Appendix A: ASSIGNMENT COVER SHEET

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Date: 23 March 2020

Table of content

Question One

Question 1.1

CULTURE

Clark Faucet had a non-cooperative culture. Marketing and engineering would never talk to one another. Engineering wanted the freedom to design new product, whereas marketing wanted final approval to make sure that what was designed could be sold. The conflict between marketing and engineering became so fierce that early attempts to implement project management failed. Nobody wanted to be the project manager.

Functional team members refused to attend team meetings and spent most of their time working on their own "pet" projects rather than the required work. Their line managers also showed little interest in supporting project management. Project management became so disliked that the procurement manager refused to assign any of his employees to project teams. Instead, he mandated that all project work come through him. He eventually built up a large brick wall around his employees. He claimed that this would protect them from the continuous conflicts between engineering and marketing.

The vice presidents for marketing and engineering reluctantly agreed to try and patch up their differences but did not appear confident that any changes would take place. Strange as it may seem, nobody could identify the initial cause of the conflicts or how the trouble actually began. Senior management hired an external consultant to identify the problems, provide recommendations and alternatives, and act as a mediator. The consultant's process would have to begin with interviews.

ENGINEERING INTERVIEWS

The following comments were made during engineering interviews:

- "We are loaded down with work. If marketing would stay out of engineering, we could get our job done."
- "Marketing doesn't understand that there's more work for us to do other than just new product development."
- "Marketing personnel should spend their time at the country club and in bar rooms. This will allow us in engineering to finish our work uninterrupted!"

- "Marketing expects everyone in engineering to stop what they are doing in order to put out marketing fires. 1 believe that most of the time the problem is that marketing doesn't know what they want up front. This leads to change after change. Why can't we get a good definition at the beginning of each project?"

MARKETING INTERVIEWS

- "Our livelihood rests on income generated from trade shows. Since new product development is 4-6 months in duration, we have to beat up on engineering to make sure that our marketing schedules are met. Why can't engineering understand the importance of these trade shows?"

- "Because of the time required to develop new products [4-6 months], we sometimes have to rush into projects without having a good definition of what is required. When a customer at a trade show gives us an idea for a new product. We rush to get the project underway for introduction at the next trade show. We then go back to the customer ant1 ask for more clarification and/or specifications. Sometimes we must work with the customer for months to get the information we need. I know that this is a problem for engineering, but it cannot be helped."

- The consultant wrestled with the comments but was still somewhat perplexed. "Why doesn't engineering understand marketing's problems?" pondered the consultant. In a follow-up interview with an engineering manager, the following comment was made: We are currently working on 375 different projects in engineering, and that includes those which marketing requested. Why can't marketing understand our problems?

Question 1.2

1)**Withdraw/avoid**. To retreat from a potential or actual conflict situation; to postpone the issue to be resolved by others or be better prepared. **Withdrawing** (retreat, avoidance or denial) includes pulling out, retreating or giving up. Additionally, it is referring to turn down a deal with a conflict. Withdrawing includes avoiding a conflict as much as possible. This style is suitable if "cooling off" period is required to attain better understanding of the conflict situation and in addition if the other party which is involved in the conflicts is both uncooperative and unassertive (Billingham, 2008).

Withdrawal is a stopgap, passive manner to handle conflict and generally failing to resolve the issue. Hence, such style must not be utilized when the conflicts is dealing a problem which is important to the successful completion of the project or is of immediate concern. Meanwhile other experts are arguing that it is not exactly a resolution technique of conflict, some are considering it a useful and legitimate 1 in some situations. technique of Withdrawal is easily telling you to avoid the problem and behave as if there is no conflict existing.

Withdraw/avoid may be utilized if a conflict is too trivial, the project is near the finish line and may be managed afterwards. The other utilization is if the argument is becoming heated and managing the conflict if things are becoming calm may lead to a solution which is better. Even though, it is useful in some cases, this technique is generally ignored

2)**Smooth/accommodate**. Highlighting area of agreement instead of area of difference; acknowledging 1's position to the needs of other people to maintain harmony and relationships. It is an approach which is appeasing. Smoothing is suitable in keeping harmony and avoiding outwardly situation which is conflictive. It is working if issues are more dominant than aspirations of the parties involved and personal positions.

Since smooth is tending to keep peace just in the short terms, it is failing to offer a permanent tending to keep peace just in the short term, it is failing to offer a long-term solution which is permanent to the underlying conflicts. Normally, conflict is reappearing again in the other form. Both withdrawing and smoothing styles incline towards delaying or ignoring tactics, which are not resolving conflict yet can slow down the situation temporarily. PMs should

remember that when the conflict is not managed and resolved in a timely manner it can possibly lead to more intense and severe conflict in the future.

3)**Compromise/reconcile**. Looking for solutions which offer some degree of satisfaction to everyone in order to partially or temporarily solve the conflict. Such approach is sometimes resulting in lose-lose situation. **Compromising** is mainly "bargaining" – to receive something in exchange for something else. **Compromise/reconcile** includes to consider different bargaining, issues, utilizing tradeoff searching and negotiations for solutions which are bringing some degree of satisfaction to both parties involved in the conflict. In such mode, neither party wins but both are getting some degree of satisfaction out of the situation (Clements and Guido ,2012).

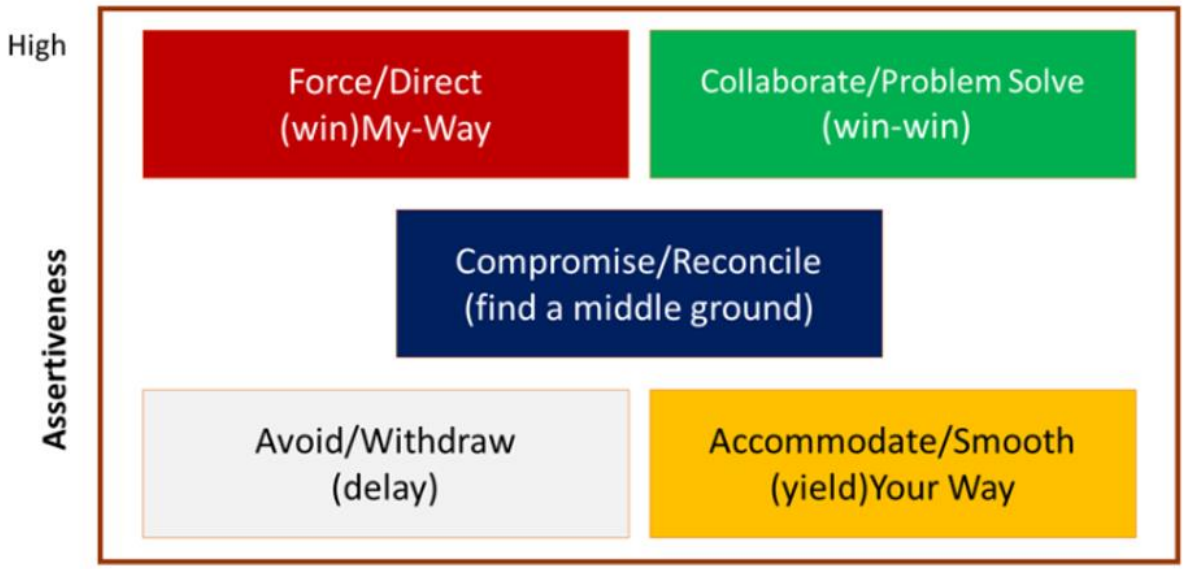
4)**Force/direct**. Pushing 1's viewpoint at expense of other people; presenting just win-lose solutions, normally enforced via power position to solve an emergency. Such approach is frequently is resulting in a win-lose situation. It means the utilization of position power to solve the conflict. **Forcing** (using dominance or power) this includes to impose 1 viewpoint at an expense the other and is characterized by win-lose result where 1 party is overwhelming the other.

It is utilized if there is no ordinary ground on which to negotiate or bargain, and if both parties are strong-willed and uncooperative. PMs can utilize it if time is of the essence, a problem is important to the project's well-being of the, and they feel that they are correct depending on the available information. Under these circumstances PMs are taking the risk and easily dictate the action on moving things forward.

5)Collaborating is a technique which is effective in managing conflict if project situation is too critical to be compromised. It includes integrating multiple viewpoints and ideas from others with perspectives which is different. **Collaborating** provides good opportunity of learning from other people. Active collaboration by both parties contributes to the resolution which is making simple in getting their commitment and consensus. Collaboration is not effective if more than few players are involved and their viewpoints are mutually exclusive.

Conflict management strategy	When to use
1. Withdraw/Avoid Retreating from actual or potential conflict situation; postponing the issue to be better prepared or to be resolved by others.	• When you think that conflict can be parked and addressed later at your favorable time. • When you think that you cannot handle the conflict and it needs escalation. • When you think that "no response" will be best solution.
2. **Smooth/Accommodate** Emphasizing areas of agreement rather than areas of disagreements; conceding one's position to the needs of the others to maintain harmony and relationship.	• When you know that you don't have much advantage. • When you perceive that conflict has actually added value. • When you are aware of the time and scope impact of a conflict.
3. **Compromise/Reconcile** Searching for solutions that bring some degree of satisfaction to all parties in order to temporarily or partially resolve the conflict.	• To reach quick solutions on important issues. • When you acknowledge that avoiding your loss is top priority and reconciliation is the best solution in your interest. • When collaboration or forcing do not work. • To maintain a long-term relationship.
4. **Force/Direct** Pushing one viewpoint at the expense of others; offering only win/lose solutions, enforced through a power position to resolve an emergency.	• In certain situations when all other, less forceful methods don't work or are ineffective. • When you know that to get the results out, direct/force is best option. • When a quick resolution is required and using force is justified. • As a last resort to resolve a conflict.
5. **Collaborate/Problem Solve** Incorporating multiple viewpoints and insights from different perspectives; requires a cooperative attitude and open dialogue that typically leads to consensus and commitment.	• When it is required to address the interests of multiple stakeholders. • When a high level of trust is present. • When a long-term relationship is important. • When you don't want to have full responsibility.

Techniques/Modes of Conflict Resolution



Question Two [20]

Question 2.1

Work Break Down Structure Decomposition Problems

There is usual misunderstanding that decomposition of Work Break Down Structure is a simple task which is going to be perform performed. In the Work Break Down Structure development, top 3 management levels or levels are normally rollup levels. Preparation of templates at such levels becomes a usual practice. Nevertheless, at levels four to six of the Work Break Down Structure, templates might not be suitable. There is a reason for this.

Breaking work down to very detailed and small work packages might need creation of thousands or even hundreds of charge numbers and cost accounts. It can increase the reporting, management, and control costs of such small packages to a point where costs go over the benefits. Even though a typical work package might be two hundred to three hundred hours and roughly 2 weeks period, take into consideration the effect on a big project, that might have more than 1 million labour hours that are directly linked to it (Kerzner,2003).

Breaking work down to work packages that are small may offer the exact cost control when, line manager may decide costs at this detail level. Line managers should be provided the right to inform PM's that costs may not be decided at the detail level which is requested. The WBS is the starting point for arranging methods like the Precedence Diagramming Method and the Arrow Diagramming Method. At Work Breakdown Structure low levels, the dependence of two or more activities may become so difficult that networks that are meaningful may not be created.

