**C868 – Software Capstone Project Summary**

**Task 2 – Section A**



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| **Capstone Proposal Project Name:** | RentApp: A Rental Property Appointment Scheduler |
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# **Business Problem**

**The Customer**

The customer is a small local real estate investment management company, called GC Partners LLC, that oversees multiple rental properties in different states. The main office in Raleigh, North Carolina, handles scheduling appointments between customers and contacts to see available rental properties under their management.

The main office needs to be able to schedule appointments for potential renters and connect them with a local contact in their area to show the properties in question. Currently the office is using hand-written notes on a calendar, and appointments are being miscommunicated to all parties involved. The company needs to improve the system and wants a computer application to do so. With an application solution the company will not only improve communications in general, but it will increase rental income and positive reviews through successful appointments.

The size of the company is small – only five employees in the main office. The team is made up of the two owners, a regional manager, a property manager, and an office administrative assistant. However, there are over 100 properties being managed in over 10 different states from coast to coast. To handle the geographic scope, GC Partners LLC has contracted real estate agents in the local areas of their rental properties. These agents are under the umbrella of “Contacts” for scheduling purposes.

It is the function of GC Partners to solicit their management services to owners of rental properties – typically single-family homes in tourist locations (i.e., Aspen, CO). These services include maintenance, cleaning, leasing, bookkeeping, repairs, and customer service.

The two owners of the company divide their responsibilities between securing new management contracts with owners and quality assurance. The regional manager is primarily focused on the financial reporting of all properties and ensuring the bookkeeping, taxes, and legal issues are kept on track for the owners. The property manager tends to the preventative maintenance, repairs, and cleaning of the properties as tenants submit requests or move out. The office administrator is typically involved in scheduling appointments over email and phone between prospective tenants (Customers) and local agents (Contacts). Each of these roles requires excellent communication for the company to operate smoothly.

GC Partners’ mission is to provide the highest quality of management services for property owners so that the owners and tenants will have the best rental experience. In the short term, GC Partners wants to reach 125 rental properties under management by the end of the year and attain 4+ stars on Google. In the next 5 years, they plan to have doubled in staff, reach 500+ properties and keep their 4+ star rating.

## **Business Case**

The RentApp software application will help the client by targeting the role of the office administrator. Specifically, the task scheduling of appointments is largely dependent on handwritten notes, hard-copy calendars, manual time-zone calculations, and email communications. Not only are there multiple ways to err in this task as it is repeated with several appointments, but it will continue to increase exponentially as more properties are available to rent.

The RentApp application will relieve the office administrator’s responsibilities of making those calculations and will simultaneously speed up the process. The database interface application will provide automatic time-zone conversions, overlap validations, and assign contacts with a few clicks of the button. This will cut down costs in terms of time and increase effectiveness of crucial value-based communications.

## **Fulfillment**

RentApp will provide an authorized user access to a graphical user interface application to view, add, edit, delete, or otherwise manipulate database information regarding appointments and customers. There will be three primary windows.

First, a login window will provide a security layer. The user is required to enter a username and password. Successful authentication will provide a connection to the database and access to the main window. Second, the main window will show two tables: Applications and Customers. These tables will be vertically aligned and show the following:

*Appointments*: Appointment ID, Title, Description, Location, Type, Start Time, End Time, Customer ID, User ID, and Contact ID.

*Customers*: CustomerID, Name, Address, Zip Code, Phone, Division ID, Country ID, Country Name.

The Appointment table will have radio buttons, which allow for filtering views. The user can filter views to see all appointments, this month’s appointments, and this week’s. A search bar will be present at the top of the Appointment table to locate a specific Appointment ID. Both tables will have buttons associated to the left, which will allow a user to Modify, Save, and Delete. Lastly, to the right of each table will be text-fields to allow for either editing or adding new data.

The data will be housed in the SQL database. Presently MySQL Workbench provides the interface to access and manipulate data with the application. Given the size and scope of the company’s requirements, as well as the long-term goals, the database storage will meet their needs and upgrades would not be required.

# **Existing Gaps**

There lies a bottleneck in the current manual system of renting an available property. The office administrator must be able to quickly take phone calls, or emails, calculate an appointment time within the right time-zone and connect that to an available contact, all without overlapping other crucial appointments. These are time-consuming and error-prone tasks, not to mention completed on paper. Inhibiting this responsibility with manual execution only negatively impacts the company’s financial performance, growth, and ratings. Furthermore, the ability to maintain records, reports, or trends of appointments and properties would be next to impossible given the near and long-term goals of the company. In short, it is not scalable.

