**ASSIGNMENT 01 FRONT SHEET**

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| **Qualification** | **BTEC Level 5 HND Diploma in Computing** | | |
| **Unit number and title** | Unit 09: Software Development Life Cycle | | |
| **Submission date** |  | **Date Received 1st submission** |  |
| **Re-submission Date** |  | **Date Received 2nd submission** |  |
| **Student Name** |  | **Student ID** |  |
| **Class** |  | **Assessor name** |  |
| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice. | | | |
|  |  | **Student’s signature** |  |

**Grading grid**

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| **❒** **Summative Feedback: ❒ Resubmission Feedback:** | | |
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| **Internal Verifier’s Comments:** | | |
| **Signature & Date:** | | |

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# Introduction

This report is about the analysis of the development of software for Tune Source, a music store founded by John Margolis, Megan Taylor, and Phil Cooper. The analysis includes an SDLC model, risk assessment, and management along with feasibility studies. They began as an offline music business focusing on locating and collecting rare and high-quality vinyl; as a result, people consistently flock here to find their favorite recordings. Aside from a headquarters shop, they also offer a website where customers may buy and search records. Last year's recorded sales were $40 million, with an annual growth rate of 3% to 5%, and they wish to expand their business to earn more commissions. Their website had already been published and was given by a local Internet Service Provider in Los Angeles and the firm IT department; the website seemed to be functioning well. They also intend to establish modest kiosks to boost sales.

# SDLC models

## Definition

The Software Development Life Cycle (SDLC) is a software industry method for designing, developing, and testing high-quality software. The SDLC seeks to develop high-quality software that meets and exceeds customer expectations and is completed on time and within budget. (Tutorials Point, 2022)

SDLC is used inside a software organization to construct a software project. It is a thorough strategy that describes how to build, maintain, replace, and change or improve certain software. The life cycle outlines an approach for enhancing software quality and the development process. (Tutorials Point, 2022)

There are various types of SDLC models that a development team can choose to develop their project. Each model has its unique traits along with pros and cons. The following section discusses some of the most prevalent ones and the final verdict on which one suits the project the best is given followed by an explanation.

## Waterfall

### Definition

The Waterfall is considered the first SDLC model to be introduced and implemented. In a waterfall model, each phase must be finished before the next one can begin, and the stages must not overlap.



Figure 1 Waterfall Model (tutorialspoint, 2022)

### Advantages

* Structure is clear, granting ease of use for the team members.
* End goal is determined early, making it easier to develop the project
* Information is communicated effectively, making the model suitable for larger projects where tasks and team members are big.

(Lucid Content Team, 2022)

### Disadvantages

* Since the model does not allow going back to the previous step to make changes. Any changes needed to make to the system would have to wait until the whole process is done and a new one is made. Implementing changes is harder.
* Client and end-users are not included in the process, changes are likely to come after the product is finished and more time is needed to develop it.
* Testing is delayed until the process is complete. Risking errors appearing early but fixed late.

(Lucid Content Team, 2022)

### Principles

* The waterfall paradigm splits your processes into consecutive segments. You may only progress to the next step of your project when the current one has been completed. This also means that there is no room for deviation or revisiting a phase once it has been completed. The only way to go back is to start from scratch.
* Minimal client involvement: A waterfall project requires little or no customer engagement. This is largely because operations begin only once the customer's needs and objectives have been properly specified. The first meeting occurs before operations begin, and the second occurs when the project is nearing completion.
* This technique also includes detailed documenting of all requirements, the development process, and the end result. This contains everything from a timetable to the specific steps you will take to solve the client's difficulties. Because there is little to no client interaction during the development phase, every critical element must be recorded beforehand.

(Waseem, 2022)

## V-model

## Prototyping

Diagram

Description automatically generated

Figure 2 Prototyping model (Martin, 2022)

### Definition

The Prototyping Model is a model in which a prototype is developed, tested, and changed until it is acceptable. It also builds the foundation for the final system or program. It works best when the project's needs are not fully understood. It is an iterative, trial-and-error process used by both the developer and the customer. (Martin, 2022)

### Advantages

* Customers get an early say in the product, which increases customer happiness.
* Errors and missing functionality are quickly recognized.
* Prototypes can be utilized in more complex projects in the future.
* It stresses teamwork and adaptable design techniques.
* Users now understand how the product works better.
* Quicker client feedback allows for a greater understanding of customer demands.