1 solution to the problems mentioned above is to build "hammock" activities, that hold with some activities where identification of accurate cost may not or cannot be exactly decided. Several projects point out an activity of "hammock" named project office (or management support), that involves general procurement, management reserve, data items, and possibly project management. The benefit of such kind of activity of hammock is that the charge numbers are below project manager's direct control.

There is a usual misunderstanding that work package typical dimensions are roughly eighty hours and smaller than 2 weeks to a month. Even though it might be true on projects that are small, it could require millions of work packages on a big job and it might be impractical,

despite the fact that line managers can manage work packages of such size. From a viewpoint of cost control, analysis of cost down to level 5 is important.

Nevertheless, it could be eminent that cost needed in preparing data of cost analysis to every level which is lower can grow exponentially, mostly when the client needs data to be displayed in a defined format which is not part of the organization's standard operating procedures. The 5th level of work packages are usually just for in-house control. Several companies are billing clients individually for every level of cost that reports under 3rd level.

The Work Breakdown Structure may be divided into subobjectives with high quality divisions of determined attempt as one goes lower into the Work Breakdown Structure. By describing subobjectives, one can add significant understanding, it anticipated clarity of action for individuals who may desire to finish objectives. On whatever work that is easily identifiable, understood, and structured in individual capabilities, there will exist a higher degree of confidence that goals may be obtained all the time (Kerzner,2013).

The level at which management of project is done is usually named level of work package. Literally, work package may take place at some level below 1st level. The Work Breakdown Structure should go with a scope of effort description needed, or else just the people who are issuing the Work Breakdown Structure can have absolute understanding of what task must be fulfilled. It is a practice which is common reproducing the client's statement of work as the WBS description.

It is frequently best policy for the PM, no matter his technical expertise, to let all the line managers to evaluate the SOW risks. Most importantly, line managers are normally the acknowledged experts in the company. PMs are usually managing at the WBS top three levels and in addition would rather give status reports to management at such levels.

Several organizations try to systematize reporting to management by demanding WBS top three levels to be exactly similar for each project, the differences are just being in levels four to six. For organizations with great deal of resemblance between projects, such approach has

standards. For many organizations, nevertheless, the dissimilarity among projects are making it difficult standardizing the WBS top levels.

Level of Work Package Detail

When you try to decide how detailed and specific to make one's work package, one should be careful not getting too detailed. It will be leading to project manager having to micromanage project and in the due course slowing down progress of the project. In other words, work packages that has details that are too large or broad are becoming unsustainable for the PM to manage as a whole.

Getting too detailed

As one is trying to decompose the scope, getting too detailed is bringing efficiencies. This can just result **in** unnecessary consumption of resources and wasted time**.** One needs to decide correct amount of detail to add.

There is a way of deciding the degree of decomposition. By asking these questions:

- Is the team satisfied with the level of detail for the work packages?
- Are the work packages small enough to determine cost, time and schedule?
- Is the work package small enough to assign to a resource?

Cannot get you the correct details:

Any person who utilized this method in life can agree with this 1 point. It is extremely difficult finding most accurate best details level when it comes to Work Breakdown Structure. Because one must fit only 1 on the page, it can become more difficult finding out what the tasks are and what should be the creation of them added to Work Breakdown Structure. This can lead to the creation of vague and useless tasks under which one can have non-similar tasks list. Any person who utilized this technique in life will surely agree with this 1 point. Surely it is hard trying to find the most and the best level of accurate for details when coming to Work Breakdown Structure. For the reason that one must to fit only 1 on a page, it is going to be very difficult finding out precisely what the tasks are and what should be creation of tasks added to the Work Breakdown Structure (Kerzner, 2009).

Deliverables Not Activities or Tasks

The **Work Break Down Structure** must have list of broken-down deliverables. This simply means, what the stakeholder/client can receive if the project is finished. This is not a list of certain tasks and activities utilized to achieve the deliverables. How the work is finished (activities and tasks) may change and differ all over the project, yet deliverables may not, not with a request of change, so that one does not list activities and tasks in the WBS.

Work Break Down Structure Is Not a Schedule or Plan

The **Work Break Down Structure may** not be utilized as a project schedule or plan replacement. A **Work Break Down Structure is** not needed to be developed in any kind of sequence or order. This is easily a visual breakdown of deliverables.

Treating Work Breakdown Structure like a schedule

The Work Breakdown Structure is offering detailed information needed to meet the project's objectives and goals. Work Breakdown Structure is not a schedule or plan yet a project visual representation that may be shared with stakeholders.

The Work Breakdown Structure is an important project management structure component. The decomposition is essential to support the Work Breakdown Structure creation and it is having a **direct influence on the overall structure of your project**. It takes time creating a Work Breakdown Structure and this assists to lower the probability of work missed meanwhile bringing the project to completion.

Work Break Down Structure Updates Require Change Control

The **Work Break Down Structure is** a formal document of a project, and every change to it needs the utilization of the process of project change control. Every change to the **Work Break Down Structure is** changing the deliverables and, then, the project scope project. It is an essential point of helping control scope creep (Knapp, 2010).

Work Break Down Structure Is Not an Organizational Hierarchy

The Organizational Hierarchy chart and **Work Break Down Structure** are not the same thing. Even though frequently identical in appearance, these 2 documents are different. The Organizational Hierarchy indicates things like lines of communication and chain of

command, yet the **Work Break Down Structure** is restricted only to a project and indicates just the scope and deliverables of that project.

Having a step by step approach is a pain!

The issue with WBS is that it has to do list approach that can be a pain since it stems from your manager's belief that the Work Breakdown Structure is done step by step. To have this approach can be leading to the idea that managers can walk around the checklist and they can be utilized to check off every item as it has been done. Eventually this can lead to micromanagement that might not be attractive to other members of the team.

The problem of requirements:

If one keeps a specific deliverable on the Work Breakdown Structure, one can end up breaking down into the activities that are needed for its creation. What really does not work is that it can break down the deliverable into the requirements which assists in describing it. Some tasks and deliverables , up to a specific extent are belonging to Work Breakdown Structure yet requirements certainly do not.

No Buying in processes utilized:

The team of the project can be utilizing all its expertise and experience which can be used to get down the specifics of such deliverables in a natural manner that the WBS could be utilized drafted with other input from each and every member of its team.

When a project manager is creating the Work Breakdown Structure with small input from some team project members, the individual can turn a little offer to no support at all from the Work Breakdown Structure with. But, this can time consuming yet in the long run, it can pay in engaging the leaders.

Having plenty of tasks to do at one go:

To have team members means, one becomes more productive and hold them accountable for reaching these achievements rather than of just completing a task list.

When one is utilizing the method of WBS, one can be able to break down all tasks in couple of hours so that one can be able to finish on time. Yet the issue is that the workers are ending up spending more time on small tasks and managers must track of all of them and that is quite a mess and ends up giving very poor outcomes. Because of a general rule, the Work Breakdown tasks must have durations between a week and around eight weeks.

The orientation:

The Work Breakdown Structure can become the result of oriented but not methods which are prescriptive. The methodology can change with no changes of the planned results. Deliverables or may be planned results should never be closely blended with some actions and methods (Larson and Gray,2010).

Having more than 100% of WBS:

An essential Work Breakdown Structure design principle applies one hundred percent rule that can state its project scope and what it involves same time, but sometimes we actually hear people saying they have around hundred and ten percent of themselves throughout a specific project. Although this is perfectly all right for the person involved, a project can be doomed to failure when Work Breakdown Structure can include more than hundred percent of the scope. In addition, it is a good measure against scope creep and team has a good idea of the problems that this creep may cause.

Becomes outdated quite quickly:

Also, the method of Work Breakdown Structure may dictate the project and reschedule everything, this does become outdated after a certain time t. It is because the project schedule can change the execution of these projects yet, but the Work Breakdown Structure will always remain the same. If one decides to update the Work Breakdown Structure, he will not have a specific project manager who can assist him.

An overall summation:

The work breakdown structure development is surely not simple. Its process must be done with great care. This can take you some time. To have a big work breakdown structure can take a while for development. For some, it can require more effort. In addition, there can exercises of brainpower and be a knowledge transfer.

The bigger there is a project scope, the larger the Work Breakdown Structure will be. Additionally, most people should give the input and then view the portion they are expected to do.

Managing group dynamics

The Work Breakdown Structure is an activity team which needs **strong facilitation skills** in keeping a team on track and motivates participation. When a member of the team is not feeling comfortable to share their ideas, one can lose other essential information.

Question 2.2

A brief description about Project audits and little background about Project audits, they are falling outside of the internal auditor traditional role; but projects are contributing remarkably to the organization's financial performance. The audits benefit of such is that they may quickly pinpoint root causes of problems on projects, which makes it likely to get projects back on track and avoiding any project failure. Project audits offer interim view of what want well and what must be improved in the project to successfully finish the project.

One must learn how to perform in-depth project audit, what project elements must be audited, and how to report and develop on the audit findings to assure that they are implemented. Examples of project audit case must be utilized, and people taking part must work through the important project audit stages and engage in a process of risk assessment which they may apply to projects audits within their own company (Heizer and Render,2012).

Planning of the audit project is important, and it includes creating a project management environment, utilizing a cultural assessment of the project in determining company's readiness for consistent approach to the project's management. Project audit impact of a on different stakeholder groups, building a team, Expected success criteria for a project audit, Objectives and Scope for a project audit.

Auditing the Management of Project Changes and Issues includes current, Past, and future issues, challenges, and concerns on the project. Change requests, change orders, and change logs. Managing project change, Issue documents and issue logs, Managing project issues.

There are some kinds of audits and they include:

Best Practices Audits: Such audits may be managed at the end of the project or at the end of every life-cycle phase. Several organizations have discovered that PMs might not be the greatest people to carry out the audit. In these situations, the organization might have facilitators that are professionally trained to conduct greatest practices reviews.

Exit Audits: Such audits are normally for projects which are experiencing difficulties and might be terminated. Employee that is external to a project, like an executive steering committee or an exit champion, manage the audits.

Quality Audits: Such audits make sure that the project quality which is planned is met and that all regulations and laws are followed. The group of quality assurance is performing such audit.

Compliance Audits: Such audits are normally carried out by PMO (project management office) to prove that project is utilizing the methodology of project management satisfactorily. Normally the project management office is having the control to carry out the audit yet might not have the control to implement compliance. Compliance audits review the level of compliance with internal policies or external regulatory requirements. It determines whether the auditee is following specific procedures, rules, or regulations set by some higher authority.

Performance Audits: Such audits are utilized to appraise the performance and progress of specified project. Executive steering committee, the project manager, or project sponsor may carry out this audit.

Information Systems – Audits of Information Systems focus on the overall network and infrastructure of the organization and controls which are relating to the security of network and the systems which are maintained in support of the company's goals. In addition, these involve application controls, project management procedures, data center operations, and technical operations.

Integrated Audits – Integrated audits cover the controls which are dealing with compliance, operational, financial, and risks of information systems. Such audits are usually centered on a specific part of a cycle or process or business cycle.

Internal audit:

The company's internal audit program is providing for compliance review of systems, process and policies assurance. The auditors are applying an approach which risk-based to the program of audit and assist to bring an external perspective and measure of independence to the organization framework of risk management.

External audit: That external audit deals with contracting, governance, financial, Risk and IT processes and management systems. Staff and management might be desired to give feedback to the activities of risk management included with such audits. Some audits can be found from time to time and are forced via regulation, contracts, and compacts.

