ASSIGNMENT 1 FRONT SHEET

Qualification	BTEC Level 5 HND Diploma in Computing		
Unit number and title	Unit 9: Software Development Life Cycle		
Submission date		Date Received 1st submission	
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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

P1	P2	P3	P4	M1	M2	D1	D2

✿ **Summative Feedback:**   ✿ **Resubmission Feedback:**

Grade:	Assessor Signature:	Date:

Signature & Date:

Contents

INTRODUCTION

In the assignment will discuss two iterative models and 2 sequential models how they work in the software development life cycle. Next, discuss the risks and how to manage risk if Spiral is used in developing Tune Source. Finally, describe and compare explain of feasibility report when using them.

I.   Iterative and sequential software lifecycle models

Software development life cycle (SDLC - Software Development Life Cycle) (Sayan, 2017)is behind a software project. It is a detailed plan to guide how to develop, maintain, change or upgrade software in a software project, which makes it possible for all project members to handle work. corresponds to your position synchronously through the general way of the company, or at least at the project level.

Software development process models are software development life cycle models that are defined and designed following in the software development process. Each model used will provide a process to follow the steps for its type to ensure success in the software development process. There are two common types of models that are iterative models and sequential models.

1.   Iterative models

a.   Overview

Iterative models are a very important part of SDLC, it is an extensive process across a range, focusing on small ranges set up for small ranges of simplification then extending into large incremental ranges the complexity of the problem until it is complete. In short, iterative models are models that turn big problems into small problems for easy resolution. In this report, we will discuss two typical iterative models that are spiral and DSDM models
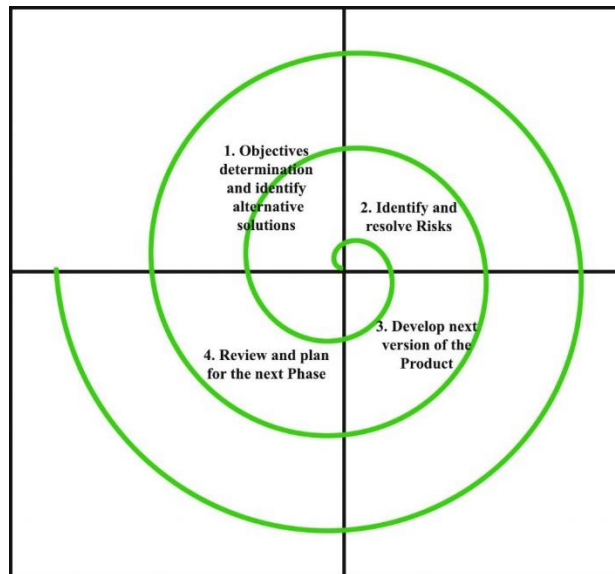
b. Spiral model (Boehm, B.W., 1988)

Figure 1:Spiral model

The spiral development model is the most important and popular SDLC model. It helps SDLC manage and support risk management. In the model, it has a lot of loops that create a spiral. In this model, the number of spiral rings will vary depending on the stage needed to develop the product in the project to be applied. The angular size of the spiral depends on the actual project progress achieved and its radius indicates the cost of the project to the present time.

The spiral model will change depending on the project you choose. However, a common model will begin to be discussed as follows:

Objectives determination and identify alternative solutions: At the first quadrant, the work that needs to be done is based on data from users, data on customer requirements will be analyzed during the beginning of the phase to determine the product target. built. Besides, in the first quadrant, it will also identify alternative means to implement this part of the product.

Identify and solve risks: Assigned at the second quadrant, in this section will address the identified risk problems by the best solution. In it, will list the risks and how to solve them with the best strategy. Spiral model handles risks by defining the scope to build prototypes at every stage of software development.

Develop the next version of the Product: Based on risk planning and analysis, it is possible to develop a test version for development and deployment.

Prepare for the next phase: From this stage, we will rely on the progress of the project, evaluate the project through step 1. Next, deploy the project and solve the next issues of the project has been planned.