# **SDLC Methodology**

There are many Software Development Life Cycle (SDLC) methodologies that could be applied to this project, including Big Bang, Spiral, and Iterative. Considering the nature of this relatively small end-product, clearly defined requirements with room for enhancements, and the need to implement a solution upon completion, the Waterfall Model will be used to manage this development project. The Waterfall development model will follow these phases:

## **Requirement Analysis**

Interview with the key stakeholders for this application solution. The key stakeholders in this case are the owners and the primary user – the administrative assistant. Discuss and gather the requirements of the application to successfully replace the problematic tasks of the assistant and meet the goals of the company. Determine that the requirements are feasible.

## **System Design**

With the requirements in place, design a low-fidelity model and high-fidelity model of the application. Create a UML (Unified Model Language) diagram, prototype, and wireframes to capture all requirements.

## **Implementation**

Write the code for each required feature and GUI (graphical user interface) pages. Match layouts to the design wireframes and prototype. Establish connections to the database, proper navigational buttons, and functioning sample data. Conduct Unit Tests on code.

## **System Testing**

Integrate the tested code into the established functional layout designs. Perform functional tests of code to ensure it works with the layouts appropriately. Report any errors. Report testing activities. Iterate through correcting bugs.

## **System Deployment**

Make sure that the database is operating properly, and connection is secured. Confirm there are no remaining defects. Deploy the application with the client and ensure the application does not break.

## **System Maintenance**

Follow up meeting with the client to ensure the application solution is satisfactory and provide future contact resources. In case the user encounters errors, document the bug and report it. As errors are fixed, deploy the updated code.

# **Deliverables**

Each phase of the Waterfall SDLC will have a set of deliverables. They are listed below. Those related to the developement fall under the Project Manager’s responsibilities. And the Product Deliverables are items to be delivered to GC Partners LLC.

## **Project Deliverables**

(Under the Project Manager)

* Requirements Analysis
  + Project Schedule of dates and times of milestones, primary contact/lead
  + Requirements Understanding Document (RUD)
* System Design
  + High-Fidelity Design UI prototype
  + Low-Fidelity Design
  + UML
* Implementation
  + Code stages
  + Unit tests
  + Test Results
* System Testing
  + Test Cases
  + Defect Reports
* System Deployment
  + User Manual
* System Maintenance
  + Service requests list
  + Updated code features

## **Product Deliverables**

(Delivered directly to Customer)

* Low Fidelity Wireframes
  + Basic non-functional representation of the application showing the various windows and general workflow of the features
* High Fidelity Prototype
  + Detailed non-functional representation of the application design
  + For customer review
* Deployment Version
  + Ready and functional application meeting RUD
  + User access credentials
  + For customer to adopt into business practices
  + User manual for reference

# **Implementation**

The implementation of this application will be straight forward and without major disruption to normal operations of the company. The company wants to begin using the finished product immediately upon delivery with full replacement of the old method. Since it is a new product for the company there will be no outages – only a brief learning curve for the primary users.

Upon sign-off of the RUD at the start of the development process, there will be minimal required participation from the client. As the Project Manager leads development, there will be status updates provided to the client, but no technical changes to their procedures until the final product is delivered. At product delivery, the Project Manager will assign a customer service tech to provide approximately 1-2 hours of hands-on training to the primary users of the application to ensure basic knowledge of the application. Administrative accounts will be created, and a super-user will be designated within GC Partners. The super-user will have elevated permissions for creating and maintaining user access to the application and database. After the initial delivery and training on the application, GC Partners can report any difficulties to the Project Manager. Troubleshooting, code repairs, and updates will be provided on an ongoing basis as needed.

As GC Partners launches use of the application, the database for the appointments and customers will be blank. Any existing information within GC Partners that needs to be entered into the database will be done by GC Partners. This will require up-front time, but once the existing information from the hand-written copies is entered into the database successfully, there will be no further required use of that method. From there, the application will be the primary method for the administrative assistant and GC Partners to handle scheduling appointments.

# **Validation and Verification**

To prove that the software application functions sufficiently well to meet the customer's needs we will validate and verify in the following ways.