Operational audits concentrate on the assessment and review of a business process. The business process activities might result in an indirect or direct financial impact to a company like the patient account balances or collection of student tuitions. Internal Audit mainly concentrate on operational audits yet may extend the scope to involve accounting procedures which can affect financial reporting. It evaluates the efficiency effectiveness of any part of an organization's operating procedures and methods (Lock,2007).

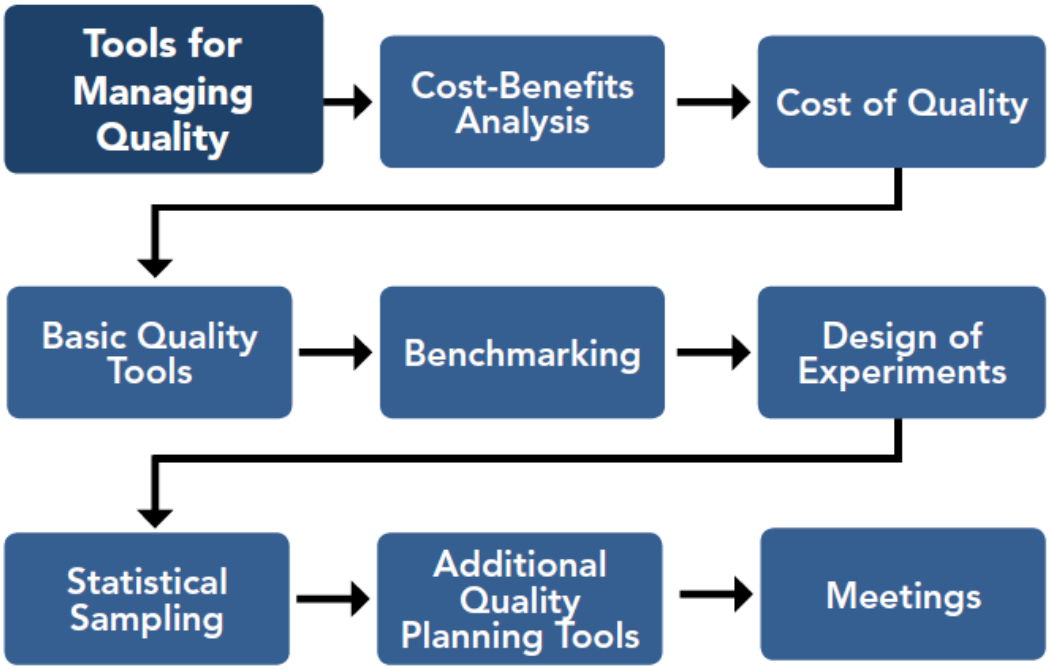
Financial – Financial audits usually include a concentration on financial controls as they are relating to reporting. Such audits concentrate on accounting controls available in the sub-ledger systems or general ledger. Auditing of financial statement is the high priority of our external auditors. Internal Audit can complement the work they are performing based on a plan that they agreed. This determines whether the financial statements are stated in accordance with specific criteria. The criteria are normally U.S. GAAP are International accounting standards.

Lately, the importance for an independent review which is structured for different business parts, involving projects, took on a most essential role. Part of it may be allocated to compliance requirements of Sarbanes–Oxley law. Such reviews which are independent are

audits which concentrate on either decision-making or discovery. The audits may be random or scheduled and may be done by external examiners or in-house personnel.

Question Three [30]

Question 3.1



Cost analysis / Benefit

The process of planning should take into consideration cost/ benefit trade-offs. The main benefit is increased stakeholder satisfaction, lower costs, less work, and higher productivity. The main cost is expenses linked with activities of project quality management. **Cost-benefit analysis** is checking how much one's quality activities can cost against how much one can gain from performing them. The costs can be measured simple; the resources and effort it is taking to perform them are only like every other task on the schedule. Because quality activities are not actually producing the product, sometimes it is difficult for individuals to measure benefits. The key benefits are efficiency and higher productivity, less reworking, and extra satisfaction from both the customer and the team.

Benchmarking

Benchmarking includes comparing planned or actual practices of the project to those of some projects to bring about ideas for enhancement and offer a quality for performance measurement. It means utilizing the outcomes of quality planning on some projects to set

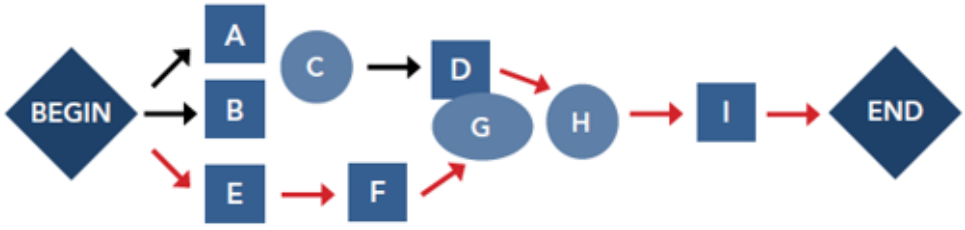
objectives for your own. One may find that the previous project in his organization had twenty percent less defects than the 1 before it.

One must learn from a project like this and put in practice every idea they utilized in making an improvement which is great. Benchmarks provide people with some points of reference for judging their own project before they can even begin the work. It is easily a reference of quality standard which is utilized for the existing project.

It can be a benchmark utilized within organization which is performing well, or 1 which is utilized over a certain industry. Benchmarking includes comparing planned or actual practices of the projects to those of comparable projects to offer a basis for measuring performance, generate ideas for improvement, and to identify best practices. The value of utilizing such method is comparing the existing project's quality standards with those of some identical projects (Lock, 2007).

Flowcharting

The technique of flowcharting in quality management normally involves effect and cause system and diagrams or process flow charts. Flowcharting may assist in predicting expected quality problems and therefore assist to create approaches for working with them. Below is the graphical representation of a process indicating the relationship between steps of the process. There are number of styles, yet all process flowchart shows: the order of processing, decision points and activities. It may assist the project team to predict problems of quality which may take place and such awareness is resulting in the test procedures development or ways of dealing with them.



Flowchart is usual kind of chart which is representing a process or algorithm indicating the steps as boxes of different types and their order by linking them with arrows. There are number of various kinds of flowcharts, and every kind has notational conventions and its own repertoire of boxes. The most 2 normal kinds of boxes in a flowchart are:

An activity (usually named a processing step) which is denoted as a rectangular box, and
A decision, that is normally denoted as diamond.

Flowcharts are utilized in documenting and designing difficult processes. Similar to some kinds of diagrams, flowcharts assist in visualizing what is happening and therefore assist the viewer to understand a process and in addition possibly find bottlenecks, flaws and some less-obvious features within it.

Design of experiments: it is an analytical method that focuses on defining variables which are having most impact on the whole outcome. **Design of experiments** is listing all the types of tests that one is going to run on his product. Design of experiments can list all the types of test procedures one will do, the approaches he will take, and also the tests themselves. (the software terminology world is named *test planning*).

Cost of quality this is what one gets when he adds up the cost of every inspection and prevention activities that one is going to complete on his project. This does not just involve testing. This involves every time that is spent reviewing documents, writing standards, meeting to analyse the defects root causes, re-working to resolve on the defects when they have been discovered unexpectedly by the team: this means , totally the most important things that one does to establish quality on the project. Quality cost may be a great number to examine in determining if one's project is having trouble or performing doing well. Let us say one's organization is tracking the quality cost on evert part of its projects; at that time one can confirm whether he is spending less or more than what was spent on some projects to get his project up to standards of high quality(Mayer, 2007).

Control charts may be utilised to describe acceptable limits. When other functions of a project are recurring, controls of statistical process may be utilised in identifying trends and hold the processes inside control limits. Planning part for controlling the quality of recurring processes is determining which control limits are and how this process can be tried out. These is answering the question: 'Is it a process variance within acceptable limits?'

The Data points pattern on a control chart can disclose a gradual trend, sudden process jumps, and fluctuating random values in increased variation. By trying to monitor the process results over some time, a control chart may assist in assessing if the process application changes results in the intended improvements. If a process is within limits that are acceptable this is in control and does not require to be modified.

Oppositely if a process is outside limits that are acceptable, the process must be modified. 7 consecutive points below or above the central line show a process which is out of control. The lower control limit and the upper control limit are normally set at (minus or plus) 3 sigma, when 1 Sigma is 1 standard deviation. Even though utilized more often in tracking repetitive activities needed to produce manufactured lots, additionally control charts can be utilized in monitoring frequency of scope change, volume, schedule and cost variances, some management outcomes to assist establishing when the project management processes are in control.

Cause-and-effect diagrams may assist to discover issues. If control charts show assignable cause for a variation, this is not always simple to pinpoint problem cause. Topics which are planned in discovering the cause may be facilitated utilizing a **fishbone diagram** or cause-and-effect where people taking part are given support in identifying potential causes of the defects. Also known as fishbone diagram or Ishikawa diagram they indicate how different factors may be connected to potential effetcs or problems . Factors are normally grouped into impotant categories as indicated below

People-any indivial involved with the process.

Methods- How process is carried out invloving: rules, procedures, policies, laws and regulations.

Machines- every tools,computers, equipment ,etc. needed to finish the work..

Material- Paper,pens,parts, raw material, etc. utized in producing the final product.

Measurement- Generated date from the process which is utilized in evaluating it's quality.

Environment – The condition like cultre,temperature , time, location I which the process is operating.

It is not a statistical method and thus applicable to all project types. Cause-and-effect diagrams does have its own critics because it is not quantitative and needs more judgement and subjective analysis.

Cause-and-effect diagrams strength is that it can assist one in making sense of the situation where there are more of variables which are interacting with one another, none of which quantifiable. In addition, cause-and-effect diagrams are visual tool that are powerful when one is trying to describe his analysis to other people.

Check sheets, histograms, and Pareto charts are utilized in solving some quality problems. If aa issue of quality-control arises, a PM should select which problem to deal with first. 1 way of prioritizing quality problems is determining the ones arise more frequently. Such data may be gathered utilizing **check sheet**, that is basic form on where user may tick the suitable box every time a problem arise or automate process of data collection utilizing the suitable technology.

In addition, Check sheets are known as tally sheets and maybe utilized as a checklist if collecting data. Check sheets are utilized in organizing facts in a way that will facilitate effective collection of data which is useful regarding a potential quality problem and check sheets are mainly useful for collecting data attributes meanwhile carrying out inspections to determine defects.

Histogram

When collection of data is done, it may be analysed by generating frequency distribution chart type named a h**istogram**. An accurate histogram is column chart where the column

widths fill the accessible space on the *x* axis and this are proportional to category values showed on the axis, meanwhile the column height is proportional to occurrences frequency. More histograms utilize 1 column width to indicate a category, meanwhile vertical axis indicate frequency of occurrences.