Advantages of spiral models:

- Managing and handling risks throughout the project: In a project, there are many potential risks that occur when the project is carried out despite careful preparation. In case of risks arising during project implementation, the spiral model will be a good choice to analyze and handle risks at all stages when the project is implemented.
- Used for large projects: With a large project, there is a lot of work to be done, which leads to potential risks so the spiral models will be the choice for large-scale projects.
- Trust of customers: Thanks to the feature of the iterative model created to divide the problem into smaller problems. So, the spiral model will help the customer know the development of the software at different stages to reinforce the belief at customers.
- Predict the actual term and cost: Thanks to the chart that the spiral model brings, customers, project developers will know the cost for each stage of the product, thereby balancing the financial, avoid financial risks.

Disadvantages of spiral models:

- The spiral model is complicated in analyzing risks, it is difficult for those who have not experienced to analyze and manage risks when choosing the spiral model applied to the project.
- Spiral models if applied to small projects will be very expensive because risk analysis costs a lot of money.
- Applicability in practice is still limited compared to other models. So look for an experienced person to coordinate the project very hard.

c. Dynamic systems development method(DSDM) (Stapleton, 1997)

DSDM is a fast application development method, this approach approaches software development, it provides lightning fast project development and processing platforms. In DSDM there will be active participation of users, and the development team is given project decisions such as continuous changes and project changes. The focus of DSDM activity is to regularly release products. Concentrating both users and the project development team will help to clearly identify and focus on providing real benefits early for the business.

DSDM consists of 5 stages: feasibility study, business study, functional model iteration, design and build iteration and implementation.

Feasibility study is the period of assessing the relevance of DSDM for the given project. This stage also mentioned the feasibility of risk level and technical aspects throughout the project. In this step, it will provide an outline of the development plan throughout the project.

Business study is the stage in which the tasks need to be done and the technology analyzed in the project. In this step, the project is organized to hold press conferences and seminars, where experts and customers can review and evaluate the discussion of the project, giving priority and non-priority issues to develops. Any duty to bear Influence and stakeholders and developers will be described in the Business Area Definition. This determination will be described as an associated entity model, …

Functional model iteration is the first iteration and incremental phase-in DSDM. During this period, the feature will be developed and given a trial version. With the trial version evaluation and evaluation will be used and upgraded the analysis model. The trial version will not be removed in subsequent upgrades but gradually upgraded until it finishes with the highest quality until the software is included in the final system. The functional model is created as an output, including atrial version code and analysis model. In this stage, functional testing is also an integral part.

Design and build iteration is the stage in which the system is focused on building. The system output has met the basic requirements. Design and features of trial version to market. User reviews will now be developed software until finalized.

Implementation is the actual production stage of the system. All work will be carried out by the user. If the actual deployment attracted a large number of users, the next process will be repeated. Besides software, this step will provide future user documentation and backups for system development. DSDM outlines the possibility. If the system meets the user requirements, the project will not develop further to save costs. But if there are still unresponsive system requirements, the development process may have to be repeated and start a new loop.

Advantages of DSDM models:

- Basic product functionality can be provided quickly because the product is developed as soon as the project starts
- The interaction between users and developers is very close because data from user feedback is a decisive factor for a successful project.
- Projects are completed on time, sometimes saving time and cost if successful the first time

Disadvantages of DSDM models:

- It is not feasible if the project has too many risks
- During the product development and completion phase, user feedback sometimes makes the project go in a different direction instead of the original direction specified.
- Not recommended for small organizations.

2. Sequential models

Sequential models are traditional models in SDLC. In the sequential model, step by step, isolate this step to complete the next step. In the sequential model there are 2 famous models that are V model and waterfall

a. Waterfall (Boehm, B.W., 1988)

The first model introduced in the sequential model is **Waterfall**. In the waterfall model, each step is performed independently and does not overlap. In SDLC, the waterfall model is the easiest model to approach and implement.

Requirements: The first stage we must complete the necessary software requirements including its functions, design and purpose … the specifications of the input-output must match and clearly.

System design: Preparations from the required step will be implemented. System design helps identify hardware and system requirements and also helps build system architecture.

Deployment: With inputs from the system design, the system is developed according to the structure and requirements of step 2, and this stage also includes functional testing.

Integration and testing: Checking the software details based on the tester's experience and giving it to the customer so that there is no error.

Deploying the system: After testing the function and there is no faulty deployment function, the product will be released to the market.

