on time, within budget, and to the required quality standards. | * Manage and lead the project team. * Develop and maintain a detailed project plan. |
| CJ Kozeny | CJ will be responsible for Tracking Gantt chart, which will record the “guesstimates” of time frames and record the “actual” time frames. CJ will work on the Maintenance Plan. CJ will help Erik begin the application development. | * Tracking Gantt Chart * Maintenance Plan * Application Development |
| John Manzo | John will work on the Software Plan. He will work with Shafiq to schedule correct dates for the plans. John will also help Erik begin the application development. | * Software Plan * Application Development |
| Shafiq Jahish | Shafiq is responsible for the Implementation Plan. He will work with John to schedule correct dates for the plans. | * Implementation Plan |
| Erik Eiler  Milestone Manager | Erik manages documentation of the daily workings of the team. He will work on the Change Log, Email Log and Meeting Minutes. As the manager of the milestone, Erik will complete the RRM and Running Document. Erik will also start the application development. | * Change Log * Email Log * Group Meeting Minutes * RRM * Running Document * Application Development |
| Joe Cremeens | Joe leads the client documents for this milestone. This includes creation of an opening statement, executive summary, client implications, and items for approval. Contact with the stakeholder is constant and the ability to adapt is essential. Joe will also assist with the three plans, if needed. | * Client Documents |

## Milestone Change Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Rev. No.** | **Change** | **Reference Sections** |
| 7/30/19 | 1.0 | Created Roles and Responsibilities Matrix | Control Documents |
| 7/30/19 | 1.0 | Created Client Documents | Client Documents |
| 7/31/19 | 1.0 | Created Software Testing Plan | Software Testing Plan |
| 7/31/19 | 1.1 | Added depth to contingency and implementation, Added dates to plans | Client Documents |
| 7/31/19 | 1.1 | Explained the procedure of testing not just goals | Software Testing Plan |
| 7/31/19 | 1.0 | Created Implementation Plan | Implementation Plan |
| 7/31/19 | 1.0 | Created Maintenance Plan | Maintenance Plan |
| 8/1/19 | 1.1 | Moved training and explained what training consists of, Added dates and clarity | Implementation Plan |
| 8/1/19 | 1.1 | Started the maintenance type sections | Maintenance Plan |
| 8/1/19 | 1.2 | Added explanation to the types of maintenance, Added an introduction | Maintenance Plan |
| 8/1/19 | 1.3 | Added bids, Added questions to work order, Removed type of maintenance from user form | Maintenance Plan |
| 8/1/19 | 1.4 | Removed bid from corrective maintenance | Maintenance Plan |
| 8/2/19 | 1.0 | Created Email Log | Meeting Communications |
| 8/2/19 | 1.0 | Created Meeting Minutes | Meeting Communications |
| 8/2/19 | 1.0 | Created Change Log | Control Documents |

****

**Martin Cleaners Database Management System**

## Client Documents



### Opening Statement

Milestone 8 for Martin Cleaners Database Management System has been completed. The systems development project continues to remain on time and on budget.

### Executive Summary

Milestone 8 is the fourth and final part this project and consists of the following: Updated Project Management Chart, Software Testing Plan, Implementation Plan, Maintenance Plan, and the Meeting Communications & Control Documents.

**Milestone 6 documents include:**

* **Project Management Charts (PMC)**
  + Contains the Gantt Chart, which shows the tasks to be completed and the estimated time of completion. The Tracking Gantt Chart tracks guestimate timeframes (“a best guess start” with “a best guess” finish) and actual timeframes (the actual start and finish times), along with detailing the differences between them (otherwise known as the variance) and who is responsible for each item within a given timeframe. Updated tasks and estimates are provided for milestone 8.
* **Software Testing Plan (STP)**
  + The STP is the testing phase of the software process, where we test for as many various functions within the system as we foreseeably can, such as adding client, vendor, and every type of information the system is intended to store. This is the point where we make sure that every part of the system is working as correctly as possible before moving into the Implementation Plan.
* **Implementation Plan (IP)**
  + The IP takes place after the STP, after the system has been completed, and is when the system is integrated within the business/organization. This includes the training needed in order to operate the system, the time period for when the system will be implemented into the organization/business, and how the system will be implemented through a series of tasks. Each task is given a unique ID with a brief description of the task to be completed, with a date and timestamp, an implementer responsible for the task, and additional notes, if any.
* **Maintenance Plan (MP)**
  + The MP is the plan for maintaining the system after it has been implemented within the organization/business. As described in the STP, not all problems can be caught before the system is implemented, and the MP ensures that if at any point issues do arise, they will be fixed. In addition, the MP can also be responsible for the inclusion of additional features down the line, should the needs of the organization/business call for it.
* **Meeting Communications & Control Documents**
  + Meeting Communications & Control Documents include any communications between team members, along with any changes that arise during the project through a Change Log. Our Roles & Responsibilities matrix is included as well, which details the specific responsibilities of every project member.