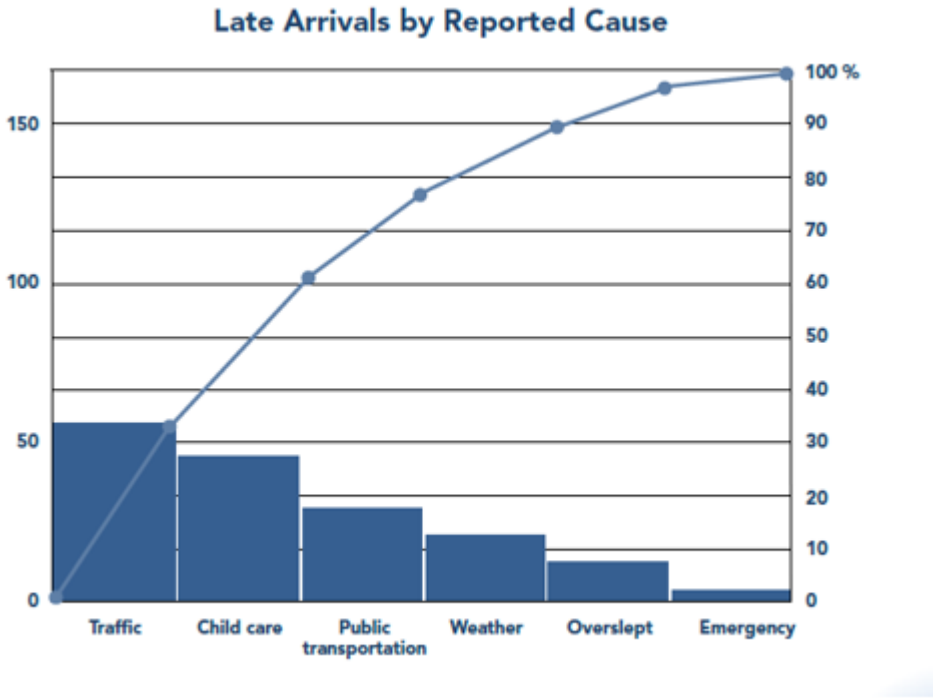
It is a vertical bar chart that indicates how frequently a specific variable state is occurring, with the height on every column that represent the relative frequency. They are useful in representing project data to stakeholders as they can provide a proper indication of which issues are the most essential to deal with.

Pareto chart

A histogram variation is frequency distribution chart created by economist named Vilfredo Pareto, which is also known as **Pareto chart**, where columns are organized in declining order with the some common on the left side and a line is added which indicates the cumulative total. Integration of columns and a line enable a user to notify at a glimpse which issues are more recurring and which fraction of the total they indicate. Once one has a quality plan and he know his guideline for managing project quality.

One's strategies for observing quality of the project must be added to the plan and the reason for each and every step he is taking. It is essential that anyone on the team is understating the rationale behind the metrics being utilized to judge failure or success of the project. It is a special kind of histogram where the values that are being plotted are organized in descending order.

The graph is coexisting with a line which indicates the cumulative foe every category. Left vertical axis indicating cost, the frequency of occurrence or some essential unit of measure. Right vertical axis is cumulative percentage of the total. In quality control the Pareto chart is frequently representing the most repeated reasons for client's complaints, the biggest occurring kind of defect, or the most usual sources of defects, etc.



It was created to show eighty to twenty Rule, which is stating that 80% of the issues stem from the 20% of the different causes.

Scatter diagram

Scatter diagrams utilize Cartesian coordinates to show values for 2 variables for a group of data. The data that is showed as a collection of points, each has the value of 1 variable establishing the position on the horizontal axis and value of another variable establishing position of the vertical axis. A scatter diagram may suggest different types of correlations among variables with a specific confidence level. Correlation can be:

A) Rising (Positive)- when the pattern of dots slopes from low to upper right, it is suggesting a positive correlation.
B) Falling (Negative) when the pattern of dots slopes from upper left to low right, it is suggesting a negative correlation.
C) Uncorrelated (Null)

A line of best fit may be drawn so as to study the correlation among the variables. 1 of the most powerful point of scatter diagram is its ability to indicate nonlinear relationship among variables.

Quality Meetings

This involve individuals which are accountable for quality management involving selected stakeholders, selected members of the project team, project sponsor, project manager, and everyone with accountability for each process of quality management, and some as required. Collective decision making is essential area of project management which may break or make this project part.

Almost all processes which for part of time management of the project can include meetings among stakeholders, the team and project manager in order to make decisions regarding associated estimates and the activity definitions. How well such meetings are conducted may have a big effect on how smoothly the project runs

14. Quality Planning

It is not enough making sure that one gets a project done under budget and on time. One needs to be certain that he is making the correct product to suit the needs of his stakeholders. Quality means to make sure that one is building what he said he would and that he does it as effectively as he can. This means that he must try not to do too many mistakes and always keeping your project working toward the goal of creating the right product.

Why Quality?

Deming Chain Reaction

QG | QUALITYGURUS

Question 3.2

Executive summary

First let's define what is a risk: Risk is described as event which is having a probability of taking place and can either have a negative or positive effect to a project if the risk is occurring. A risk can have 1 or more causes and, when it takes place, 1 or more impacts. For e.g., a cause can require to have limited personnel assigned for project design, or an environment qualified to perform the work. The event of risk is that the available assigned personnel cannot be enough for the activity, or the qualified agency can take longer than planned to give a permit.

When either of such uncertain events take place, there can be an influence on the project performance, schedule, or cost. Each and every project take on risk element of risk, and it is via management of risk where techniques and tools are applied to track and monitor such events which are having the possibility of impacting the project outcome. Management of Risk a continuous process which continues during the life of a project.

Risk management involves risk management processes for analysis, identification, planning, control and monitoring. Most of such processes are modified during project lifecycle as risks that are new may be established at any given time. It is the risk management objective to lower the impact and probability of events harmful to the project. Simultaneously, every event which can have a positive impact must be used.

1.1 Purpose /Objective

This plan is documenting the procedures, processes and tools which can be utilized in controlling and managing such events which can have a negative impact on the FleetSell project. This is the controlling document to manage and control any project risks. This plan is going to address:

Risk Reporting and Tracking, Risk Contingency Planning, Risk Mitigation, Risk Assessment Risk Identification.

Table1 on page 55 will present a sample of the risk register and **Table 2** on page 65 is going to present the risk impact assessment matrix

Define objectives: risk can be described as any constraint or event which is preventing the team or project manager from obtaining objectives and goals of the project. For that reason it is essential at the beginning to describe these objectives and goals great detail and show who is accountable for obtaining them.

Here is a brief description of the project. The name of the project is FleetSell system which is a new software application owned by the bank ,this software application is a web based application not a windows or desktop application ,the bank is outsourcing the resources from outside the company called Lesedi Software Innovation Pty(Ltd), it will be developed by a team of highly qualified Software engineers, this software application allows the clients of the bank to buy vehicles and trucks. The bank has the power to provide and decline offers from their external clients also assist their client's loans.

The client can create a quotation from the software application, if the client is happy then the quotation is converted to a deal, the client is the able to accept and sign the offer or deal. The outsourced team which is going to build this new software application, contains 4 team members 1 Business analyst which is responsible for getting requirement from the employees of bank(called users) and drawing functional specification and technical specification, 2 Software developers 1 is responsible for the backend design which is creating the database structure and showing how the data will be store.

The other is responsible for Frontend design which creating the layout and user interface of the project this means he will be creating the web forms and add the buttons and text boxes on the web pages. Lastly we have tester who is going to test the software application before we deploy or move it production, this tester will be responsible for QA (quality Assurance) and unit testing will be done by users of the system in this case employees working for the bank .The objective is to have a fully functional software system called FleetSell, and this system is a web based application which must be finished on time and within budget the job will take 6 months to be completed.

2 Risk Management Strategy

2.1 Risk Identification

A risk is an event which can stop the project from successful completion or from progressing as planned. Risks may be determined from numerous different sources. Others can be identified before project starts and can be quite obvious. Some can be determined throughout the project life cycle, and a risk will be identified by any person linked to the project. Other risk can be deep rooted to a project itself, meanwhile some can be outcome of external impacts which are totally outside the project team control. The FleetSell *Project* Manager has general responsibility for managing risk of project.

The team members of the project can be assigned certain areas of responsibility to report to the project manager. During each and every phase of the project, a certain discussion topic can be identified as a risk. The intention is instructing the project team in the need for risk identification, awareness, Communication and documentation.

Awareness of risk needs every team member of the project be aware of what account for a risk to the project and become sensitive to specific factors or events which can possibly influence have an impact on the project in a negative or positive manner.
Identification of risk is made up of identifying which risks are likely to have an effect on the project and to document the characteristics of every risk.
Communication of risk includes conducting risk events or factors to the attention of the project team and project manager.
The FleetSell project manager must document and identify risk factors that known throughout the Risk Register creation.

It is the FleetSell project manager's accountability to provide help to the stakeholders and some project team by identifying risk and documenting the potential and known risks in the Risk Register. Modifying the risk register can take place when there is change in risk factors. Management of risk can be a discussion topic throughout the project meetings which are scheduled regularly.
The FleetSell project team can have discussions about any new risk events or factors and will be reviewed with the FleetSell project manager. The manager of the project can establish when any of the newly identified risk events or factors guarantee further assessment. The

ones that do can go through risk response development and risk quantification, as suitable, then action item can be closed. At any point throughout the project, any risk events or factors must be brought to the attention of the FleetSell project manager utilizing some other form of written communication or Email to document the item. The manager of the project is accountable for writing the risk to the Risk Register. New notification of risk must involve the following elements of Risk Register:
Risk event or factor Description, for example conflicting operational or project initiatives which are placing demands on project delays, resources, unexpected study outcomes, etc. Possibility that the event will take place. For e.g., a fifty percent chance that the vendor cannot have an animal colony which meets the available criteria.

Schedule Impact. The number of months, weeks, days or hours that a risk event can affect the schedule. Quality Impact. A risk factor can cause reduction in the quality of products or work to be developed. As an e.g., shortage of funding caused by cost overruns may cause impact statistical empowerment and the reduction of the study size.
Cost Impact. The impact of this risk event, when it is occurring is likely to have impact on the budget of the project.

The risk identification usually begins before the initiation of the project, and the risk number goes up as the project reaches maturity during the lifecycle. If there is an identified risk, it is 1st evaluated to work out the degree of impact to the scope, schedule, quality and cost, the possibility of occurring and then prioritized. Events of risk can have an impact just on one or meanwhile some can have an impact to the project in multiple impact categories. The number of impacted categories, probability of occurrence, and the degree (low, medium, high) that they impact the project can be the starting point for assigning the priority of the risk.

All the risks that are identifiable must be inserted into a risk register and documented as risk statement. Risk is an uncertainty event which may happen in the future, it has cause and effect, it impacts objectives. It is an uncertain event or condition that if it occurs has an effect on one or more project objectives. If it occurs it impacts one or more project objectives which are scope, time, and cost. Risk have triggers which is events that signal that they will occur or have occurred.

Steps to manage risk

Identify risk, in risk identification meetings, review historical documents such as previous project, change logs and risk registers of previous project. Assumptions are other excellence source of risk. Assumptions by nature are risky, they are essentially guessing, we have a question, but we don't know the answer, so we guess the answer. The obvious risk associated with every assumption is that the guess is wrong. You can gather risk through interviews, as you are talking to your stake holders, simply ask them any concern they have regarding the projects, once we have the risk, we will want to filter them.

Risk has a probability that it will occur. Risk management has the objects to decrease the probability of a negative event to occur if have P(negative risk) = 50% which means having a probability function P on negative risk being view as being 50%, it is project manager's job and his team to reduce that as low as possible . P (negative risk) < 50% to 0%, showing it going down, in case of aa positive risk event one must increase the probability P (positive risk) = 50% to 100%

All projects have risk this mean All Project = Risk, there can know risks identified and analysed to making it possible to handle that risk ,we show that as a project with iterations ,such as you would find with agile project and the analysis of it is to identify that risk and handle that risk . unknown risk however is those to be feared, the issue is they can be easily managed in a proactive fashion, your plan may simply be a contingency plan. Any risk which is 100% certain is no longer a risk, it is a certainty.

