ASSIGNMENT 01 FRONT SHEET

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**	
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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:**
Internal Verifier's Comments:		
Signature & Date:		

Contents

P1:Describe two iterative and two sequential software lifecycle models.

1.Sequential models:

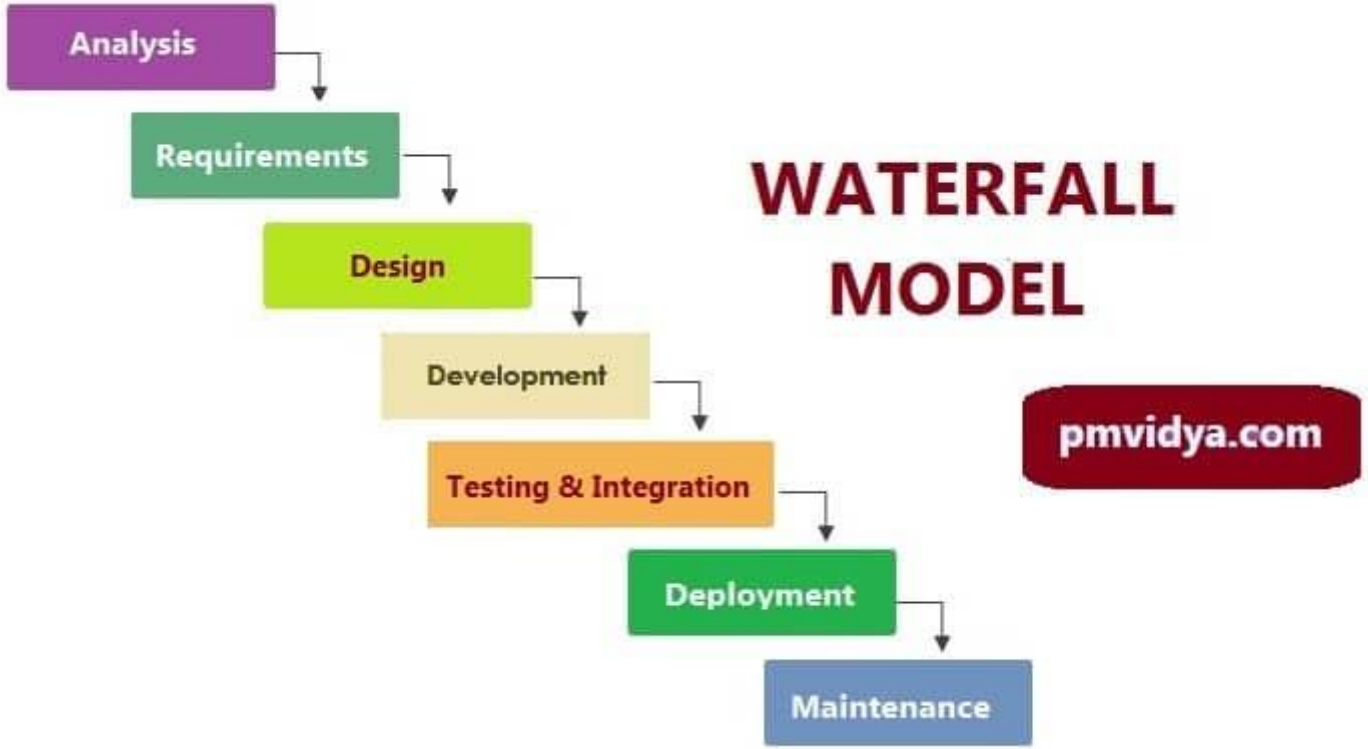

Figure 1: Sequential models

1.1:Waterfall Model

Description:

- This is the first development modeling program that has been utilized.
- The steps of software development are applied successively in this methodology.
- The previous stage's output is the following stage's input. Only when the preceding step has finished is the following stage conducted. When you wish to update something, don't go back to the previous stage to process the request.