### Implications for the Client

Milestone 8 is when the system that we’ve been developing throughout our capstone courses will finally be implemented into the organization/business. This will require coordination with both the client and the team members to allow this to happen, and to create a plan of action for maintenance beyond implementation.

### Items for Approval

**Items for approval are:**

* Procedure and Human Factors Testing and Acceptance Testing date approvals required from the client. Either the client or the client’s proxy will have to be present during these times.
  + According to the STP, Procedure and Human Factors Testing has been proposed for August 6th, 2019, while Acceptance Testing has been proposed for August 7th, 2019.
* The date for the implementation into the organization/business requires approval from the client.
  + According to the IP, implementation of the system has been proposed for August 12th, 2019.
* Post-implementation and maintenance plans require approval from the client.
  + According to the IP and MP, a post-implementation overview will occur on September 12th, 2019, to verify the system is working as intended. After that, annual maintenance plans will be discussed with the client to ensure the system continues to run effectively.



**Martin Cleaners**

## Software Testing Plan

Introduction



This software testing plan will help ensure the Martin Cleaners DBMS system is free of user interface and programming logic errors, meets the functionality requirements of its design specifications, and its usability, durability, and documentation satisfies the Project Sponsor’s needs and expectations. Upon the successful completion of these tests, system implementation may commence.

This plan consists of a sequence of non-overlapping test phases, beginning with verifying the functionally of the application’s individual modules and then ensuring the modules function as expected when operating in concert. Next, this plan describes the conducting of various system tests to validate the effectiveness of backup and recovery routines, the efficacy of system security controls, and to derive an end-user assessment of the system’s completeness, correctness, usability, and documentation. Lastly, this plan covers a final acceptance phase, in which the system is demonstrated for and live tested by the Project Sponsor (or proxy), then any remaining issues with the application or the training and implementation plans are identified and resolved.

All members of the Mavs Group, the Project Manager (or proxy), and the Project Sponsor (or proxy) will be engaging to some degree in this plan’s testing phases. Testing is set to run from August 3, 2019 to August 7, 2019. By-phase test participants and schedules conclude each testing section.



### Module Testing

These low-level tests examine the application’s individual modules to ensure each subprogram and subrountine independently function without command, logic path, or computational errors.

Using simulated test data, module tests begin with application-level black box testing of each form, subform, and query to ensure proper formatting, storage, and retrieval of data input and to verify query-driven report requests produce expected aggregated output. Test data must include values which try all input masks, conditional processes, exception handling, and mathematical calculations specific to each module.

Any errors discovered during black-box testing will be further examined through code-level white box testing, where the programming logic for each problem module is inspected, debugged, and then retested.

Mav Group members Erik Eiler, Christopher Kozeny, and John Manzo will conduct module testing from August 3, 2019 to August 4, 2019.



### Integration Testing

These tests build upon independent module testing by verifying the correctness of data transfers, data control couples, and execution controls between two or more modules.

Using a bottom-up testing method, lower-level modules (forms, subforms, queries, and reports) will be tested to ensure data properly moves between modules and module-to-module interactions net expected results. For instance, when the Purchase form, subform, and query modules are used in concert to insert a new purchase record, inventory records also are properly updated. Such tests ensure the referential integrity between the application’s database tables.

After the lower-level modules have passed their tests, the main menu module will be tested to ensure navigation to forms and reports functions as expected.

Mav Group members Erik Eiler, Christopher Kozeny, and John Manzo will conduct integration testing on August 5, 2019.



### System Testing

Following integration testing, the full system will undergo three different system tests to verify system durability, security controls, operational efficacy, and behavioral correctness when using the DBMS application.