For people who are in project management land, the pmbok guide has all sorts of processes that are involved with risk management and these happen to be processes in knowledge area, we use KA to refer to knowledge area , these processes becoming with plan risk management to identifying risk all the way monitoring controlling risk are key part of the PMI-PMBOK guides ,tools and techniques. The project manager has wealth of tools and techniques available to help them to handle the most difficult part of the job of risk management. The more experienced the project manager probably the more unknown risk become known sooner. Sometimes however with the least experienced project manager the more surprise risk shown up. If you find that your projects are flooded with ongoing risk, you may wish to re-examine your planning process.

Risk Register for FleetSell System													
No.	**Rank**	**Risk**	**Description**	**Category**	**Root cause**	**Triggers**	**Potential Response**	**Risk Owner**	**Probability**	**Impact**	**Severity**	**Status**	**Frequency**
R30	1	Load shedding	Eskom cuts electricity off	External	Lack of coal and power stations	Buy and use generators as a backup for electricity	Eliminate risk	Project sponsor	3	High	5	Open	2
R125	2	Coronavirus	Employees affected by corona virus	Human Resource	China	Allow worker to work remotely	Accept risk	Project Manager	5	High	5	Open	5
R20	3	Internet or network	Availability of Internet or network	Technical	No power	Have server administrators and data	Eliminate risk	Team Leader	2	High	5	Open	2

						administrators to monitor the servers and networks							
R30	4	Budget Allocation	Budget or Money to be spent on FleetSell Project	Cost	Money	Request enough budget from the project sponsor	Eliminate risk	Project sponsor	2	High	5	Open	3
R18		Rain interruption	rain interruption of a building project or systems downtime in an information technology project.	External	Nature	Disaster Recovery solution	Accept risk	Project manager	3	Medium	3	Open	2
R4	5	Contract Negotiations	Employee leaves the company	Human Resource	Money	Offer counteroffer is possible	Deflect risk	Project manager	2	Low	1	Open	2
R2	6	Dies	Employee past on	Human Resource	Accident	Have a backup program	Accept risk	Project manager	2	Low	1	Open	1

						mer on standby							
R1	7	Strike	Employees or unions go on strike	Human Resource	Money	Works can work remotely	Accept risk	Project sponsor	1	Low	1	Open	1
R80	10	Source Control	Save the work done on the source control, if a worker resigns then	Technical	Technology	Use SVN or TFS source control some is from on the internet	Turn risk into an opportunity	Team Leader	5	High	4	Closed	4
R12	11	Difficulties in implementation		Technical	Leadership	Have a project plan	Mitigate risk	Team Leader	2	Medium	3	Open	2
R16	12	Overoptimistic scheduling	Underestimating work to be done	Technical	Leadership	Have a project plan	Deflect risk	Team leader	4	Medium	2	Closed	2
R3	13	Wrong direction of emphasis	Miss the project deadline	Technical	Leadership	Hire experienced Business Analyst		Team Leader	3	Low	1	Closed	1
R6	14	Personal issues (due to the small team)	Conflict between team members	Human Resource	Leadership	Resolve issues in teams	Accept risk		3	Low	1	Closed	2

R2	15	Inexperienced project management	Miss the project deadline	Human Resource	Leadership	Hire experienced project managers	Eliminate risk		1	Low	2	Closed	1

Table 1 Risk Register

2.2 Risk Responsibilities

The accountability for risk management is shared between all the project stakeholder. Nevertheless, decision authority for selecting if they are going to proceed with implement contingency actions and mitigation strategies, particularly those that are having a resource requirement rest or associated cost with the Project Manager that is accountable for notifying the funding agency to decide the requirement for modification of a contract. The following list shows certain accountabilities for various aspects of risk management.

Risk Identification: All stakeholders of the project

Risk Registry: Project Manager

Risk Assessment: All stakeholders of the project

Risk Response Options Identification: All stakeholders of the project

Risk Response Approval: Project Manager with concurrence from CO/PO/COTR

Risk Contingency Planning; Managers of the project

Risk Response Management; Managers of the project

Risk Reporting; Project Manager

2.3 Risk Assessment

Assessment of risk is the act of identifying the possibility that a risk can take place and the impact which event can have, must it occur. This is primarily an analysis of “cause and effect”. The “cause” is an event which may occur, meanwhile the “effect” is the possible effect to the project, if the event occurs. **Risk Activity Responsibility**

Risk assessment includes 2 factors. 1st is the possibility that is the measure of sureness that a risk, or event, can occur. It can be measured in a numerous way, yet for the FleetSell project will be assigned a probability as defined in the table below.

Probability of Occurrences		
Definition	**Meaning**	**Value**
Frequent	• Occurs frequently • Will be continuously experienced unless action is taken to change events	**5**
Likely	• Occur less frequently if process is corrected • Issues identified with minimal audit activity • Process performance failures evident to trained auditors or regulators	**4**
Occasional	• Occurs sporadically • Potential issues discovered during focused review.	**3**
Seldom	• Unlikely to occur • Minimal issue identification during focused review	**2**
Improbable	• Highly unlikely to occur	**1**

The 2nd factor is estimating the impact on a project. It may be somewhat subjective assessment yet must be quantified whenever viable. The duration of the potential delay, the estimated cost,

The scope changes and the quality reduction are in many cases factors which may be Documented and estimated in risk statement and therefore measured utilizing the project management tools which is standard (i.e. statements of work, budget, project plan). Instead of impact which is detailed the estimates of the Risk Register is containing 5 five ratings for impact;

Catastrophic (A)

Confidentiality/ Security breeches

Technical miscommunications

Production delays

Materials breech

Tainted product

Withdrawal of product manufacturer

Inability to validate data

Regulatory/Compliance violations/issues

Critical (B)

Production errors which contain regulatory violations that are posing direct consequence to the operation

Reoccurring violation of every safety regulation which results in serious injury

A security discovery that needs immediate corrective action before continuing with operation

A non-compliance discovery which results in operational or process humiliation.

Moderate (C)

Element of production errors which can pose indirect consequences to the operation

Security discovery that needs a Corrective Action Plan

Minor (D)

Errors in production which contain opportunities for improvement and / or quality system

Minor errors in completed Company procedures and policy

No evident security threat affected

No compliance impact anticipated

No regulatory action anticipated

Negligible (E)

Communications which is properly executed

“Clean” product

Experiments that are validated

On time production

No confidentiality/ security element affected

No compliance/ regulatory violation

For every impact category the effect evaluation must involve concern of the next impact areas impact:

Cost – Such effect is normally calculated as a dollar amount which has a direct effect to the project. Nevertheless, cost is often reported and estimated as simply equipment, additional resources, etc. Such is true whenever these additional resources may not result in a direct financial effect to the project which is due to the fact that resources are volunteer or loaned , there are other kinds of donations that will not impact the budget of the project , or the equipment is now on idle and there is no cost of utilization. Besides if there is direct cost, the additional resources must be documented in risk statement as mitigation cost part.

Scope – On whatever occasion there is possibility that the completed product may not be finished as imagined originally there is scope impact. Scope impact can be calculated not providing a deliverable such as an IND, or as lowering of the number of studies completed.

Schedule – It is critical to estimate the risk event schedule impact as this is frequently resulting in the basis to elevate some impact categories. Schedule slowdown is often resulting in cost increase and can result in lowering of quality or scope. Delays of schedule may or may not affect the project critical path and an associated push out of the final end date.

Quality/ Performance– Quality/ Performance is often missed as an impact category and most frequently quality reduction is the preferred choice for risk mitigation. “Low cost replacements” and “short cuts” are manners of lowering the impact of cost. When not documented in a suitable manner and approved by the project sponsor, mitigation strategies which depend upon quality reduction may be resulting in significant disappointment by the stakeholders. More risks can be assigned 1 category, yet others may be assigned more than 1, or all (Newton, 2007).

2.4 Risk Response

For every risk which is identified, a feedback should be pinpointed. This means that it is the project team responsibility to choose a risk response for every risk. The project team can require the best potential risk evaluation and description of the response options so that they can choose the correct response for any risk. The possibility of the risk event taking place and the effects may be the basis for establishing the degree to which the actions to mitigate the risk must be taken. 1 way of assessing mitigation strategies is multiplying the cost of the risk times the probability of occurrence.

Mitigation strategies which cost less than calculation of risk probability must be offered serious consideration. The potential response options are:

Deferred – An establishment of how to address such risk can be discussed at a later stage. The outcomes of the risk evaluation process are documented in every Risk Statement and it is summarized in the Risk Register that can be reported on a monthly basis.

Acceptance – easily accept that it is a risk. If selecting acceptance as a feedback the IMPD is specifying that given the possibility of occurring and the linked impact to the project which results, they are not going to take actions and can accept the quality, scope, schedule, and cost impacts when the risk event is taking place. Mitigation – Taking steps in reducing the probability or/ and rick impact.

More testing, close monitoring, taking early action, etc. Transference – Shifting the risk impact to a 3rd party (such as a subcontractor). It is not getting rid of it; it is easily shifting responsibility. Avoidance – Changing the project to ignore the risk. Change objectives, scope, etc.

2.5 Risk Mitigation

Risk mitigation includes 2 steps:
Identifying the different steps, or activities, to lower the possibility or/ and effects of an adverse risk. Creation of a Contingency Plan to work with the risk if it occurs.

To take steps early in reducing the possibility of an unfavorable risk-taking place can be more less costly and effective than fixing the harm after a risk has taken place. Nevertheless, other mitigation of risk options can easily be too costly in money or time to take into consideration. Activities of mitigation must be documented in the Risk Register and reviewed more often. They involve:
Establishing potential failure points for every solution of the risk mitigation. For every point of failure, document t the event which can raise a “flag” showing that the factor or event has reached a critical condition or occurred. For every failure point, issue alternatives for fixing the failure. As documenting part, a risk, some 2 essential items must be addressed. The 1st one is to mitigate steps which may take to lower the event probability from occurring. The 2nd one activities series which must occur either when or prior occurring of event, or

contingency plan. Actions of mitigation are often having a cost. Other times the cost of risk mitigation may be more than the cost of assuming the risk and incurring the consequences.

It is essential to assess the impact and probability of any risk against the cost of mitigation strategy prior deciding to implement a contingency plan. Contingency plans that are implemented before risk occurs are pre-emptive actions intending to remove or lower the impact of the risk in its totality. Contingency plans which are implemented after occurring of a risk may normally just reduce the impact. Documenting and identifying events which pose a risk to the project outcome is only the 1st step. It is equally essential monitoring each and every risk on scheduled basis by a management of risk team and reported on in the status report of the project.

2.6 Risk Contingency Planning

Contingency planning is a series of activities, or the act of preparing a plan, if an unfavorable risk takes place. To have contingency plan in place is forcing the team of the project to think in advance as to a course of action when a risk event occurs.

Identify the contingency plan tasks (or steps) that can be performed to implement the mitigation strategy.

Identification of important resources like labor, equipment, and money.