Maintenance: this step is performed after the product has been used in practice, based on customer feedback, the maintenance will be carried out and continue in the future.

Advantages of waterfall models:

- The waterfall model evolves through stages and is very clear without overlapping, so it is easy to use.
- Each stage is clear and has specific products to consider processes, so it's very practical.
- In addition, the advantages of the waterfall model allow branching and control, so that we can set the time to manage easily to save time and complete according to schedule.

Disadvantages of waterfall models:

- It is difficult to estimate the cost for each stage of the development process that can be extended when steps are not completed on schedule.
- An application when in the design phase is missing during the request phase will not be able to return and supplement

- Not a model that is suitable for complex and risky projects

b. V model

Base on (Mathur, S. , Malik, S., 2010) **V Model** is an SDLC model in which the steps in the model will follow the V-shape. It is also called the Verification and Validation model. (According to the author (Mathur, S. , Malik, S., 2010) Validation: In testing, this technique is carried out without running code. It will have activities such as review (review), inspection (inspection) and inspection from beginning to end (walkthrough). Validation: Validation is a test performed by running code. Includes functional testing (function) and non-function (non-function).)

V Model is an extensive waterfall model and based on the linkage of the testing phase for each respective development stage. This means that stages are developed and quality ensured simultaneously. In this model, there is no test step, instead testing takes place during project completion.
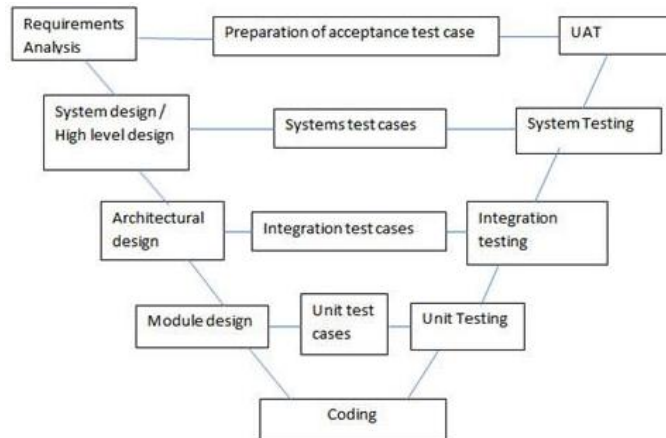

Figure 2: V model

The left side of the model:

Required analysis: Brain storming / walkthrough, interviews

System requirements: Plan for possible fulfillment requirements. The technical feasibility of the request will also be addressed. The group also learns about modules that will be dependent, hardware and software needs. The verification activity will evaluate the design, in addition to confirming that the generated test cases for output are: System test cases, Feasibility reports, System test plans, documentation on hardware and modules, ...

Architectural design: In this stage, the task to do is to design the system architecture including related documents, software hardware testing plans and modules.

Low-level design: Classes, methods, small functions and diagrams of data are created.

Code: Verification activity will Review code, test and Confirmation operation: functional and non-functional testing. This stage includes test cases and code document reviews.

To the right of the model:

Unit test: Perform unit tests and write documents related to unit tests.

Integrated testing: In the integrated test, a comprehensive product inspection will be carried out, all errors will be recorded in the integrated test documents including results and errors.

Checking the system: Actual inspection of the product's operation, Error detected and tracked to correct.

User acceptance testing: user and business re-testing, non-functional testing will also be implemented during this period.

Advantages of V model:

- The operation process throughout the project is very strict, proper and adequate application of processes that helps the project minimize failures
- Effective operation for small and medium projects
- Tests are used at the beginning of the project, so errors are quickly detected and remedied quickly
- Easy to manage for clearly defined goals

Disadvantages of V model:

- Not sure about risk management
- There is no software created in the middle of the project

II. Risk management in the Spiral lifecycle model (Whitten, J. L., Bentley, L. D., & Dittman, K. C. , 2000)

1. What is risk management?

Risk management is the process of identifying, evaluating and handling threats to the organization, specifically in Tune Source, which helps identify and handle what Tune source encounters during deployment. This risk is determined based on threats such as: shortcomings in personnel, finance, product functions in the wrong direction …. Therefore, the risk management plan increasingly includes the processes of companies to identify and control threats to the project including the risks listed below.