(Lewis, 2019)

### Disadvantages

* The primary downside of this technique is that it is more time and money consuming than alternative development methods such as the spiral or Waterfall model. Because prototypes are often abandoned, some businesses may not see the benefit in using this method.
* Inviting client feedback so early in the development process may also generate issues. One issue is that there may be an overwhelming number of modification requests that are difficult to satisfy. Another difficulty might develop if, after viewing the prototype, the buyer requests a faster final release or loses interest in the product.

(Lewis, 2019)

### Principles

* Not a comprehensive development methodology in and of itself, but rather a way for dealing with specific aspects of a broader, more traditional development methodology.
* Attempts to decrease inherent project risk by segmenting a project and making it easier to adjust during the development phase.
* The user is involved throughout the development process, which enhances the chance of the final implementation being accepted by the user.
* Small-scale mock-ups of the system are created through an iterative change process until the Prototype meets the needs of the consumers.
* While most prototypes are created with the intention of being abandoned, it is feasible in some situations to progress from prototype to operational system.
* To prevent fixing the wrong problem, a basic grasp of the core business problem is required.

## Agile

## Spiral

## Risks and approach to manage them

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Risk description | Type | Probability | Impact | Solution |
| 1 | Data of the store is lost or corrupted due to power outage | Physical risk | Medium | High | implement a uninterruptible power system so that the system can safely shut down in case of a power outage |
| 2 | A user makes purchased using stolen credit cards | Financial | Low | Medium | Work tightly with credit card company and only let the transaction go through when the company has verified that it is legitimate |
| 3 | A developer accidentally pushed defective codes into production | Human error | Low | High | Implement a version control solution so the code can be rolled back in case such a scenario happens |
| 4 | Due to miscommunication, the developer team has created a website that is far from what the client has envisioned, the aesthetics and layout are off with what they think it would be | Quality | Medium | High | Wireframe and detailed design layout should be carefully discussed with the clients before the front-end is coded. |
| 5 | A customer's credit card has been charged twice for a month of subscription | Quality | Low | Medium | Investigate the part that causes such problem for the customers, offer them a refund along with a discount as an apology to keep them subscribed. Implement a better quality assurance process to prevent future incidents from happening |
| 6 | The project is projected to go over the budget that was initially discussed and offered during the development of the system | Budget | Medium | High | Another meeting/discussion regarding such problem need to be held should this happen to decide whether to cut out features to lower the cost of the project of to invest more into the project to ensure the quality for the users. |
| 7 | The project manager demands for a mobile app of the website since more and more people are using smartphones and that would bring much more profits and revenues for the store | Project scope | Low | Medium | This falls too far out of the scope of this project. One good way to approach this is to make it a separate project to be developed after this project has been finished and put online. |
| 8 | The project uses vanilla JavaScript to make a website. However, there is a new framework called ReactJS that would greatly reduce the development time and cost. | Technology | Medium | Medium | Migrate the developed part into a system that runs on the framework. The migration will take extra time and effort, but in the long run it would save much more time and cost than it costs. |
| 9 | Personnel from Human Resource has tried to prevent the employees from unionizing. This has caused an uproar among them, and they are striking, tremendously slowing the development | Resource | Low | Very High | The person responsible’ s employment needs to be immediately terminated. Professionals on labor laws and negotiation need to be invited to ease down the tension between the company and the employees. A union should also be formed to meet the demand of the employees and incentivize them to continue working and completing current and future projects. |
| 10 | Project manager comes up with the idea of automatic playlist generation where the system would automatically create a playlist based on each user's listening activity and favorites songs and genres. This way the users can discover new music similar to what they already listen to and love | Project scope | Low | Low | Since this is not an essential part of an online music service, it can be left to develop after all the initial requirements have been met and the product is ready to be online. At that stage, such a feature can be focused on to be developed as it involves Artificial Intelligence and Machine Learning, which is not a part of traditional websites. |

# Feasibility study

## Purpose of conducting a feasibility study for the project.

Feasibility studies are critical for business growth. They may help a company decide where and how it will operate. They can also identify possible roadblocks to its operations and estimate the amount of capital required to get the firm up and operating. Feasibility studies seek marketing tactics that will persuade investors or banks that investing in a specific project or business is a sensible decision.

## How the feasibility criteria applies to Tune Source

### Technical feasibility

#### Familiarity with Application

The development team are well familiar with the application. In the past, they have

developed five online stores for different clients, and all run stably, quickly, and were able to pull in

much more customers. Making the risk of this aspect Very Low.

#### Familiar with Technology

Since web-based technology is easy to use and adapt to, the risk for this is Low. The staff

should already be acquainted to websites and the internet. They would have to go through training

sessions to familiarize with the new system when it goes online.