Model analysis:

- Requirement gathering:During this phase, data collection and requirements analysis are described in the requirements specification document.
- System Analysis: Analyze and develop software systems, as well as define the overall software system architecture.
- Coding: The system is constructed unit by unit and then combined in the next step. Each unit generated and tested by the developer is referred to as a Unit Test.
- Testing: Installation and testing of software This phase's primary responsibility is to identify and rectify any faults discovered so that the software functions appropriately and in accordance with the requirements specification document.
- Implementation: Deploy the system in a client environment and promote it.
- Operations and Maintenance: Maintain the system in the event of a customer or user fault.

Application:

The following is a popular software project model:

- Small, short-term projects.
- Project needs change seldom, and there are no unclear requirements.

Advantages:

- Simple to use, simple to obtain, simple to maintain.
- Products evolve at distinct stages.
- Validation at each level ensures early fault discovery and remediation.

Disadvantages:

- Less adaptable, with a narrow range of adjustment.
- It is tough to assess progress at each step.
- The methodology is not appropriate for long, continuing projects or complicated projects with significant changes in requirements during the development life cycle.
- It's difficult to return once a certain period has passed.

1.2:Vmodel

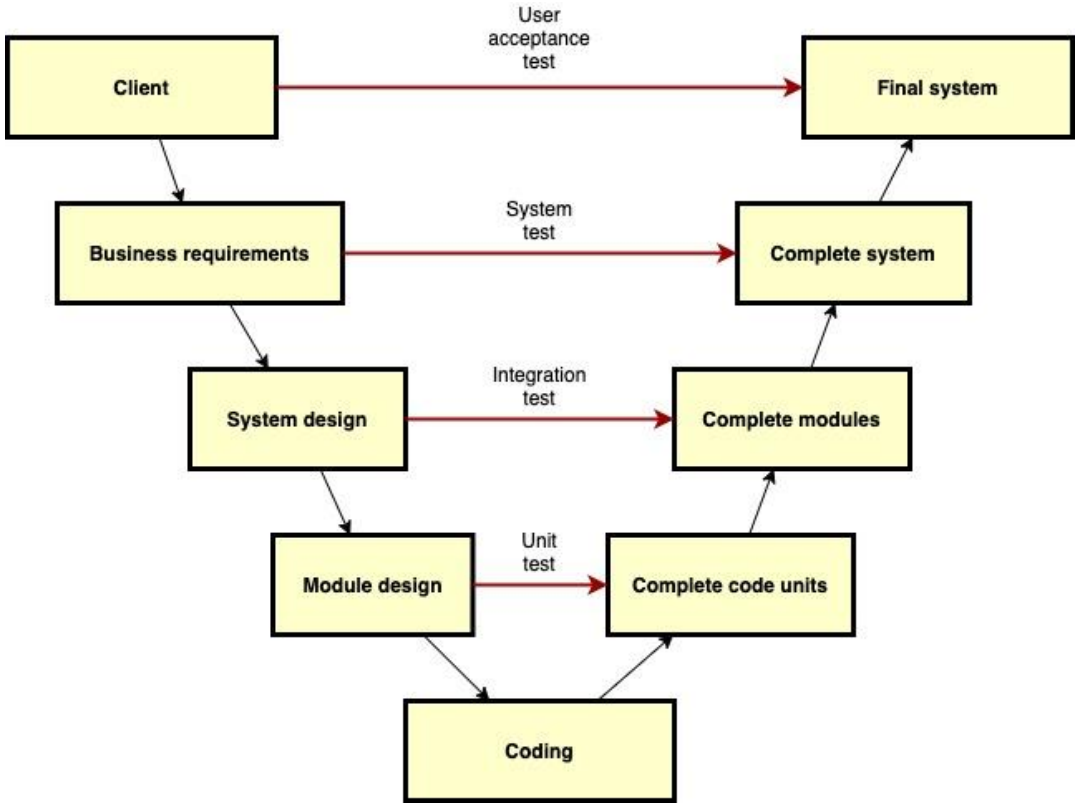

Figure 2: Vmodel

Description:

- Vmodel is a waterfall model extension. This is not the case with the waterfall model. The V model features a software development phase that corresponds to a testing phase; testing in the V-model occurs concurrently with the software development cycle.
- The testing effort is included from the start with the V model.