**System Test One: Recovery**

Recovery testing ensures the system can be restored to the working state it was in at the time of its latest backup. This type of testing accounts for software and hardware failures, data corruption and anomalies, and the reliability of system backup routines. This test will employ simulated test data with records populating all database tables.

To satisfy the recovery testing objectives, it must be demonstrated off-site data backups are correct and can be swiftly accessed and applied. Error-free reinstallation of MS Access 2019 on the system must also be verified.

To execute this test, first ensure the simulated test data is either easily recognizable or can otherwise be verified as correct after conducting the test. Next, save a backup of the application’s database from inside of MS Access (File > Save As > Back Up Database), then upload the backup file to Google Drive. Uninstall MS Access and restart the host computer. Reinstall MS Access from its MSI file or disk; use default installation options and verify the MS Access product key is valid and the program installs error-free. Then download the database backup file from Google Drive. Open the file and verify the data, schema, and user interfaces are fully restored and the DBMS application functions as expected.

Mav Group members Erik Eiler, Christopher Kozeny, and John Manzo will conduct system recovery testing on August 5, 2019.

**System Test Two: Security**

Security testing ensures the system is protected from threats and risks posed by external actors and erroneous system usage as specified in the Comprehensive Systems Control Plan (pp. 24-27)

These tests will try the input-masks, primary key generation, and non-null constrains built into the DBMS application to ensure data input is of the proper type, correctly formatted, records contain all mandatory values, and primary keys correctly auto-increment.

Additionally, protection against external threats will be assessed by verifying the presence, always-on status, and auto-update settings of the Windows Defender (anti-malware) and Windows Firewall (unauthorized network access) programs on the Windows 10 system running the DBMS application. Password-protected access to the operating system, application, and off-site backup location must also be verified.

Mav Group members Erik Eiler, Christopher Kozeny, and John Manzo will conduct system security testing on August 5, 2019.

**System Test Three: Procedure and Human Factors**

The final system tests verify the usefulness of end-user documentation. Because the system will operate in an environment without on-site technical support personnel, it is imperative the application’s user manual contains plain-language, easy-to-comprehend instructions for proper application usage, backup and recovery routines, and troubleshooting steps for common hardware and software failures.

To execute these tests, have an end-user who is not on the development team follow the procedural directions in the application’s user manual to create, update, and lookup records using the Client, Appointment, Vendor, Purchase, Supplies, and Equipment forms with simulated test data. Then follow user manual instructions to generate, print, and save Invoice, Appointment, Purchases, and Profit/Loss reports.

Next, refer to the user manual’s backup and recovery instructions to perform a database backup, restore the application’s database, and reinstall MS Access. Ensure an end-user who is not on the development team can perform the same backup/recovery routine described above in the System Test One: Recovery subsection using just the application’s user manual.

Next, have an end-user who is not on the development team review the troubleshooting steps in the application’s user manual. Verify the end-user understands the instructions for resolving common system problems, such as rebooting consumer-grade modems and routers, uninstalling/reinstalling software, and replacing PC peripherals. If need be, explain rarer, more complex problems may require an on-site service call from a hardware/software technician or database administrator. Contact information for several on-site support services will be available in the application’s user manual.

Additionally, the scope of these test must include an evaluation—from the perspective of an end-user—of interface design and layout quality, usage intuitiveness, and how well the system addresses the Project Sponsor’s information and business needs. The results of these tests will determine if the system is ready to be presented as finished product in the next testing phase.

The Mav Group’s Project Manager (or proxy) proxy and the Project Sponsor (or proxy) will execute these tests, while group members Erik Eiler, Christopher Kozeny, and John Manzo gather their feedback to inform any needed documentation or application changes. System procedure and human factors testing will occur on August 6, 2019.



### Acceptance Testing

Upon the completion of the system tests and any resulting modifications to the user documentation or application, acceptance testing may commence. The objective of this final software testing phase is to ensure the Project Sponsor is satisfied the system will function as expected and agrees to allow the development team to proceed with their implementation plan.

These tests afford the Project Sponsor or her representative(s) the opportunity to see the system demonstrated by the development team and then personally interact with the application. At this point, the development team also presents the Project Sponsor with a comprehensive report of the all testing procedures conducted and their results along with detailed plans outlining end-user training and system implementation. These plans must meet the Project Sponsor’s final approval; thus, plan modifications may be required during this testing phase.