#### Compatibility with the existing system:

This is low risk as the system implements Microsoft technology (ASP.Net) which is proven to

be reliable and have not posed any challenges with compatibility.

### Economic feasibility

The system will be developed within a year with support from the developer for 5 years. The

table below proves that the project is economically feasible.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | Total | |
| Benefits |  |  |  |  |  |  | $                       - | |
| Increased sales from new customers |  | $384,125 | $460,950 | $553,140 | $663,768 | $796,522 | $2,858,505 | |
| Increased sales from existing customers |  | $363,188 | $435,825 | $522,990 | $627,588 | $753,106 | $2,702,696 | |
| Reduction in inventory |  | $80,000 | $96,000 | $115,200 | $138,240 | $165,888 | $595,328 | |
| Reduction in staff |  | $120,000 | $144,000 | $172,800 | $207,360 | $248,832 | $892,992 | |
| **Total Benefit** |  | $947,313 | $1,136,775 | $1,364,130 | $1,636,956 | $1,964,347 | $7,049,521 | |
| After examining the current tangible value of the company with past projects as a reference, the system is projected to bring inearlyar 1 million dollars in revenue in 1 year after the implementation and 7 million for the whole period where the system is supported by the development team. | | | | | | | |
|  | | |
| Development Costs |  |  |  |  |  |  |  | |  |  | |
| Development team | $500,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $500,000 | |  |  | |
| Consultant | $30,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $30,000 | |  |  | |
| Hardware and software | $200,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $200,000 | |  |  | |
| Data conversion | $5,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $5,000 | |  |  | |
| Office and equipment | $100,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $100,000 | |  |  | |
| Development training | $5,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $5,000 | |  |  | |
| **Total Development cost** | $840,000 | $                    - | $                       - | $                       - | $                       - | $                       - | $840,000 | |  |  | |
| This is the funding needed to develop a system for the store, as this is an one-time cost, it only occurs at the year in which it happens and does not for the rest of the project. | | | | | | | |  | | |
|  | | |
| Operational Costs |  |  |  |  |  |  |  | |  |  | |
| Software upgrade |  | $3,000 | $3,180 | $3,371 | $3,573 | $3,787 | $16,911 | |  |  | |
| Software license |  | $1,500 | $1,590 | $1,685 | $1,787 | $1,894 | $8,456 | |  |  | |
| Hardware maintenance |  | $1,000 | $1,060 | $1,124 | $1,191 | $1,262 | $5,637 | |  |  | |
| Hardware upgrade |  | $1,000 | $1,060 | $1,124 | $1,191 | $1,262 | $5,637 | |  |  | |
| Staff training |  | $1,000 | $1,060 | $1,124 | $1,191 | $1,262 | $5,637 | |  |  | |
| Technicians |  | $60,000 | $63,600 | $67,416 | $71,461 | $75,749 | $338,226 | |  |  | |
| Administrator |  | $50,000 | $53,000 | $56,180 | $59,551 | $63,124 | $281,855 | |  |  | |
| **Total operational cost** |  | $117,500 | $124,550 | $132,023 | $139,944 | $148,341 | $662,358 | |  |  | |
| This is the funding needed to keep the system running throughout the period after the development of the system. It only occurs after the development and implementation of the system. | | | | | | | |  | | |
| **Total Cost** | $840,000 | $117,500 | $124,550 | $132,023 | $139,944 | $148,341 | $1,502,358 | |  |  | |
| **Total Benefit - Cost** | -$840,000 | $829,813 | $1,012,225 | $1,232,107 | $1,497,012 | $1,816,006 | $5,547,162 | |  |  | |
| The first year is spent on developing the software, therefore the system is not online to make any revenue yet, making the money flow a negative value.  After examining the current tangible value of the company with past projects as reference, the system is projected to bring in near 1 million dollars in revenue in 1 year after the implementation and 7 million for the whole period where the system is supported by the development team. | | | | | | | |  | | |

#### Intangible Benefits

Implementing an online store would attract many more customers to Tune Source, increasing the reputation and market shares of the company.

* Reduce thenumber of staff number needed for a larger scale of operation.
* Reduce the amount of labour needed to make and process payment as the system is automated.
* Minimize human errors in record keeping.
* Is flexible for future expansion.

# conclusion

# References

Tutorials Point, 2022. *SDLC Tutorial.* [Online]   
Available at: https://www.tutorialspoint.com/sdlc/  
[Accessed 24 June 2022].