C868 – Software Capstone Project

Task 2 – Section A

Capstone Proposal Project Name: Safe Handoff

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Business Problem

1. The Customer

The application will be made for a private cardiology group, Riverstone Cardiology. The group consists of 5 cardiologist who provide services at local area hospitals. The application will be designed for the cardiologists to update daily patient details for handoffs. This desktop application will provide access to all physician partners to securely share patient updates amongst themselves. The goal is to minimize medical errors and improve patient care. In the long term we will also include mobile based application.

2. Business Case

Riverstone Cardiology group includes 5 cardiologists who provide services at multiple local area hospitals. Currently, for nights and weekends there is one of the partners who is “on-call” for the group and manages all the patients during that time. At present each physician gives a verbal “check-out” to the on-call physician about all the patients. There is no system in place to find written daily rounding details/ updates if needed to be checked by on-call physicians. This verbal update system leads to issues related to missing important details or misinterpretation which can lead to medical error and patient harm. The practice is looking for an efficient system to store their daily patient hand-off. This system should allow all partners to update daily notes at any given time. The customer requires an application with simple, intuitive interface for the physicians with reliable database. The team needs to be able to review active patient list and have ability to store the patient data after discharge for record keeping. They need to be able to print the rounds list for a safe hand-off to the on-call physician. With an urgency to find better solution for the physician team of the group, the client needs a sole propriety business application on expedited basis for personal use.

3. Fulfillment

A standalone application, ‘Safe Handoff’, will be developed for the client. This will be a Windows based application to be compliant with their current IT infrastructure. Application will have multiple screen layout. Individual login information will be provided to physicians through their HR/ IT. Initial screen will allow them to login with their individual credentials. The GUI will be clean and self-explanatory. Basic color theme will be chosen for GUI to achieve a professional look. Main menu screen will serve as a junction to reach to the task window of user’s need. User will be able to add new patient details, view and update existing patient details, and change patient status between active and archived. The data will be stored in remote MySQL database which can be expandable and/or migrated to accommodate future growth. User will be able to generate and print a summary, rounds-list, of all active patients in the database.

Existing Gaps

Currently, there is no system in place to include documentation daily updates for handoff if needed to be checked by on-call physicians. Current physician-to-physician verbal report system leads to

issue of missing important details and misinterpretation which can lead to medical error and patient harm. “Safe Handoff” will provide an electronic environment for exchange of detailed patient updates between physicians. Safe Handoff is a new application and not an extension of any existing IT system. It will fill the gap in systematic documentation of patient hand-off.

SDLC Methodology

The agile software development methodology will be used to manage and develop this project. Using agile method for development of this application will help in setting up small goals and better response to any unpredictable problem. Even though Safe Handoff is a small-scale project, by breaking it down into separate individual tasks gives more realistic estimate of time and effort it needs to finish the whole product. The client’s requirements will be taken into consideration and initial preparation/planning will be done for the project. The aim will be to produce clear measurable deliverables on each stage of development and improvise the application in satisfactory manner. The agile software development method does not require extensive detail planning of the project in advance and give a scope to impromptu changes on demand for betterment of the product.

Deliverables

Considering the nature of agile software development life cycle, planning for a specific measurable deliverable is incredibly difficult. The final deliverable of the project is the application itself. However, for a small-scale project, the execution process for the project can be planned and put forward. This approach to development of the application gives some idea on achievable at each step of the project. The approach to develop the application will produce following deliverables:

- Storyboard for the application
- Database connection and database schema
- Non-function graphical user interface
- Source code of the application
- Test result of entire application
- User guide documentation

Project schedule and time frame for deliverable will be discussed and set forth with client in advance. As the project advances, the progress in the project will be communicated with client at regular intervals. Client’s feedback will be a vital component in testing phase of the application.

Implementation

Riverstone Cardiology needs expedited development of the application as they have an increasing patient volume. Keeping client’s requirement as priority, the fully functional application is planned to be developed, tested, and implemented in their ecosystem within 2 months’ timeframe. The application will be designed and developed by a single developer, which make communication process

with client much easier. The Safe Handoff application development project can be divided into three main phases.