Developing contingency plan schedule. Since the date the plan will be performed is not known, such schedule can be in the format of day fist, day second, day Third, etc., instead of having specific start and end dates.

Define escalation procedures and emergency notification, when suitable.

Developing contingency plan for training materials, when suitable.

Update and review contingency plans when suitable (Nokes and Kelly, 2007).

Distribute the plans and publish the plans to those directly involved in performing the plans and the management. In addition, contingency can be reflected in the budget of the project, as line item to cover expenses that are unexpected. The budget amount for contingency can be limited to only the higher probability risks. It is usually established by cost estimation when a risk takes place and multiply it by the probability. For e.g., assuming that an estimated risk to result in extra cost of

Fifty thousand dollars, and the probability of occurring is eighty percent. The amount which must be added in the budget for this 1e item is forty thousand dollars.

Linked with contingency plan, are stop triggers and start triggers. A starting trigger is an event which can activate the contingency plan, meanwhile a stop trigger is the basis to continue normal operations. Both must be pointed out in the Risk Register and must be embedded, e.g.; the stop trigger may be added in the contingency plan field.

2.7 Tracking and Reporting

As activities of the project are completed and conducted, risk events and factors can be observed in determining when in fact trigger events have taken place which can show the risk is now a reality.

Depending on trigger events which was documented throughout the risk mitigation and analysis processes, the project managers or project team can have the authority to validate contingency plans as considered suitable. Risk mitigation activities that happen day to day can be directed and enacted and by project managers.

Contingency plans that once initiated and approved can be included to the project work plan and be reported and tracked together with all of some project activities.

Risk management is a continuous activity which can continue during the life of the project. Such process involves continued activities of risk reporting, contingency plans, monitoring trigger conditions, planning for newly identified risks, risk assessment, risk identification on regular basis.

Project status reporting include a part on risk management, where risks that are new are presented together with every status changes of current risks. Other risk attributes, like impact and probability, can change throughout the life of a project and it must also be reported.

2.8 Processes to Address Immediate Unforeseen Risks

The person who identifies the risk can immediately inform the project managers. The person who is notified can evaluate the situation of the risk.

If needed, the project managers must establish a mitigating strategy, and assign resources as required.

The project risk manager can document the risk event and the mitigating strategy.

Probability of Occurrences			Catastrophic	Critical	Moderate	Minor	Negligible
Definition	Meaning	Value	(A)	(B)	(C)	(D)	(E)
Frequent	• Occurs frequently • Will be continuously experienced unless action is taken to change events	5	5A	5B	5C	5D	5E
Likely	• Occur less frequently if process is corrected • Issues identified with minimal audit activity • Process performance failures evident to trained auditors or regulators	4	4A	4B	4C	4D	4E
Occasional	• Occurs sporadically • Potential issues discovered during focused review.	3	3A	3B	3C	3D	3E
Seldom	• Unlikely to occur • Minimal issue identification during focused review	2	2A	2B	2C	2D	2E
Improbable	• Highly unlikely to occur	1	1A	1B	1C	1D	1E

Table 2 Risk Assessment Matrix

Risk Levels:

Risk is High for codes 5A, 5B, 5C, 4A, 4B, 3A

Risk is Medium High for codes 5D, 5E, 4C, 3B, 3C, 2A, 2B

Risk is Medium Low for codes 4D, 4E, 3D, 2C, 1A, 1B

Risk is Low for codes 3E, 2D, 2E, 1C, 1D, 1E

Question Four [20]

Project summary

Step 0: Select project

It is called Step 0 for the reason that in a way this is outside the main process of project planning .Project that is proposed does not come into view out of thin air, other process should decide to start off this project instead of some other .Meanwhile a feasibility study may propose that there exist a business case for the project, this could still need to be determined that it must have priority over some projects. The assessment of the project merits can be part of the project portfolio management.

1. Purpose, Scope and Objectives

1.1 Identify project scope and objectives

The purpose project discussed in this document is to design and implement a software product, which will assist the lecture in process data analysis and monitor performance of the students. The project name is MAMS which stands for Management of Assessment and Marks System. Second goal, which will be incorporated during the project, is to produce informative, structured and evaluated documentation of the product itself, the software creation and design processes, as well as the project management process (Schwalbe, 2009).

Requirements of course will be fulfilled when the customer accepts the results and deliverables. The software product in question is not directly related to any other named software or projects and will act as an independent product. The requirements of the delivered software product are specified in detail in the Software Requirements Specification document. An important principle for planning a project is to plan in outline 1st and then most detail as time to perform specific activity is approaching .Therefore a list of activities and products that are the outcome of Step 4 can be evaluated when a tasks linked to a specific phase of the project are considered in detail. It will be followed by more detailed iteration of steps five to eight for the phase under consideration.

1.2 Distinguish the project as their objectives or product driven

As the development of a system proceeds it is tending to become more product driven, though the primary objective on all always remain and must be respected. Activities that exist in this step make certain that all the project parties are agreeing on the objectives and are dedicated to the project success.

1.3 Identify objectives and practical measures of the effectiveness in meeting those objectives. The project objective is discussed. some objectives are laid down which are referring to the resources that might be utilized and expected timescales.

Step 1.2: Establish project authority

A single general project authority must be determined so that there is integration between all those concerned.

Step 1.3: Stakeholder analysis -identify all stakeholders in the project and their interest

Fundamentally all parties who are having a project interest must be identified we must list all the stakeholders

Step 1.4: Modify objectives in the light of stakeholder analysis

Stake holder Analysis

Stakeholder Register				
Stakeholder's Name	**Position**	**Internal/External**	**Project Role**	**Contact Information**
Phillip Mtombeni	Project Manager	Internal	Project Manager	2000032207@lesedi.com
Pitso Motlhale	System Designer	Internal	Senior Software Developer	2002097273@lesedi.com
Boitumelo Maswabi	Software Design	Internal	Software Developer	2002091649@lesedi.com
Frans kuhn	Head Of Department	External	Project Sponsor	Frans.kuhn@uj.ac.za
Vusi Dlamini	Dean	External	Project Manager	Vusi.Dlamini@uj.ac.za
Simphiwe Gumede	Lecturer	External	Senior Manager	Simphiwe.Gumede@uj.ac.za

For one to get a full cooperation from everyone who is concerned, it may be essential to change objectives of the projects. It can mean adding features that are new to the existing system that provide benefit to other stakeholders as a way of ensuring their dedication to the project. It is possibly dangerous as the existing size of the system can be increased and the initial objectives may be obscured. Because of such dangers, it is put forward for consideration that this process be completed conscious and in a controlled way (Shenhar and Davir, 2007).

Step 1.5: Establish methods of communication with all parties

For the staff that is internal it must be reasonably easy yet a leader of the project implementing the project can require finding a contact point. this step is leading to the 1st communication plan draft

1.1.2. Assumptions and Constraints

In this project a technique is used to bring a new perspective into analysing process data. The software will be able to detect various trends in time perspective and thus help the person conclude what just happened or did not happen in the process.

The deadline for the software product is set to 18 July 2020. Keeping that in mind, the scheduling will be quite tight, but also realistic. Estimated amount of work time is about three man-months (480 hours). The software product will be one of the first of its kind and therefore everything has to be done within the project - few if any pre-made software components will be used, except for the standard libraries and interfaces which are described in detail in the technical process plans section.

The client has proven to have a significant amount of dedication towards this project. That said, there should not be any risks involving client's premature project cutbacks

1.1.3. Project deliverables

Below a list of items that have to be delivered to the client is given. Everything will be delivered on paper form except for source code and executables that will only be delivered electronically.

The items that will be delivered to the client are:

- User Requirements Document
- Software Requirements Document
- Prototype
- Detailed Design Document
- Software User Manual
- Software Transfer Document
- Source code and executable programs
- Software Project Management Plan
- A copy of the entire project repository on compact disk
- UML Diagrams
- A path that user can access the system

- SPMP documentation
- System Requirement Analysis Software System Proposal
- Software Design Document
- User Documentation Manual,
- Specification
- The work product(s) to be delivered to the client. The quantities, delivery dates, and delivery locations are specified in the project agreement.

1.1.4. Scheduling and Budget Summary

Budget and resource allocation

For each phase as described in the SPMP, a budget has been estimated. In all of the budget estimates the time spent by the project manager is not taken into account and work packages assigned to the project manager are not specified.

1.2. Evolution of the Software Project Management Plan

Although initially written alongside the Software Requirements Specification document this Software Project Management Plan will evolve as the project goes on. Any major change in this document has to be ratified by the client.

Reference Materials

SRS

[SRS] *Software Requirements Specification, Project*

SDS

[SDS] *Software Design Specification*

SPMP

DTW

[DTW] *Berndt, D.J. & Clifford, J. 1996. Finding patterns in time series: A dynamic programming approach. In: Fayyad, U.M., Piatetsky-Shapiro, G., Smyth, P. & Uthurusamy*

R. (eds.) Advances in Knowledge Discovery and Data Mining. Menlo Park, AAAI Press / The MIT Press. P. 229-248.

REVIEW

[REVIEW] Research Scientist, Computer Laboratory, University Of Johannesburg.

2 . Definitions and Acronyms

UR User Requirements Phase

CSC Computer Software Component

SRS Software Requirements Specification

SPMP Software Project Management Plan

SDS Software Design Specification

ICD Interface Control Document

JDK Java Development Kit, *Sun Microsystems, Inc.*

JVM Java Virtual Machine

JRE Java Run-time Environment

JNI Java Native Interface

Swing A collection of inter-architecture windowing components for Java

STL Standard Template Library for C++

MoM Minutes of meeting

HTML Hypertext Markup Language

UML Unified Modelling Language

4. Project Organization

4.1. External Interfaces

No external organizations will take part in this project, other than in the roles of client and project team.

4.2. Internal Structure

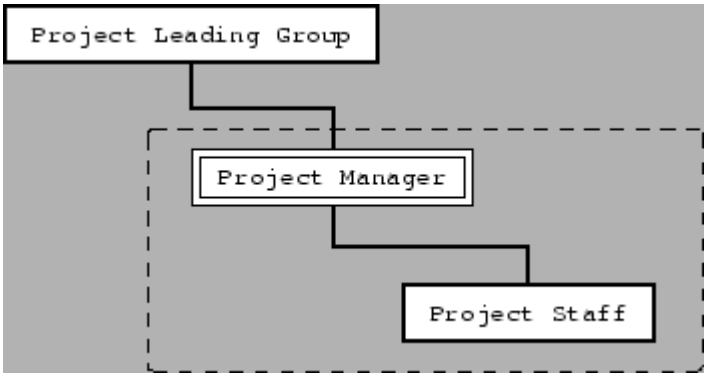


Figure 2: Project Groups

The organizing model in this particular project will be somewhat flat. The number of people participating is so small that this is the only way to go.

Project lead group, consisting of Mr. Phillip and Mr Pitso, Mr Boitumelo from University Of Johannesburg will review all work accomplished by the project staff:

Each member of the project staff will have their own responsibilities according to their prior knowledge of the subject, but since fast and effective communicating is not a problem between the staff members, consulting each other will not become an issue.

Each member of the assigned project staff will be responsible for all documentation concerning the work modules they have to accomplish. Consulting other group members is an essential part of the documentation and design processes.