Application:

- The requirements are well stated.
- The technology remains the same and is well known by the project team.
- Determine the product's stability.
- There are no criteria that are confusing or undefined.
- Short project.

Advantages:

- This is a very rigorous pattern, and the steps are finished all at once.
- Simple, easy to comprehend and use, and simple to maintain.
- Works effectively for small projects with clearly defined needs.

Disadvantages:

- High risk, difficult to manage and control.
- This is a bad pattern for complex, object-oriented applications.
- Poor model for long and ongoing projects.
- Not appropriate for projects with a medium to high risk of change needs.

2:Iterative models:

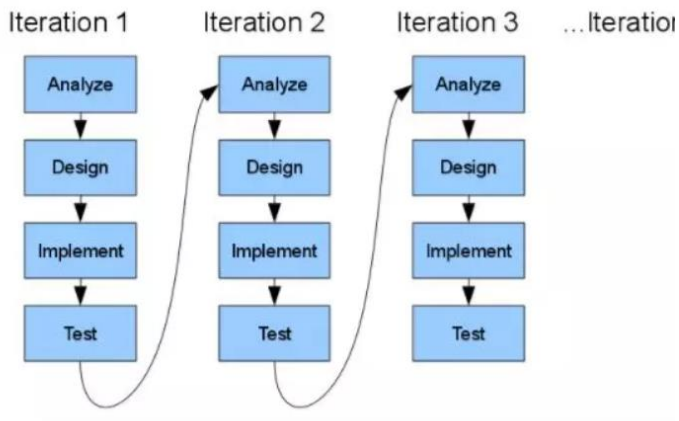

Figure 3: Iterative models

Description:

- The specification of a pattern is iterated from start to completion. This program is then iterated, with each iteration of the model producing a new version of the software.
- Rather to constructing software from the specification and then beginning to execute, this methodology may be evaluated incrementally to arrive at the final requirements.

Application:

- Although key needs must be established, some feature or enhancement requirements may emerge over time.
- While working on the project, the development team is using and learning a new technology.
- Suitable for huge tasks that must be completed quickly.

Advantages:

- Step by step, construct and perfect the product.
- Design time will be less than documentation time.
- Some functionalities may be created fast and early in the life cycle.
- Changing scopes and criteria is less costly.
- Risk management is made easier.
- Software is generated early in the lifecycle to permit client review and feedback.

Disadvantages:

- System architecture or design issues might develop at any time.
- Management needs have become increasingly complicated.
- The risk analysis phase is critical to the project's development.

2.1 Spiral Model:

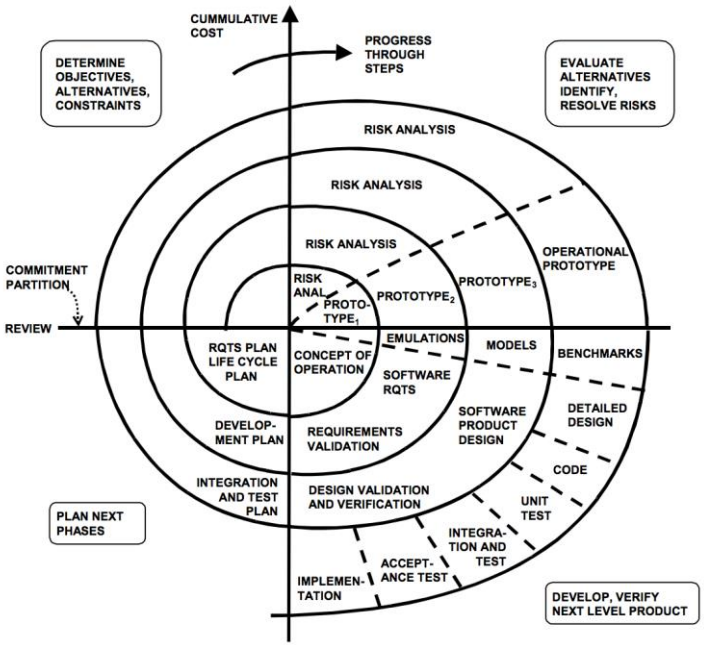

Figure 4: 1 Spiral Model

Description:

- Spiral Model is the software development method that is risk-driven. The prior models' problem-solving abilities and the strengths of other models are still present. The spiral model, which is based on the specific risk models of each project, provides a mechanism to apply parts of one or more treatment models, such as the accelerometer, waterfall model, or model. Prototyping via evolution
- The spiral model is a model that combines the waterfall model (Waterfall-Model) with the iterative model (Iterative-Model), and it shares many characteristics with the incremental model (Incremental-Model).

