**C868 – Software Capstone Project Summary**

**Task 2 – Section A**



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Business Problem

# The Customer

Diabetix is a startup company with a small team of 5 employees based out of the United States. The company is helmed by a passionate CEO. The CEO was diagnosed with Type 1 Diabetes at a young age. This enables him to understand the struggles of managing diabetes while simultaneously trying to live life. Diabetix believes it can disrupt the market for diabetes management applications. The current offerings are sub-par at best. This application will be their first venture into business. During this time of pandemics, the CEO realized now is the time to enact his business idea that he believes will change the world. The company is determined to provide top-tier functionality and user experience.

Diabetix hopes to optimize the lives of diabetics around the world. Remembering to check your blood sugar while also living a busy life is virtually impossible. The CEO recognized this and formulated his business idea to create an all-encompassing tool for diabetics. The age of cell phones has presented a golden opportunity. The company believes creating a mobile app will provide immense reach among the population.

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# Business Case

Each day millions of people document their blood sugar. The most common way a person documents their blood sugar readings is by using a glucose monitor. Most monitors save a finite number of readings before deleting the oldest ones first. The numbers are saved to the device. During a routine visit to an endocrinologist, the readings are taken from the device and printed out. Most devices do not have a functional format for the display of information. This can cause incomplete information and confusion for both parties.

Forgetting or not wanting to take readings is also an enormous issue. Living with a debilitating chronic disease is not an enjoyable experience. Alleviating even a minor part of this feeling could have tremendous effects on all facets of life. This was a major goal for the CEO.

# Fulfillment

Diabetix requires a security first implementation for their new application. Personal health information should be safeguarded. The use of a login screen fulfills the requirement. Firstly, the application must document readings. The information is compiled to create reports that provide a visual representation of their health journey. Visually seeing the progression creates a gamification effect. This elicits a stirring response in most. The application will be developed in Java for Android devices. The database technology will be Room Framework. This provides a scalable database that provides higher data capacity than a normal glucose monitor. The app has alarm functionality so alarms can be set to remind people to check their blood sugar.

Existing Gaps

The Diabetix application is not replacing any existing process or application within the company. The company is a startup, and this is its first business venture. Yet, the existing gap in the market is vast. There are many options to document blood sugar readings. Entering readings in a physical journal or storing the data on a glucose monitor are both options currently. Modern technology has revolutionized how data is documented, stored, and displayed. The cell phone is the perfect tool for solving this problem. The software used on most glucose monitors is simplistic. The method in which data is stored and displayed is bridled by the hardware of the devices. Modern cell phones are more powerful than the computer on the shuttle that sent Man to the Moon. Most people use a cell phone every day. The implementation of Diabetix is seamless and requires no barrier to entry for the modern person.

SDLC Methodology

After carefully considering every SDLC Methodology, the Waterfall method is the best fit for this project. The requirements of the project have already been laid out by the CEO. The employees of the company are spread over a large geographic location. The world is still in a pandemic. The threat of a new pandemic is also on the horizon. Testing in person is not ethically viable currently. This makes the Waterfall method the perfect SDLC Methodology for this project. The Waterfall method has several phases. First is the requirements phase. The second is the design phase. The third is the implementation phase. Next is the testing and verification phase. After is the delivery phase. Finally, is the maintenance phase.

# RequirementsPhase

The requirements phase is the entry point of the project. The creation of the minimum viable product (MVP) is the focus of the requirements phase. Key stakeholders will be involved with the creation of the MVP. The goals of the application will be laid out by the stakeholders in collaboration with the development team. Clear and actionable goals must be the priority. All goals must be approved by stakeholders. The deliverable for this phase is documented stakeholder-approved requirements.

Design Phase

The next phase is the design phase. Wireframes will be created to provide a visual flow to the application. Wireframes are used as prototypes of the final application. The wireframes will be delivered to the stakeholders for approval. Feedback is necessary for the iterative process of updates to the wireframe. The culmination of feedback and updates will be the final wireframe. This wireframe must be approved by stakeholders. The wireframe is the basis of the entity diagram. The diagram illustrates the database layout and tables to complete the application. A testing plan must be drafted in this phase. The plan is used to validate the application in later stages. The deliverables in this phase are the testing plan, wireframes, and entity diagrams.