If all testing conducted prior to the acceptance tests was both thorough and guided by already established functionality and usage guidelines, acceptance testing should not uncover any problems severe enough to warrant an implementation delay. However, developers must still be prepared to address any minor issues that may have gone undiscovered in previous testing phases.

Acceptance testing will conclude with identification of any remaining closure items the Project Sponsor and development team conclude need correction or adjustment before implementation. These items may include changes to the application or training and implementation plans. Once these items are addressed, the client assumes ownership of the system and the system implantation plan may be executed.

Mav Group members Erik Eiler and John Manzo will conduct the acceptance testing demonstration and gather feedback generated from Project Sponsor’s (or proxy’s) system interactions. The rest of Mav Group members, Christopher Kozeny, Joe Cremeens, and Shafiq Jahish will join Eiler and Manzo to identify and resolve any pre-implementation closure items. Acceptance testing will occur on August 7, 2019.



**Martin Cleaners**

## Implementation Plan



### Introduction

This implementation plan will help ensure the Martin Cleaners DBMS system is implemented correctly and the end user is familiar with how the system works. This plan will ensure that the system will be accurately implemented in the real world.

This plan consists of an overview of the system, a brief description of every major task that would be involved in the implementation of the system, the overall resources needed to support the implementation effort such as hardware, software, facility, materials and personnel, and any site specific implementation requirements.

Since John is the primary contact with the client, he volunteered to complete the implementation process. John will be setting aside a day to install the software, train the user about the system and data conversion, and hand over the documents to the user.



### System Overview

Sheri Martin is the sole proprietor of Martin Cleaners, a residential and commercial cleaning service. Martin currently uses MS Word 2013 to manually create invoices she emails to clients. No formal system or procedure is in place to track inventory, equipment, or payables. A smart phone calendar app is used to for client appointment setting. A lack of integration between all these operational components hampers Martin’s current workflow, leading to record-keeping inefficiencies, frequent errors, and lost opportunities. Martin also finds accessing the organization’s performance over time to be difficult and time-consuming.

Sheri Martin requests the Mavs group develop a database application. The new application includes the following features: Automated invoicing, payables management, equipment and inventory tracking, and appointment handling. The application simplifies performance gauging through date-range-based queries of payables and receivables.



**Summary of Task**

### Hardware Requirements

Sheri Martin is currently using MS Word to manually enter clients’ data and generate invoices for them. She already has a computer that can be used for the new system. The task here will be to check the current computer and make sure it properly works to support the system. Sheri will also need to purchase a 2 TB external hard desk.

Task: Ensure that the current computer supports the system

Responsible Person: John Manzo

When: 8/10/2019



### Software Installation

For our system we have decided to use MS Access 2019. Sheri Martin would need to purchase a copy of the Office 2016 that contains Access 2919 to use for the database.

Task: Install Office 2016 with Access 2019.

Responsible Person: John Manzo

When: 8/12/2019



### Training

Training will be major part of our project. We want to make sure that the end user knows how to properly utilize the new system. For this reason we will have a training session for Sheri Martin to train her about the system and data conversion. The training will cover introduction of the user to the new application, data entry, how to check inventory, and how to generate invoices.

Task: Train the user

Responsible Person: John Manzo

When: 8/12/2019.



### Data Entry

Data conversion will be a big part of this project. Sheri Martin has been manually entering data and most of the data she has is hard copy. Sheri would be entering the data for at least all the services that she provided to clients within the past one year. The data will include client’s information, data of the service, cost of the service and any information related to those appointments.

Task: Data Entry to the database

Responsible Person: Sheri Martin

When: After the training is completed.



### Document Handover

Documentation was a huge task through out the two sessions for this class. We have generated large volume of very helpful documentation that would be very beneficial to our client. We will be handing these documents that include the running docs, appendices and the user manual to the client.

Task: Handover documents

Responsible Person: John Manzo

When: 4:00PM on 8/12/2019.



### Post Implementation Overview

After the implementation is completed we would like to know how the system is working and whether our client has any issues or questions so for that reason a follow communication will be made with the client to have a post implementation overview. During the post implementation overview, we will make sure user is able to use the application for data entry, tracking inventory, and generating invoices. We will also make sure that user used the application to generate invoices for that month and make sure it worked.