All project members will be communicating with each other, in order to introduce a flat organization model. Each person will have to acknowledge their own skills so that others may acquire information from them, whenever needed. And vice versa, one will not have to hesitate to ask questions from their peers. Component-Based Development mandates that project members and component users give detailed feedback to others of their work, otherwise good results are not to be expected (Snijders etal., 2001).

4.3. Roles and Responsibilities

Rough division of roles between the staff members:

PHILLIP MTOMBENI
project management for:
wrapper module and interface design
wrapper module implementation

PITSO MOTLHALE

project management for:
DLL design and implementation
software requirements specification

BOITUMELO MASWABI

project management for:

GUI design and implementation
software design specification

5. Managerial process plans

5.1 Start-up plan

5.1.1. Estimation Plan

However, scheduling constraints dictate that the staff needed in this project are expected to deliver at time. Requirements and technical design, implementation and testing phases will take a maximum of a few weeks each, shortest being only three days. A big emphasis on documentation demands some time from implementation, but that will be considered in scheduling. The overall working time spent by the core group in this project is expected to be three man-months, that being near the artificial milestone of 500 hours. Amount of time spent on each task is described in section 3.2.1

5.1.1(a) Estimate effort for each activity

Some estimates of duration, cost and effort may already be done. At this point the non-staff resources required, the probable elapsed time and the staff effort which is required for every activity may need to be produced. The technique of getting to any of these estimates may differ depending on the kind of activity.

The difference among effort and elapsed time must be noted. Effort is work amount that needs to be done. When a task needs 3 staff members to work for 2 full days each, the effort which is expended is 6 days. Elapsed time is the time among the end and start of a task at hand. In example mentioned above, when the 3 staff members begin and end at the identical time then the elapsed time for the activity can be 2 days.

The single activity estimates of effort must be added to obtain the entire bottom-up estimate that can be reconciled with the past top-down estimate. The activities in the activity network may be annotated with their elapsed time so that the whole project duration may be calculated.

5.1.1(b) Revise plan to create controllable activities

The individual activities estimates can disclose that others will be taking a long time. Long activities are making a project hard to control. When an activity which includes system, testing is to take twelve weeks, it can be hard after 6 weeks to determine if exactly fifty percent of the work is done. It can be better to break it down into series of small subtasks.

There may be number of activities which are essential, yet individually are taking up little time. For training course, there may be requirement of copying training materials, order refreshments, register system users on the training system, notify those attending, booking equipment and books and so on. In such situation it can be simple to package the activities into one merged activity ‘making training course arrangement’ that can be completed with a checklist.

Generally speaking, trying to make activities about reporting period length utilized for controlling and monitoring the projects. When you have a progress meeting every 2 weeks, therefore can be convenient having activities of every 2 weeks duration on average, so that progress meetings can usually be made aware of finished tasks every time they are held.

5.1.2. Staffing Plan

Specify the numbers and types of personnel required to conduct the project.

Name Function E-mail

Mr P.M. MTOMBENI 2000032207 2000032207@lesedi.com

Mr P.D. MOTLHALE 2002097273 2002097273@lesedi.com

Mr B.K. MOSHWABI 2002091649 2002091649@lesedi.com

Function not yet being specified

5.1.3. Resource Acquisition plan

All necessary software package of the product will be handed in on the disk or usb 7.1

5.1.4. Project Staff and Training Plan

No extra staff will be hired during this project. Three members of the core group will be enough for a project of this scale.

Project staff will not be trained especially for or during this project, but naturally some new information concerning for example the algorithm and the user interface has to be acquired in order to deliver a usable product.

Purpose of this project is to also learn and develop each participant's skills in software projects' task fields.

5. 2 Work Plan

Specify the work plan, dependency relationships, resource requirements, allocation of budget and resources to work packages, and a project schedule. Much of the content may be in appendices that are living documents, updated as the work proceeds.

Work activities need to be broken down to the level of being able to identify necessary resources, estimate duration; list products produced acceptance criteria and predecessor and successor work activities.

5.2.1 Work Activities

Complete SPMP

- Complete Use Case Scenarios
- Complete Formal Specification Document
- Implement System in Alloy
- Verify System
- Prepare Presentation

5.2.2 Schedule allocation

Leaving aside delivery deadlines, work from different activities can proceed in parallel. After an initial planning, design, and feasibility check process, it is planned to progress development, testing and documentation on different areas of functionality in turn, directed by milestones.

5.2.3 Resource Allocation

Specify the allocation of budget and resources to the various project functions, activities, and tasks.

There are no significant resource allocations for this project apart from stated time.

5.2.3.1 Identify and allocate resources

The type of staff required for every activity is recorded. The available staff for the MAMS project is spotted and are allocated provisionally to the tasks.

5.2.3.2 Revise plans and estimates to take into account resource constraints

Other staff might be required for more than 1 task at the same time, and, in such case, order of priority is determined. They make decisions at this stage and these might have an impact on the entire duration of the MAMS project if other tasks are delayed meanwhile the team wait for staff to become free.

They must ensure that someone is available to begin working on an activity as soon as the previous activities are completed may mean that they are idling meanwhile waiting for the work to start and are then utilized inefficiently.

The Gantt chart provides a clear picture of when activities can possibly occur and is highlighting which ones can be performed simultaneously. Activity networks may give the wrong impression in this respect.

3.6 Review overall resource estimates

At one-point crucial risks will be identified and the broad approach to the project will be decided, this can be a great point where re-estimating effort and some resources needed for project implementation. Where enough information is accessible, estimation depending on function points may be suitable.

Assumptions on which the project is based and imposed constraints such as schedule, budget, resources, software to be reused, customer software to be incorporated, techniques to be employed and product interfaces to other products. These are overviewed here.

5.2.4 Budget allocation

Predictions for the minor financial costs of this project are stated in section **5.3.3**

5.3.1 Requirements Control Plan

Formal and non-formal reviews of the code and documentation will be held both inside the project team and the client, in order to make sure that everything required will actually be done well and in time. There are no formal requirements control plan. Development is

directed towards the requirements specified in the proposal UML document, but can be varied as the problem is better understood.Take into account user requirement concerning implementation this means the customer can have his own requirement procedure for e.g. a company can instruct the utilization of a specific development method.

5.3.2 Schedule Control Plan

Project staff will be in contact daily to bring delays or fallbacks immediately to others' knowledge. Code milestones will occur at the end of each module's coding phase, to keep formal track records and ease risk assessment and evaluation. Weekly meetings among the core group will also be held. Since the project deadlines are very firm, milestone scope will be adjusted towards a self-consistent and stable software build before each delivery.

5.3.3 Budget control plan

Requirements	4 hours @ 150/man hour	R600.00
Specification/ Analysis	6 hours @ 150/man hour	R900.00
Design	6 hours @ 150/man hour	R900.00
Implementation	6 hours @ 150/man hour	R900.00
Other	5 hours @ 150/man hour	R750.00
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Total	**27 hours**	**R4050**

5.3.4 Quality control plan

See section 7.4.

5.3.5 Reporting Plan

A memo of each formal review will be provided alongside with the project's formal documentation. A final report of the whole project will also be written.

Each member will report any disturbances in a subtask to the project manager. This report should contain at least the time spent so far and an estimate of the work still needed. After a subtask has ended, the project manager will also receive a formal notification with information of the time spent.

5.3.6 Metrics Collection Plan

Emphasizing on metrics collection in this project would result delays and distortion in the creative process. Working time statistics and scheduling accuracy will be collected. Testing results will provide formal metrics.

5.4 Risk Management Plan

Most important risk factors in this specific project are:

1. Difficulties in implementation
2. Overoptimistic scheduling
3. Wrong direction of emphasis
4. Personal issues (due to the small team)
5. Inexperienced project management

Factor 1 is the most likely risk to realize. In order to keep this from happening, there are a few guidelines for the project members to keep in mind:

Be honest to yourself and to others

Be critical about your skills, do not excess them

Ask questions

If the first risk realized at any point, the resolution is to take advantage of any person who has knowledge in the problematic area. This includes the use of Usenet newsgroups or other bulletin board systems found on the Internet. If, and only if the problem is a real showstopper and development of the software depends on its solution, means of project's management level resolution plans will take place.

Overoptimistic scheduling *(2)* and inexperienced management *(5)* together form the second most dangerous risk cluster. Avoiding risk realization will be much easier if management completes the tasks *"by the book"* and does not cut to own conclusions at every turn.

Two risk factors *(3,4)*, that are left, are the most difficult to minimize, because the direction of emphasis will show up only at the end of the project and personal issues are almost never predictable.

If any of the most likely risks, namely overoptimistic scheduling, seem to realize at a fast pace, there are at least three options to choose from:

end the project at that stage, leave the project at hold until all the members of project team are available, or continue under-staffed until the project is finished of which the last one is most preferred resolution plan both from the client's and the project staff's point of view.

5.4.1 Identify high-level project risks:

Risks must take into consideration which threaten successful project results. Broadly speaking, some risks may be linked to the development or operational environment, project technical nature or the product type that is being created.

Corona virus is a serious risk at the moment if one software developer or resource is diagnosed with the virus this mean the project will delayed or stopped or the new resource must be hired to replace the one which is sick.

5.4.2 Identify activity risks:

Identify and quantify activity -based risks: Risks deep rooted in the whole nature of projects were already been taken into consideration in Step three. Now we want to check each activity in turn and evaluate the risks to its successful outcome. Each plan is always based specific assumptions. Let us say the component design is planned for 5 days. It is based assumption that the customer’s requirement is unambiguous and clear. Therefore, when it is not, it means the additional effort for clarifying the requirement can be required. The likelihood that an assumption where a plan is based is incorrect account for a risk.

In such e.g. 1 manner of expressing the uncertainty can be expressing the estimation for effort as a range of values. An easier way of working with uncertainty is having most likely estimate for where anything is working without any issues (like users changing their requirements) and a 2nd estimate which involves safety margin to that it is having an

estimation of ninety five percent chance of being met. A project plan can be based on a big number of assumptions, and so other manner of picking out the risks which are more important is required. The harm that every risk can cause and the possibility of it taking place must be determined. Such evaluation may draw attention to more serious risks. The normal impact when issue materializes is making the task more costly and longer.

5.4.3 Plan risk reduction and contingency measure where appropriate:

It can be possible avoiding or at least reducing other identified risks. At the same time, contingency plans identify action to be taken when a risk materializes. For e.g., a contingency plan can be to utilize contract staff when a project team member is unavailable at important time if it is serious illness.

5.4.4 Adjust overall plans and estimates to take account of risks:

A team can change their plans, maybe by adding activities that are new which lower risks. For e.g. programming language which is new may mean that the team must schedule training courses and a time for programmers to learn new programming skills on some non-important work.

5.5 Project close-up plan

5.5.1 Close-up Plan

Normally, all documents and code would be provided to your advisor in electronic form to allow for maintenance. The other items will be part of the final Studio Exposition.

5.1.2 Execute plan/lower levels of planning

On one occasion the project is under way, project plans may require to be drawn up in more detail for every activity when it becomes due. Detailed project planning of the later stages may need to be slowed down because most information can be available close to the beginning of the stage.

Certainly, it is compulsory to make provisional plans for the most distant tasks because, for the reason that thinking about what needs to be done may assist unearth potential issues, yet observation must not be lost of the fact that such plans are provisional.