Implementation Phase

Technical implementation begins after the completion of the design. This is where the development of the application begins. The development must be following the design documents drafted in the previous phases. Significant changes in this phase may cause delay. This could cause fundamental changes and regression to the design phase. The creation of the database and coding environment will be performed. Deliverables are an application based on entity diagrams and wireframes drafted in the design phase. The application must fulfill the requirements laid out in the requirements phase.

Verification/Testing Phase

Testing needs to be done before a product can be released. This ensures the product fulfills all requirements and has minimal errors. This allows for a great user experience. Quality assurance engineers will rely on design documents created earlier in the process. User case scenarios and personas help create test cases. Each function and activity must be tested thoroughly. Bugs must be documented and assessed for impact on the project. Higher impact bugs must be resolved first to reduce possible delays in delivery. Unit tests will be implemented to test the features of the application.

Delivery Phase

The completion of the testing phase begins the delivery phase. The application is set to release. The application files will be compiled into an android package file (APK) and signed with a certificate by the developer. The APK holds the code and assets of the application. The developer will hold the private key. The software will then be added to the Google Play Store.

Maintenance Phase

The application is available to the public. Bugs and general complaints are inevitable. The Google Play Store page where the app is located must be closely monitored. All issues and complaints must be documented. Issues will be tested to verify they are reproducible. The quality assurance engineer and the developer will work together to produce functional and bug-free resolutions. Higher risk issues will be worked on first. The application must be continually maintained and patched when necessary.

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Deliverables

The Waterfall Methodology phases include multiple deliverables. The two types of deliverables are project and product deliverables. These deliverables will be described and listed below along with the artifacts that qualify.

Project Deliverables

Project deliverables are items that belong in the Project Manager’s realm of responsibilities.

* Project Schedule
* The project schedule defines what items will be worked on and when they will be worked on. The schedule details the entire timeline of the development process. Each item will have an estimated time of completion.
* Requirements Documentation
* The document contains all application requirements laid out by the key stakeholders of the company. Each requirement must be approved by the stakeholders.
* Test Plans
* The plan lays out the procedures used to test and validate the application. This includes testing each function of the application and each screen. The tests should verify the application is as bug-free as possible.

Product Deliverables

Product Deliverables are items produced for the purpose of delivering them to the customer.

* Wireframes
* Wireframes are visual representations of the desired flow of the application. Wireframes display each screen in low fidelity with the basic functionality described. Wireframes are the basis of prototypes. Wireframes require approval before moving on to creating higher fidelity mockups.
* Prototypes
* Prototypes are high-fidelity design documents based on the final approved wireframe. The prototype provides a clear picture of what the final application might look like. The prototype can be used to test design elements.
* Final Application
* The final application is fully tested and as bug-free as possible. It fulfills all the requirements set by the company. The application provides a user-friendly graphical user interface (GUI). The application allows for the entry of blood sugar readings. The application parses data into visual reports. The application provides configurable alarms to set.

Implementation

The project manager will be tasked with keeping the stakeholders up to date with the current developments in the project. The project schedule will be critical in managing the entire development process. Each item on the schedule will be divided into easier more focused tasks. Information about the task and the estimated completion date will be communicated to all the stakeholders. A weekly meeting will be held to keep the stakeholders continuously involved and updated.

The quality assurance team will be responsible for testing the software. The QA team will begin testing near the end of the development of the application in the implementation phase. The team will be using Android Studio. The QA team will be utilizing an emulated Android phone running Android version 11. The application is using the Room framework for the database. The QA team will test each function and screen of the application thoroughly. Once testing has been completed, unit testing will begin. The team will use Junit 4 for unit testing. The QA team will compile reports of all work done during the week and hand them off to the project manager. The project manager will brief the stakeholders weekly on the progress. The QA time will also compile reports for the development team. These reports will include bugs fixed and new bugs found. The report will categorize the bugs and list the bugs with the highest risk first. This will help prevent delays. After the bugs have been discovered and fixed the project manager can present the application to the stakeholders. Once the stakeholders have signed off the final preparations for deployment will begin.