Stages of the spiral Model:

- **Planning phase:** Collect and assess customer project requirements. Including the following tasks: cost estimation, project implementation schedule, estimating the quantity of human resources, working environment to determine system needs. Following that, produce specification papers (Bussiness Requirement Specifications and System Requirement Specifications) to facilitate further customer and system analysis exchanges.
- **Risk analysis phase**: To identify hazards and provide alternatives, an analytical technique will be used. At the conclusion of the risk analysis phase, a prototype will be produced. Alternative solutions will be recommended and adopted if any dangers are discovered throughout this process.
- **Engineering phase:** This is the stage at which the project is coded by the developers, and the software is tested and deployed on the customer's website by the testers.
- **Evaluation phase**: The client will be involved in this phase to review the work and the product to ensure that it satisfies all of the prior requirements. If the consumer wants any changes, the phases are repeated. This is a critical stage since user input on the product is necessary before it is published.

Aplication:

- When it is critical to examine (analyze) costs and risks.
- The consumer may make a modification request at any time.
- The software needs are intricate and extensive.
- Need to develop a new product line
- When substantial changes occur (careful research and investigation is required).
- When the project must release regularly.

Advantages:

- Risk assessment. As a result, risk avoidance is improved.
- Risk assessment. As a result, risk avoidance is improved.
- Document control and approval must be strictly enforced.
- Later on, further features or adjustments may be implemented.
- Early in the program's life cycle, software will be generated.
- Applications are created quickly, and functionality are added in a methodical manner.

Disadvantages:

- In terms of risk, during the analysis stage, a highly trained professional is required to complete the study.
- Not applicable to small-scale projects.
- Because of the spiral nature of the concept, the project cost and duration can be unlimited.
- Because there are intermediary stages, project documentation might be rather extensive.
- The risk is that the project will not be completed on time or within budget.

2.2:Agile Model:

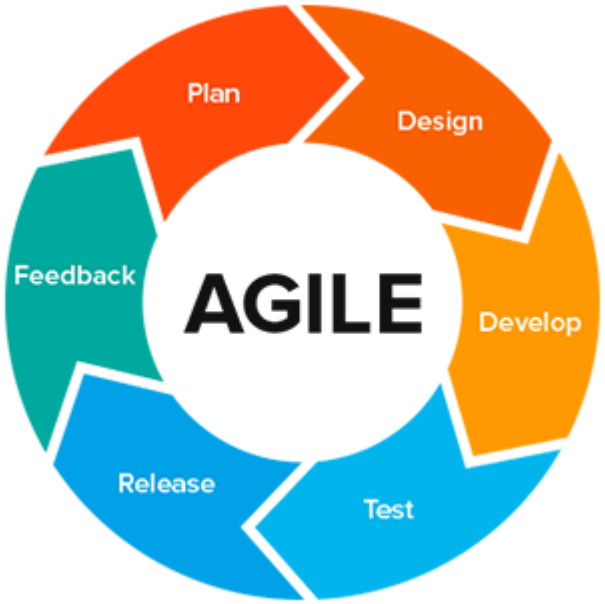

Figure 5: Agile Model

Description:

- Agile is a flexible software development process that is considered as an advance over earlier models such as the "waterfall" or "CMMI" paradigm. Agile software development is a collection of iterative and incremental development processes in which requirements and solutions are generated collaboratively by autonomous and cross-functional teams.
- The model is iterative and gradual.

- Tasks in Agile are divided into short time limits in order to deliver particular features to the final release.

Aplication:

- Can be utilized for any sort of project, but requires client participation and interaction.
- When clients demand functionality to be provided for a short length of time, use this method.