First one is design phase. Office manager of the practice will be integrally involved during this design phase of the software development project. The aim of initial meetings with client will be to understand different aspects of the project and discuss and approve the user interface design. Initially, client's current IT infrastructure will be assessed. We will finalize look and feel of the software as well as navigation chain of user interface with the client. Another crucial aspect for this phase is to discuss the expected size and load of the required database. First phase is expected to be completed in 1-2 weeks.

Second Phase is the application development phase. This phase is expected to be lengthiest of the entire project. The actual coding and development of the application will happen during this phase. All the work in this phase will be done by the developer. Client will not be expected to have personal meetings during this phase, but they will continue to get periodic updates regarding progress of the development. This phase is expected to take 3-4 weeks.

Testing and delivery of a product takes place in third phase. First, we will test all the functionality of the product in our environment and debugging will be performed as needed. Further we will test the product with office manager of the practice in their IT environment. A live demonstration of the product functionality and interface will be done for all physician members at client's convenience. Instruction guide will be provided to the office manager. The guide will include extensive explanation of usage and functionality of the application. On-site 1:1 training and support will be provided for a period of 2 days after implementation is completed. This phase is expected to take 1-2 weeks.

Validation and Verification

Software quality control is one of the critical phases in software development life cycle. Software testing, verification and validation is the process of checking that the software system meets all the requirement and fulfills its intended purpose. During the development phase of the project, the developer will constantly test segments of code to ensure error free application. The developer will perform unit test to check the functionality of interactive objects of the interface to confirm no logical error or exceptions. Once all the pieces of the application are ready, the developer will run integration testing of the application. Here, developer will also check for verification and validation. A test login will be created for testing. Test patient data will be entered to confirm functionality and integration of processes like add new patient, edit patient data, view patient list, toggle between archive and active patient list, and print list functionality. Prior to final implementation user feedback will be obtained during live demonstration phase to client to perform final tuning of user interface.

Environments and Costs

1. Programming Environment

The application will be developed on a pc running on Windows 10 operating system. I will use NetBeans IDE JDK9 as programming environment. It will be JavaFx application and GUI will be designed

using Scene Builder. MySQL relational database will be used for backend data storage. Remote MySQL database server will be used to connect to the database. The application will be written in Java programing language. The database is accessed with use of JDBC application programing interface. MySQL Workbench 6.3 will be used to manage database schema and table structure.

2. Environment Costs

There is no cost associated with any of the components of application programming environment. None of the program development environment used in this project require licensing fee. The storage of limited amount of testing data is free of cost. There is a nominal fee associated for the database hosting and maintenance which is $100 per year. The storage size of database is easily expandable, and cost will depend on client's patient volume and needs.

3. Human Resource Requirements

The time and cost for the labor to complete the application is listed bellow

- Phase 1 Planning and Design: Time Duration: 20 hours, Labor Cost: $1000
- Phase 2 Application Development: Time Duration: 40 hours, Labor Cost: $4000
- Phase 3 Testing and Delivery: Time Duration: 30 hours, Labor Cost: $3000

Project Timeline

An overview of the phases of the project and information about the time required to complete each phase.

Phase	Milestone/Task	Deliverable	Description	Dates
Pre-development	Phase:1	Assess requirement and current infrastructure	Meeting with customer for procedure review and IT assessment	6/1/2020 – 6/5/2020
Design	Phase:1	Design roadmap	Create the storyboard that demonstrates the look and feel of the application interface	6/6/2020 – 6/14/2020
Application Development - GUI	Phase:2	Non-Functional user interface design	Design necessary screens for various application pages	6/15/2020 – 6/21/2020
Application Development – source code	Phase:2	Workable application	Development of functional application to commence testing	6/22/2020-7/15/2020
Test plan	Phase:3	Test report	Unit testing of the application and necessary debugging. Final integration testing.	7/16/2020-7/20/2020

Delivery	Phase:3	Software Application User Guide	Development of user guide document. Live demonstration and implementation. On-site training/support.	7/21/2020-7/28/2020