The development team will begin drafting a release plan. The plan will outline the deployment process. Once the release plan is approved by the stakeholders the release process can begin. The application will be compiled into an APK and signed by the development team with a certificate. The development team will have the private key for the APK. Finally, the application will be uploaded to the Google Play store.

Validation and Verification

The development and quality assurance team will perform most of the validation and verification of the application. The development team will validate that the application fulfills all the requirements. This first begins in the implementation phase using the requirements document. The application will be developed using the requirements document as the basis. Stakeholders are updated weekly on the process by the project manager. This keeps the stakeholders up to date on the current stage of development.

The QA team will verify all functionality of the application. Various tests with edge cases in mind will be conducted. The functionality of the database will also be tested by the QA team. They will validate data can be entered easily and without fault. The QA team will also conduct user testing near the end of the testing phase. This provides a real-world use case experience. The team will collect feedback from the users and document all their findings. This will be presented to stakeholders by the project manager. The stakeholders will either sign off or request further user testing. Bugs found will be communicated to the development team for remediation.

Environment and Costs

Programming Environment

* Windows 10 Pro OS
* Android Studio IDE
* Java Programming Language
* Room Framework Version 2.3.0
* Android Compile SDK 32, Minimum SDK 26
* Android Version 11 Virtual Device

Environment Costs

The environment costs for this project are extremely low. The operating system for the computers costs $199.99 for each license. Android Studio is free. Room Framework is also free to use. The database will be hosted on the user’s cellular device so there are no hosting fees. The Google Play Store does charge a one-time fee of $25 to publish your first application to the app store.

Human Resource Requirements

The size of the team for this project is small yet effective. The team consists of one project lead, one designer, three developers, and two quality assurance engineers. The developers are the majority of the human resource costs for the project. The total cost is $32,425.

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| Role | Quantity | Hourly Rate | Estimated Work Time | Total Cost |
| Project Manager | 1 | $65/hour | 80 hours | $5200 |
| Software Designer | 1 | $55/hour | 15 hours | $825 |
| Software Developer | 3 | $80/hour | 100 hours | $24000 |
| QA Engineer | 1 | $60/hour | 40 hours | $2400 |

# **Project Timeline**

For this section, you'll need to look at the phases of the project and provide information about the time required to complete each phase.

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| --- | --- | --- | --- | --- |
| Phase | Milestone/Task | Deliverable | Description | Dates |
| Requirements | Task 1 /  Requirements Documentation | Stakeholder-approved Requirements Documentation | Meeting with customer and procedure review | 7/01/22 –  7/20/22 |
| Design | Task 2 / Wireframes and Prototypes | Wireframes and Prototypes | Create wireframes and prototypes to validate the flow and interface of the app. | 7/21/22-  7/31/22 |
| Design | Task 3 /  Entity Diagram | Entity Diagram | The diagram illustrates the database layout and tables to complete the application. | 8/1/22-  8/7/22 |
| Design | Task 4 /  Testing plan | Testing Plan | The plan is used to validate the application in later stages. | 8/8/22-  8/15/22 |
| Implementation | Task 5 /  Functional app | Functional app | A functional app that fulfills all requirements | 8/16/22-  8/31/22 |
| Testing | Task 6 /  Quality assurance testing | QA testing report | QA team will perform exhaustive testing on all functions and screens of the app | 9/1/22-  9/15/22 |
| Testing | Task 7 /  Guerilla User Testing | User Testing Report | QA team will perform guerilla user testing on the application. Feedback from users will be documented in a report. | 9/16/22-  9/30/22 |
| Delivery | Task 8 /  Delivery | Final Application | The fully tested application will be presented to the stakeholders. Once the application is signed off the application is complete. | 10/1/22-  10/2/22 |
| Delivery | Task 9 /  Deployment | App deployed to Google Play Store | The final application will be compiled and published to the Google Play Store. | 10/3/22-  10/4/22 |
| Maintenance | Task 10 /  Maintenance | Continual Maintenance Plan | A continual maintenance plan is drafted and agreed upon by stakeholders and the development team. | 10/5/22-  Future |