2. How to identify Risks?

According to "" In the risk management process there are 7 ways to identify risks:

- **Interview**: During the interview process, the interviewer will provide a series of questions for the interview process to find out the problems that need to be addressed, during the interview process there are often long-time experienced users and parties. related, the interview process must be planned in detail. After the interview, the result will be the result of the interview.
- **Brainstorming** about the project will determine the project goal, including successful project management including progress, budget, quality or scope, resource … or risks in Interview, code generation, stakeholders, weather is also a part that you need to think about the level of risk.
- Use the **inherent risk** list of the company, but depending on the project, the risk list is also different
- Assumption is the source of risk. Risk assumptions should be prepared about this project by asking stakeholders. This way will include documentation of **risk assumptions.**
- One of the seven most common ways of determining risk is a cause and effect diagram. This diagram is simple and powerful, the project manager will determine the cause of the risk and then minimize and eliminate them.
- Nominal Group Technology (**NGT**) is a set of processes related to problem identification, finding solutions and decision making, in the risk management group, the input will be a series of risks and output is list and documentation of how to resolve those risks .
- Building a conceptual model based on **the UML** model, in this model shows the risk-related objects and risks identified by the stakeholders, in which the lowest layer in the model will indicate the risk and how to solve it

3. Risk management in the Spiral lifecycle model

In the spiral model, there will be a discipline to manage software risks including: Risk identification, risk analysis, risk prioritization, risk management planning. In the spiral model the top 10 priority risks are given as follows:

Risk Item	Risk management techniques
Personnel shortfalls	Failure to meet the proposed human resources will be the top risk, lack of qualified personnel, how to discuss ...
Unrealistic schedules and budgets	Details of costs, prices, estimated costs, software requirements and difficulty of the project affect costs.
Developing the wrong software functions	Determined analysis of functions and no function; task analysis, unit analysis, creating studies that identify user requirements, early user guides
Developing the wrong user interface	Analyze by asking questions, listing functions, types, diagram models, structure design and interface
Gold plating	Scrubbing requirements; create templates; Cost benefit analysis; Focus on MVP
Continuing stream of requirement changes	Prepare revised costs and manpower, Use rapid prototyping, Create automated testing
Shortfalls in externally furnished components	Reference test, compatible analysis
Shortfalls in externally performed tasks	contract fees, competitive designs or prototyping, team building
Real-time performance shortfalls	adjustment, modeling, simulation
Straining computer science capabilities	Cost benefit analysis; create templates; references check

The first process of risk management with spiral model is **risk assessment**. The organization uses risk assessment to determine the extent of the risk to the software that the organization is implementing. The consequences of risk will be the level of impact on business purposes. Risk assessment based on 5 levels rating scale in risk survey (25-Almost certainly, 20 possible, 15-Maybe, 10-Not sure, 5-Rare).

Probability	Consequence				
	Insignificant	Minor	Moderate	Very High	Extreme
Almost Certain	M	H	C	C	C
Likely	M	H	C	C	C
Possible	L	M	H	C	C
Unlikely	L	M	M	H	H
Rare	L	L	L	M	M

The inherent risk calculation will be explained as: Inherent Risk = Consequence X Probability Inherent risk and in which have 4 level rating scale

Level of Inherent Risk	Description	Inherent Risk I *P
Critical	Critical Risk, Immediate action required	Over 260
High	High Risk, Corporate senior management attention needed to develop and possibly initiate action steps in the near future	151 to 260
Moderate	Moderate Risk, Functional head attention needed	76 to 150
Low	Low Risk, Manage by routine procedures	Less than 75

(Extreme Risk, High Risk, Moderate Risk, Low Risk).

III.   Feasibility analysis (Whitten, J. L., Bentley, L. D., & Dittman, K. C. , 2000)

Feasibility analysis is analysis of strengths and weaknesses of the project. In the feasibility analysis, there are 3 items that we should note: technical feasibility, economic feasibility, and organizational feasibility. After finishing the feasibility analysis, the feasibility analysis document will be submitted to the project management.