Task: post implementation overview

Responsible Person: John Manzo

When: 9/12/2019.

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**Martin Cleaners Database Management System**

## Maintenance Plan



### Introduction

The maintenance procedures described below will be adhered to on a year-round basis. Martin Cleaners will need to ensure that the provided Database Management System is properly maintained and optimized throughout it’s useful life. Using the methods outlined below, it can be ensured that the system will remain operable and profitable for the longest possible time period.

### Corrective Maintenance

Corrective maintenance will be completed as errors arise or are found by the end user. Errors will be found and fixed through the firefighting method. In the case of a system error or system failure, a Maintenance Work Order Form can be submitted. Following this, the work order will be reviewed by the development team and a bid will be provided in a timely fashion. Depending on the severity of the corrective maintenance, this issue can be addressed within a timeframe that will minimally affect the operations of Martin Cleaners. Updates will be implemented, and Documentation will be updated following the maintenance procedure. Once the work order has been fulfilled, the development team will follow up with Martin Cleaners to ensure that full functionality has been restored. Corrective Maintenance is covered under the original System Service Request.

### Adaptive Maintenance

Adaptive maintenance refers to tweaking or updating the system as the environment around it changes. In the case of new regulations, new products or new reporting, adaptive maintenance can be performed by a trained technician in order to better fit the changing needs of the business. In the case that a new feature is to be added or a significant change is to be made, this can be sent as a Maintenance Work Order Form to the development team. The work order will be reviewed by the development team and a bid will be provided in a timely fashion. Depending on the complexity of the adaptive maintenance, this issue can be addressed within a timeframe that will minimally affect the operations of Martin Cleaners. Updates will be implemented, and Documentation will be updated following the maintenance procedure. Once the work order has been fulfilled, the development team will follow up with Martin Cleaners to ensure that full functionality has been restored. Adaptive maintenance will be performed on an as-needed basis.

### Preventive Maintenance

Preventive Maintenance will be fulfilled by frequent technician visits to Martin Cleaners. Twice yearly, a Database Analyst will review the database and provide insight into any current or future maintenance that needs to be done in order to prevent future issues. Separately, 4 times yearly, a technician will visit the site to do a review of the system itself. This visit will be related to usability concerns, general system maintenance and the overall health of the system – both in the present and the future. This technician will be in charge of anticipating and forecasting additional future changes to be made to the system. Any major design change or expansion expected by this technician can be relayed to the development team for consultation.

### Perfective Maintenance

Perfective Maintenance will not be included in the ongoing, continuous maintenance plan. As Martin Cleaners finds that changes are needed, GUI’s can be updated, storage devices can be changed and any other usability concerns that may arise can then be addressed. With such a small, specific system, the need for continual Perfective Maintenance is not necessary, though it can be requested by Martin Cleaners through the submission of a Maintenance Work Order Form using the process outlined above.

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**Martin Cleaners Database Management System**

### Maintenance Work Order Form



**REQUESTED BY:** Martin Cleaners

**DATE:**

**DEPARTMENT:**

**LOCATION:**

**CONTACT:**

**Type of Maintenance Request:**

**[ ] Database/Data Problem**

**[ ] User Interface Problem**

**[ ] Form/Report Problem**

**[ ] Addl. Features Needed**

**[ ] System Refinement**

**[ ] General Maintenance**

**[ ] Other**

**Urgency:**

**[ ] Immediate, Operations are impaired or opportunity lost**

**[ ] Problems exist, but can be worked around**

**[ ] Business losses can be tolerated until new maintenance can be performed**

**[ ] Other**

**Please clarify this information before submitting a request.**

What caused the issue that you are experiencing? How did it come about?

Did the system do something unexpected, or is it simply not working as expected?

If this is a general maintenance or system refinement request, what caused a need to request service? If not, please provide any additional details that may be helpful to the team.

**--------------- TO BE COMPLETED BY DEVELOPMENT TEAM--------------**

**ADDITIONAL DOCUMENTATION INCLUDED? [ ] YES [ ] NO**

**ADDITIONAL DOCUMENTATION NEEDED? [ ] YES [ ] NO**

**ACTION** (to be completed by developer)  
  
 [ ] Request approved

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Assigned To

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Start Date

[ ] Recommend revision

[ ] Suggest user development

[ ] Reject for reasons

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**COMMENTS** (to be completed by developer)