Advantages:

- . Improve collaboration and effective work exchange.
- Crickets manage to build functions fast and plainly.
- It is simple to add and update requirements.
- Minimal regulations, simple documentation, and ease of use.

Disadvantages:

- Not appropriate for dealing with intricate dependencies.
- There are several threats to long-term viability, maintainability, and scalability.
- We require an experienced staff.
- It is strongly reliant on clear customer engagement.
- Due to a lack of documentation, technology transfer to new team members might be challenging.

P2: Explain how risk is managed in the Spiral lifecycle model:

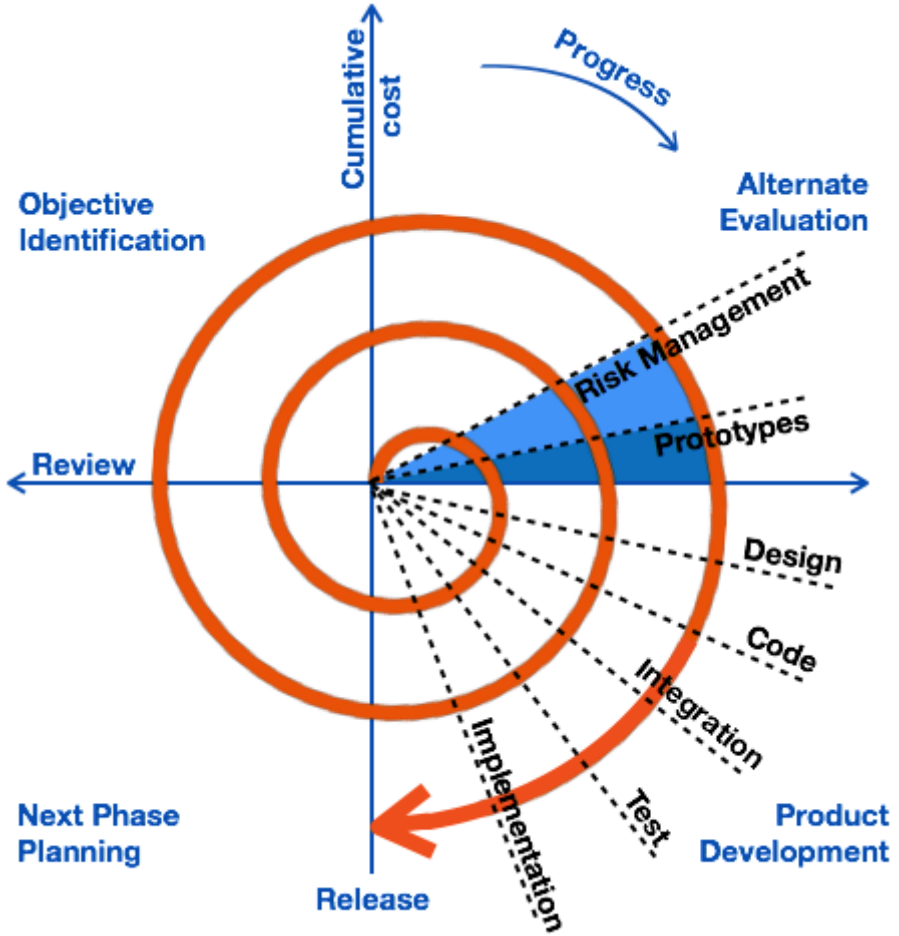

Figure 6: Spiral lifecycle model

- The spiral model is a risk management system development lifecycle (SDLC) strategy that blends the iterative development process model with components of the Waterfall model. Software developers prefer the spiral model for large, costly, and sophisticated projects.

Uses of the spiral model:

- projects that need regular releases
- initiatives that may require adjustments at any point
- Projects with medium to high risk
- initiatives in which cost and risk analysis are critical
- projects with ambiguous or complicated specifications

S Steps of the spiral model

- Step 1:The revised system requirements are as specific as possible. This generally entails interviewing a number of users who represent all of the external or internal users, as well as other parts of the existing system.
- Step2:A tentative design for the new system is prepared.
- Step3: The preliminary design is used to create the initial prototype of the new system. This is generally a scaled-down system that represents an approximation of the final product's qualities.
- Step4:A second prototype is created through four steps: (1) analyzing the first prototype in terms of its strengths, shortcomings, and risks; (2) specifying the needs of the second prototype; (3) planning and designing the second prototype; and (4) building and testing the second prototype.