First the Project Manager and development team will confirm the RUD items are all accounted for and functional. It is the Project Manager’s duty to systematically ensure all required features exist, are coded properly, and are successfully tested. Unit tests are created and run periodically throughout the phases of development. These will validate and verify the logic of the code for specific features of the application. The Project Manager will ensure the development team has sufficiently tested all features of the application for proper functionality per the RUD.

A functional test will be exercised to assure quality of the application in general. For example, a Customer and Appointment will be added, each will be modified and saved, and each will be deleted. Those will be the core functionality tests of the application. At delivery, the client will also run its own acceptance testing of the application to ensure it is running properly in their environment and meets the RUD items to their satisfaction.

# **Environments and Costs**

## **Programming Environment**

The application will be developed using the Java programming language on the IntelliJ IDEA Community Edition integrated development environment. This IDE is at no cost and includes all necessary tools and libraries for development. The database will be MySQL and accessed via the application’s programming. But to assist in development, direct access will be through MySQL Workbench. All the above will be required prior to beginning development.

To develop the RentApp solution, the minimum hardware and software are as follows:

* 64-bit versions of Microsoft Windows 10,8
* 2 GB RAM minimum, 8 GB RAM recommended
* 2.5 GB hard disk space, SSD recommended
* 1024x768 minimum screen resolution
* Java JDK version Java SE 11.0.13
* Java FX version compatible with JDK 11 (JavaFX jdk-11.0.13)
* MySQL Connector Driver (mysql-connector-java-8.1.23)
* MySQL Workbench 8.0.25
* IntelliJ IDEA version 2021.1.3 (Community Edition)

## **Environment Costs**

The costs associated with the software application are quite affordable. Overhead for the technical environment is low with minimal first-time costs, if any. It is recommended that a desktop computer with proper capacities, as listed above, is employed for the project development. For GC Partners, it is recommended to dedicate or acquire a single thin client computer with a high-speed internet connection. There is a nominal fee associated with maintaining the database of $500 a year that allows for unlimited storage size and 99.8% uptime. As such, GC Partners will be able to access use of the application via a virtual desktop through the thin client desktop computer at the main office.

## **Human Resource Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Staff | Hours | Rate | Description | Total |
| Designer | 20 | $35.00 | Wireframes + UI Design | $700.00 |
| Developer | 120 | $35.00 | Java program and Unit Testing | $4,200.00 |
| Quality Assurance | 20 | $40.00 | Functional Testing | $800.00 |
| Project Manager | 90 | $55.00 | SDLC full lifecycle management | $4,950.00 |
| TOTAL HR COST | 250 hours | $41.25 avg |  | $10,650.00 |

# **Project Timeline**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phase | Milestone/Task | Deliverable | Description | Dates |
| Requirements | Task 1 | Requirements Understanding Document (RUD) | Determine primary contacts and both parties agree on requirements | 1/31/2022- 02/04/2022 |
| Requirements | Task 2 | Project schedule | Milestones dates and goals established | 02/08/2022 |
| Design | Task 3 | Low fidelity wireframe | Design the look and feel of the project | 02/08/2022 – 02/11/2022 |
| Design | Task 4 | High Fidelity prototype | User Interface design with more detail | 02/11/2022 – 02/14/2022 |
| Design | Task 5 | UML | Unified Model Language diagram | 02/14/2022 – 02/18/2022 |
| Implementation | Task 6 | Code Stages | Develop code to meet design documents | 02/18/2022 – 03/10/2022 |
| Implementation | Task 7 | Unit Tests | Testing code sections | 02/18/2022 – 03/10/2022 |
| Implementation | Task 8 | Test Results | Review/analyze and repair as needed | 02/18/2022 – 03/10/2022 |
| Testing | Task 9 | Test Cases | QA functional tests | 3/10/2022 – 3/14/2022 |
| Testing | Task 10 | Defect Reports | Review/analyze and repair as needed | 3/10/2022 – 3/14/2022 |
| Deployment | Task 11 | User Manual |  | At Delivery |
| Deployment | Task 12 | Client Acceptance | RUD specifications satisfied | At Delivery |
| Maintenance | Task 13 | Service Request list or tickets | Bugs submitted by GC Partners LLC | Post Delivery |
| Maintenance | Task 14 | Updated code features | Updates deployed for RentApp | Post Delivery |
|  |  |  | Total | ~ 42 Days |