1.   Technical feasibility

The first step in analyzing the feasibility of the project is to evaluate the technical feasibility. In which, it will assess the evolution of the system. In technical feasibility, it is the technical risk analysis of the project. During the business phase of the project, getting users to get acquainted with the project will be one of the important parts that the project must aim for if it wants to succeed. Risks increase significantly if users do not like using the application. In a system, upgrading the system is less risky than creating a new system, maybe users will refuse to use a new system. Secondly, users should be concerned about creating a new system that is compatible with the current operating system version that users use. When creating a new system, data integrity is ensured compared to the old system. For example, when the ZALO social network, the accounts are updated the same as the current phone number they use. The scale of the project is also a concern when the project is difficult and will continue to expand, the lack of high-level human resources will lead to the system generating many errors. There are many ways to analyze the technical feasibility of the project, should analyze the project and compare it with larger and similar projects in level. Another option is to rely on IT analysts, usually, a project will be judged from an analysis of technical feasibility.

Apply technical to tune source

In tune source, there are many risks associated with getting used to the application. Specifically, the marketing department does not have much experience in the business model by registration. Next, the IT Department, has experience in selling CDs on the website, but the website has not yet operated with the registration form and downloading music directly. But in the present time, there have been many online listening and music websites such as nhacuatui.com, sportify.com so the adjustment of risks of familiarity is not really high. There are ISPs providing online storage services so the risk of IT department is very low. In addition, consultants are always ready to provide tune source information at any time.

Project size is considered medium risk. The project team consists of 10 people or less, the support of business users will be required they can handle and complement each other in different jobs. The project timeframe will be a complement to the market appearance on time. With retail stores, the internet system is qualified to use downloads and subscriptions smoothly. ISPs are well-known providers; they can scale services to match digital music download systems.

2. Economic Feasibility

Organizations have limited funding, many projects will compete for capital, so system-related costs and benefits are of concern in the economic feasibility, when the economic feasibility analysis will indicate financial opportunities and economic risks. In order to analyze the economic feasibility, it is necessary to follow these steps:

1. Determine costs and benefits

2. Assign values to costs and benefits

3. Determine cash flow

4. Evaluate the economic value of the project

a. Return on investment (ROI)

b. Breakeven point (BEP)

c. Net present value (NPV)

1. The first step in economic feasibility is to **analyze benefits and costs**. In it is divided into 4 parts:

Development costs that businesses use to pay for research, project development, product introduction ... Development costs are considered a one-time cost.

Operating costs are the cost of maintaining an organization's operations including those that maintain parts, equipment, and related activities tangible benefits

Tangible benefits are those measured in monetary terms. Intangible benefits are benefits that cannot be measured with money. But, both of improve productivity of processes and personnel. Reduce the cost of products and services purchased.

2. Assign values to costs and benefits understanding: Analysts need to assign non-monetary and monetary values to defined costs. It is understandable, attaching the value of benefits is to convert the value of the economy to another aspect. A report will be created after assigning benefits and costs.

3. Determining cash flow is to determine the benefits and costs in a certain number of years to indicate the presence of cash flow over time. Usually this includes complaint calls, storage costs, hardware and software. This cost also depends on inflation and annual growth.

4. In the final step of the economic feasibility, it is Assess Project's Economic Value in this step, the main job will be to evaluate the expected profit against the cost. Reviews include many techniques that have been used and verified:

a, To calculate ROI, the return on the investment will be divided by the investment cost. Percentage or rate will be the result obtained. In the above calculation, "The present value of investment, refers to the proceeds from the sale of interest investments.

b, The break-even point for a project is the value of the product that the project creates by itself. The breakeven point is when the base rate is equal to the executed price plus the premium paid. A basic example, if the company sells shares for $100 as a break-even point, if the stock rises to $120, the company makes a profit. If the stock falls below $100, the company is losing money.

c, Net present value (NPV) is the difference between the value of the outflow of money and the present value of cash flow over a period of time. NPV is used in capital budgeting and investment planning to analyze the profitability of a planned project or investment. A positive net present value indicates that the expected income generated by a project or investment exceeds the expected cost.

Apply economic feasibility for tune source

In tune source marketing department will charge cost – benefit analysis. In particular, Music Download System is a large part of the company's profits. In addition, the following figures are based on the evaluation of project economic value: ROI over 3 years: 280%, NPV over 3 years: $4,180,431, Break-even occurs after 0.17 years.