- Step5: If the danger is considered too significant, the entire project might be canceled. Overruns in development costs, miscalculations in running costs, and other variables might result in a less-than-satisfactory end product.
- Step6: The existing prototype is assessed in the same way that the previous prototype was examined, and if required, another prototype is produced from it using the four-step approach stated above.
- Step7: The previous procedures are repeated until the client is happy that the revised prototype accurately portrays the desired final product.
- Step8:Based on the modified prototype, the final system is built.
- Step9: The completed system has been carefully analyzed and tested. Routine maintenance is performed on an ongoing basis to avoid large-scale breakdowns and reduce downtime.

How is risk managed within the Spiral model?

SL	Risk (Identification of expected Risks)	Probability	Risk Factor (RF= P x I)	Risk Category	Response plan
1	Not enough of server power	20%	60%	Medium	Set aside extra funds to upgrade server configuration.
2	Laws and regulations	40%	29%	Low	Keep channels of communication open. Don't have unreasonable expectations. Make tough judgments on behalf of the consumer. Keep note of your suggestions as well as the client's decisions. Do not get into a fight with the consumer. Clients with

					borderline personalities should be avoided or dealt with with caution.
3	Illness or sudden absence or employee quitting	20%	70%	High	Create a backup team to better plan for anticipated occurrences and to keep good communication in order to prepare for the worst-case situation.
4	Bad leadership, planning issue or wrong strategy	30%	60%	Medium	Define the company's strategy and goals explicitly, select a professional individual, and maintain open communication

					throughout the process.

P3: Explain the purpose of a feasibility report

- A feasibility study is a report that assesses the viability of a collection of potential project pathways or solutions. The person who writes a feasibility report assesses the feasibility of several ideas and then recommends the best alternative. They then give the feasibility study and offer their proposal to their company.

Purpose of a feasibility report:

- The goal of a feasibility study is to assess the viability of various solutions or project pathways and select the best choice. The feasibility report helps readers comprehend the viability of various approaches to a problem or project by breaking them down. Readers can determine whether to follow the study's suggestion for the optimal method based on the evaluation presented in the report. This detailed examination of several ways can assist businesses in making the best judgments possible about projects and difficulties.

Executive summary:

The executive summary is one of the initial sections of a feasibility study. An executive summary can assist your readers comprehend the major aspects of your report and read an overview of the study. Your executive summary should be succinct and written simply and concisely. Some aspects to consider mentioning in your executive summary are:

- A brief summary of what's in your report, including the problem you're attempting to solve or the project you're working on.
- Notes on the major points of your study or key information from your report
- A concise description of how the project or problem ties to your company's overarching objective.

The purpose of creating your executive summary is to make it succinct and easy to grasp so that you can go into further depth in your report. Although the executive summary is one of the initial sections of the report, many individuals choose to write it after writing the report to make it simpler to decide what information to put in it.

Background and context:

- Background and context should also be included in a feasibility study. This part is essential for readers of the report to comprehend vital contextual information. For example, if you're considering several techniques for a project, you may provide the project's history and aims in the background and context section. You might describe where the problem came from and how it impacts your firm if you're assessing potential remedies to a problem. This might help your audience grasp the viability of various methods.

Evaluation of solutions:

- The evaluation of solutions section is an important part of a feasibility study. This part achieves the goal of a feasibility study, which is to assess the viability of solutions and project routes. The evaluation section compares potential techniques using your evaluation criteria. Following the review process, you will give a suggestion on the optimal method.

P4: how technical solutions can be compared.

1:Discuss how the three feasibility criteria (technical, economic, organiational) areapplied to the project:

Feasibility study:

- A feasibility study is an analysis that evaluates all important elements for a project, including economic, technical, legal, and scheduling issues, to determine the chance of the project being completed successfully.