6 Technical processes

6.1 Process Model

6.1.1 Unified Process will be used refer to UML documents:

This subsection of the SPMP shall determine the relationships among major project functions and activities by specifying the timing of major milestones, baselines, reviews, work products, project deliverables, and sign-off that span the project. The process model or system development life cycle (SDLC) approach may be described using a combination of graphical and textual notations. Software Project Management Plan This is the controlling document for managing a software project, and it defines the technical and managerial processes necessary to deliver the project requirements.

The process model may be described using a combination of graphical and textual Each

milestone should be reached with a consistent and useful set of functionalities, test cases for implemented functions, and reasonable confidence in code coverage. The process model must include project initiation and project termination activities. Development will follow an incremental, milestone-driven method.

6.1.2 Analyses project characteristics:

The common purpose of this section of planning operation is to assure that suitable techniques are utilized for the project.

6.1.3 Select development methodology and life cycle approach:

The project life cycle and the development methodology to be utilized for a project can be impacted by the problem raised above. The methodology idea which is the methods group to be utilized in a project is discussed by the team. For number of software developers , the option of methods may look simple: software developers can utilize the methods that they normally utilized in the past projects .It is important to notice that there should be a caution in guessing that the existing project is identical to the previous project. And also, the methods

utilized, there are generic manners to structure projects like utilization of waterfall life cycle which needs to be taken into consideration. Meanwhile objective setting includes to identify the issues that must be resolved, this planning part is figuring out the manner in which such issues are going to be resolved. Because the project is a story to the planner, other research into the methods usually utilized in problem domain is beneficial. For e.g. in the due course as part of the project a questionnaire survey has to be carried out. There many books on the techniques utilized in these surveys and wise idea is to look at 1 or 2 of them at the planning stage.

1.2 Methods, Tools and Techniques

For the Software Design Specification, the software will be modelled using Microsoft Office Visio to draw UML diagrams.

Two main components of the software product will be programmed in different languages: The DLL will be implemented in C++. Code for the graphical user interface will be written in C++.

Borland Builder will be used as the Swing form design program.

1.3 Infrastructure Plan

No hardware investments will be made for this project. The software development will be done using existing workstations and network infrastructure.

6.3.1 Identify project infrastructure:

Projects are not performed in a vacuum. There is normally some type of existing infrastructure where the project should fit. In which project managers that are new to the company, should establish the precise nature of such infrastructure. It can be the case where project manager is working for outside company performing the work.

6.3.1 Identify relationship between the project and strategic planning:

Project portfolio management supports the selection of the project to be performed by a company. In addition, the programme management may assure that a set of projects is

contributing to usual strategy of the company. Additionally, there is a technical framework where new proposed systems are to fit. Software and hardware standards. for e.g., are required so that different systems may communicate with one another. Such technical strategic decisions must be documented as enterprise architecture process part. Compliance with the enterprise architecture must assure that successive ICT projects create software and some components compatible with those created by former projects and in addition with the current software and hardware platforms.

6.3.2 Identify installation standards and procedures:

Every company which is developing software must describe their development procedures. As minimal the usual stages in software life cycle to be performed must be documented during the creation of the product at every stage.

Configuration management and change control standards must be in place to assure that changes to requirements are in orderly and safe way. The standard procedure can put forward the quality checks that must be completed at each project life cycle point or such can be documented in a different quality procedures and standards manual. The company as part of its control and monitoring policy can have measurement programme in place that is dictating that specific statistics must be gathered at different project stages.

Lastly the project manager must be broad-minded about any control standards and project planning. Project managers will be linked to how projects are controlled: for e.g., the manner in which hours spent by members of the team on each task are recorded on timesheet.

6.3.3: Identify project team organization

Leaders of the projects mostly in large projects case, may have other control over the manner that their project team can be organized. Frequently although the company structure can be dictated to them. for e.g. high-level managerial decision may have taken that business analysts and software developers can be in separate groups, or that development of business to business web applications can be done in different group from that accountable for traditional database applications.

When the leader of the project is having some control over organizational project team then it could best be taken into consideration at the later stage.

1.4 Product Acceptance Plan

High quality of documentation is essential for product acceptance and coursework grading. Before acceptance, the software MUST fulfil the steps of unified process

6.4.1 Identify products and activities

Identify and describe project products (or deliverables). The most detailed planning of the individual activities is now occurring. The planning for long-term is wide in outline meanwhile the most immediate tasks are planned in detail.

Step 4.1: Identify and describe

Step 4.1 Identify and describe project product (or deliverables)

Generally speaking, there can be no product of the project which do not have activities which create them. In every case when possible, we ought to assure the reverse: there should be no activities which are not producing a product which is tangible. Pinpoint all the things the project is going to create assist us to assure that all activities we must perform are accounted for Other products can be handed over to the customer when the project ends- these are called deliverables. Some products may not be in final configuration yet are required as intermediate product utilized in the process of creating deliverable.

Such products can involve a huge number of technical products like operating instructions and training material. In addition, there will be products to do with the quality and management of the project. Document plan can for e.g. be product management.

Products can form hierarchy. The most important products can have group of components product that in turn can have subcomponent products. Such relationships may be documented in a PBS (Product Breakdown Structure)

..

In this e.g. products are grouped into those that relate to individual modules and those that relate to the entire system. A 3rd group that happens to have just 1 product is named ‘management product’ and is made up of progress reports. The asterisk on progress report show that there can be new entity instance ‘progress report’ which is created repeatedly all over the project.

Other products are built from the start for e.g. software components which are new. A product can simply be a document like a component, like a software design document. This can be modified version something which is already existing like altered piece of code. A product can even be human being like a product of the training process, a trained user. One must remember all the time that a product is the activity outcome. A normal error is identifying as product things which are really activities like ‘testing’, ’training’ and ‘design’. To specify ‘documentation’ as product is a mistake that must be avoided, this term by itself is precisely too generalized. Such planning process part heavily draws on quality laid down in PRINCE2.

They state that products at the bottom of Product Breakdown Structure must be documented by product descriptions which include:

The criteria of quality which describe if the product is acceptable

The standards which are relevant

The product forms

The product composition

The product purposes

The product identity/name

The product derivation (which is, some products from where it is derived)

6.2 Document generic product flows

Other products can require 1 or more other existing products 1st before they may be built. For e.g. a design program should be generated before the program may be written and the specification of the program should exist before the design can be started. Such relationships may be portrayed PFD (Product Flow Diagram).

Product Flow Diagram must not have connections among products which are looping back repeatedly. Such is with emphasis not because repetitions are not acknowledged. Contrarily the Product Flow Diagram permit for looping back at some point.

States that in the process of integration testing it was discovered that user requirement was missed in the whole specification of the MAMS system. When we go back to the whole MAMS system specification and modify it, we can notice from the Product Flow Diagram that each and product which follows it may need to be reworked. A module which is new may require to be coded and designed, test cases may need to be added to examine that requirement which new was incorporated successfully and the integration testing may need to be repeated.

The which the Product Flow Diagram may rely on decisions and assumptions about how the MAMS project is going to be performed. Such decisions might not be crystal clear from the Product Flow Diagram, and a textual description that explains the reasons for the structure may be helpful.

Step 4.3: Recognize product instances

Where the similar Product Flow Diagram is relating to more than 1 instance of a specific kind of product, an effort must be done to pinpoint any instance. It may be that in fact there are only 2 component software modules in the software that is going to be created.

6.4 Produce ideal activity network

Appropriate way of generating 1 product from the other there should be 1 or more activities which perform the transformation. By pinpointing such activities, we may build an activity network that indicate the tasks which have to be performed and the proper way which they have to be implemented. The activity networks are most suitable meaning that no account was taken of constraints of resources.

It is assumed that resources at hand for both modules of the software to be created in parallel. An adequate rule is that activity networks are not at all changed to take into consideration resource constraints.

6.5 Modify the ideal to take into account need for stages and checkpoints

The sequencing activities approach defined above inspire persuade the formulation of a plan that will minimize the elapsed time or overall duration, for MAMS project. It reckons that an activity can begin as soon as previous one in which it depends has been completed.

There may, nevertheless, be a requirement to change this, by dividing the MAMS project into stages and introduce checkpoint activities. Such are activities that draw simultaneously the products of previous activities to examine that they are compatible. It can possibly slow down work on other elements of the MAMS project, there must a trade off among quality and efficiency.

The individuals to whom the project manager reports to may choose to abandon the routine monitoring of activities to the project manager. Nevertheless, there may be other important milestones or activities that present the finalization of essential stages of the MAMS project where they may want to take specific note. Checkpoint activities are frequently helpful milestones.

7 Supporting plans

7.1 Configuration management plan

Not applicable

7.2 Test plan

Not applicable

7.3 Documentation Plan

Documents to be written during this project are the project plan (this document), software requirements specification, technical specification, the results and the final report.

Each document will be written, using standard packages to standardize formatting. An HTML conversion of the finished documents will be provided for the client with the help of HTML.

No separate user's manual will be written, because the target audience will be either familiar with the algorithm at hand or learning it.

7.3.1 Document plans and obtain agreement

It is essential that project plan be carefully documented and that all parties to the project agree and understand the commitments needed from them in the project plan. It may sound crystal clear, yet it is amazing how frequently such is not completed. The team must utilize communication plan to assure suitable communication among stakeholders at the right points on the MAMS project.

7.4 Quality Assurance Plan

Quality of the software product will be verified and improved during the development process using techniques such as formal reviews and peer inspection. Formal reviews will be held internally in the group when a task is about to end or has just ended. Each delivered document will be formally reviewed with the client

7.4.1 Analyze some project characteristics (involving quality-based ones)

For e.g. is it process control system, or information system to be developed, or is there going to be both elements? Is the system going to be safety critical, where people's life can be treated by a malfunction?

7.4.2 Review quality aspects of the project plan:

A harm when controlling every project is that activity may disclose that activity done earlier has not being properly completed and requires to be reworked. This, at a blow may change a project which appears to proceed satisfactorily into 1 which is badly out of control. It is essential to know that if a task is reported as finished, it really is therefore the significance of quality reviews. Every task must have quality criteria. Such are quality checks which must be passed before that activity may be 'signed off' as finished.

7.5 Reviews and Audits plan

A Software Quality Assurance Plan will be developed following recommended departmental standards. See section 1.1.2.

1 for its delivery date.

Problem Resolution plan

7.6 Problem resolution plan

A problem resolution system will be determined closer to project release. If the project is publicly adopted, then problem reporting, and resolution will be managed through the systems.

7.7 Subcontractor Management plan

Not applicable

7.8 Process Improvement Plan

Project management documentation and a development journal will be maintained through the project and examined to identify excessive rework or opportunities for better process.

8.1 Addition plans

Security –A username and password will be needed to use the product

Training-Training will be performed by development team at the time of delivery Because the product is straightforward to use ,1 day should be sufficient for training Development team will answer questions at no cost for the first year of use

Maintenance-Corrective maintenance will be performed by the team at no cost for a period of 12 month. A separate contract will be drawn up regarding enhancement.

8.2 Available Hardware and Software Resources

Hardware and software resources are well-suited for a project of this scale. However, the client can loan a laptop computer for development and testing with needed software for short periods of time. Development material repository will reside on a computer at the computer engineering laboratory in the University Of Johannesburg.

8.3 Project Dependencies and Closure Requirements

The project is a standalone project: it is not dependant on any other projects. By July 18th, 2020, when all the software and documentation deliverables have been finished, reviewed and accepted, the project will be finished

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