3. Organizational feasibility

The final technique is organizational feasibility. This is the last and most difficult technique because in a project with many stakeholders, there are many related organizations. However, there are many ways to evaluate the organization's feasibility: Linking strategy and stakeholder analysis. The affiliate strategy is going to be a plan that helps organize, track and optimize your links. With the right plan will minimize the risk and optimize the profits earned. In addition to the stakeholder analysis, the system is being assessed and potential changes will be assessed when noted by stakeholders. After the study there will be some information analyzed. This information used to assess the interests of stakeholders should be addressed in the project plan.

Organizational feasibility applies to tune source

From the initial perspective and data of the project, this project has a low risk. Stakeholders like the company director are a marketing expert who has a lot of knowledge about the market. Special system users who buy at the store greatly appreciate the entry of tune source to the current market. However, there are still many risks such as the number of discs will be limited if famous singers release albums. Some other concerns will be that customers will choose other music download sites instead of buying albums on tune source due to Unfair competition.

IV.   Solution technical (Whitten, J. L., Bentley, L. D., & Dittman, K. C. , 2000)

Custom development is building the system from the beginning. There are many advantages when developing custom systems. In custom development, businesses build designs based on the inherent processes of businesses. Therefore, after creating the system does not have to change the inherent process to match the software. Solution from the beginning will be suitable for businesses with advantages in financial potential. This system will function exactly the way it originally created. Moreover, custom development will help the system operate according to the latest version, best suited to the environment it is targeting.

However, in custom development there are undeniable disadvantages. In the process of system development, there are problems encountered by businesses that must solve themselves without receiving any other assistance. This development style is not very risky when starting to work, for example, the code may not be as smooth as expected. On the other hand, extremely high and rigorous manpower requirements lead to a shortage of senior personnel. Human resource risk is also mentioned, human resources can leave the project and delay the project, leading to a risk of time management. When using custom development, tune source language options and IDE develop. However, all codes can be stolen by the code creator, leading to a risk of unfair competition.

Packaged Software:

Besides custom development, businesses can choose available software packages for system development. It can be seen that the market now has a lot of online music sites developing like tune source. Packages will be available for sale and businesses can use and customize according to customer requirements. An available software package will help the company avoid the risks that custom development brings. The company will not have to pay a lot of money for coding, especially when upgrading the system requires huge human resources to be able to fulfill the requirements that customers offer. However, in software packaging, there are still many risks that it brings. Hacking websites and dos web will be the top security risk. Music will be stolen and sold for sale from which the company suffered huge losses. When upgrading software will need to buy a lot of upgrade packages that the company provides, making the cost increase many times. In addition, the company needs to have a clear competitive goal and not be entangled with other companies leading to a complete failure system.

The following is a comparison of technical solutions for tune source:

Evaluation Criteria	Relative Importance (Weight)	Alternative 1: Custom Application Using C#	Score (1–5)*	Weighted Score	Alternative 2: Custom Application Using Python	Score (1–5)	Weighted Score
Technical Issues:	10	Programmers do not have much experience in C #	3	30	Programmer have a lot of experience in develop web with python	5	50
Senior manpower	20	Resources for C # are experienced newcomers	2	40	Human resources who know how to use python graduate school graduate become and do in fpt	2	40
Security	10	C # is cross-platform, so security is not really good	2	20	python has good security and easy to use	4	40
Project size	10	Suitable for large projects	5	50	Suitable for large projects	5	50
Economic Issues:							
Project development funding	25	The cost for C # is high because the	2	50	The cost for C # is low because the	5	125

		current C # programmer is not available			current C # programmer is available		
Organizational Issues							
Linking strategy	15	All affiliate strategies must be created from scratch	2	30	The organization has a strategy for the project created by python so it does not take much time to create an affiliate strategy	4	60
Stakeholder analysis	10	Users prefer to use C # applications because they use on windows	4	40	Users do not know much about python, it is difficult to feedback if there are errors during use	3	30
TOTAL	100			260			395

* This denotes how well the alternative meets the criteria. 1 = poor fit; 5 = perfect fit

After implementing technical solutions, tune source will be developed option and the language used is python.

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