Technical Feasibility:

- In terms of technological feasibility, the organization's available technology meets all of the project's objectives. To complete the project, sufficient technical specialists, alignment with existing structures, and a large enough project size are required.

Economic Feasibility:

- The following charges are necessary for the project to be financially feasible: project development costs, system maintenance costs, and maintenance and upgrade costs. It also aids in project management, increasing both the project's commercial and intangible rewards like as status and experience.

Organizational Feasibility:

- It is vital to have managerial experience to appraise the features or talents of a senior management team, whether it is a single organization or a larger group. Non-financial human capital encompasses human resources (managers and employees), services, locations, equipment, and intellectual property rights applications.

2: Discuss whether the project is feasible

Technical Feasibility:

- Our organization employs roughly 10 PHP programmers and approximately 6 Python programmers. We also have a group of front-end engineers that are fluent in HTML, CSS, and JavaScript. There is also a template for a UX/UI team. However, we still need to communicate with third parties about the testing crew. The IT crew at Tune Source is already familiar with the company's existing Web-based CD sales system.

Economic Feasibility:

- The company's bottom line will soar as a result of its music subscription and download strategy. The following are the estimated business figures: In five years, the ROI (Return on Investment) will be more than 300 percent, and the NPV (Net Present Value) will be about $5 million. Cait is focused on boosting customer happiness, growing customer loyalty, establishing a favorable reputation, extending a company's market position, and increasing competitiveness as a consequence.

Organizational Feasibility:

- From an operational standpoint, this project has a medium level of risk. The company's management is excited about this initiative since it will help the company expand and thrive. They appreciate this company's transformation since it allows them to give a better customer experience.

Compatibility with existing systems:

- The Tune Source company's present technology, which includes a database system, an online music supply system, and infrastructure, may be inherited and upgraded. The ISP will upgrade the system to handle both current and future systems.

3 .Alternative technical solutions using the alternative matrix

To address the company's demand for clients who want a website that fits their needs, the team settled on a front-end that would utilize HTML, CSS, and JS, as well as a back-end that would use three languages: There are three programming languages: Ruby, PHP, and Python.

	Ruby	PHP	PYTHON
Compatibility	Work on multiple platform	Easily compatible	Can not run on Linux
Security	Normal	Normal	High
Framework	Few frameworks	There are a number of CMS frameworks available	Normal support
Speed	Low	High	Very High

Scoreboard evaluates the quality of priority items:

Criteria	User Requirement	Point	Note
Techinal Issues			
Compatibility	High	1	Platform and operating system compatibility is critical to online distribution.
	Medium	2	
	Low	3	
Speed	High	1	The secret to a positive customer experience is speed, which increases a company's potential to attract consumers.
	Medium	2	
	Low	3	
Framework	High	1	There are additional design, feature, and customization possibilities.
	Medium	2	
	Low	3	
Security	High	1	Consumers' trust in whether or not their data is safe is addressed by security. This is a critical factor in determining whether a client
	Medium	2	
	Low	3	

			stays with the organization.
Learn	High	1	The simplicity of learning will assist us in evaluating the capacity to train human resources on that basis.
	Medium	2	
	Low	3	
Economics Issues			
Human Resource trainning cost	High	1	Cost of training project resources
	Medium	2	
	Low	3	
Cost for project implementation time	High	1	Costs associated with the length of time required to complete a job. For example, employee salaries,etc
	Medium	2	
	Low	3	
Organizational Issues			
Level of mentoring needed	High	1	The level of mentorship required for the project. More trained consultants would be required for innovative techniques. The

			project's cost will be increased.
	Medium	2	
	Low	3	

Alternative Matrix for Tune Source company:

Evaluation Criteria	Weight Points	Alternative Solution 1: C# Score(1-5*)	Alternative Solution 2: Python Score(1-5*)	Alternative Solution 3: PHP Score(1-5*)
Multi-platform development environment	30	3	5	4
Data support	10	3	2	3
Easy to use/coding	20	3	5	4
Deloy hard	-15	2	3	2

Framework Support	30	3	5	3
Developing skill requirement	-5	3	2	1
Total:	70	240	365	165

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