# Reflective Review

## Part ONE

### Question 1

#### Requirements Specification

The Business Requirement Specification document specifies the requirements for the online Environmental Management system which is to be delivered to the customer. All stakeholders of the project should be able to read and understand it.

The Software Requirements Specification document provides a complete description for both functional and nonfunctional requirements and specifications which the project has to fulfill. A detailed and comprehensive framework and user interface description of the system are the vital points, and is to be used as a contract between the development team and client. As such, all project stakeholders should be able to read and understand it.

An Entity Relationship Diagram is a specialised diagram which illustrates the interrelationships between entities in a logical structure of database. It is used as a tool for the development of a relational database and consequently would be understood by the database designer and other developers.

#### Project Management

***“Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs or expectations from a project****.” - Lecture week 2*

A Business Case document provides all the relevant information in a concise business level manner. It describes what the project is expected to deliver as well as what it will not be delivered. It gives a summary of the product’s functionality and benefits, and also describes how external factors may affect the project’s scope. It documents the business case for the implementation of the system and consequently is designed to be read by the project sponsor and other managers in the client’s company.

A Project Charter formally documents the existence of the project and provides direction on the project’s objectives and management. It acts as a form of acknowledgement and agreement to the project and is required to be signed off by key stakeholders. Its intended audience is the project manager and the project sponsor.

A Project Plan is a crucial document which consists of a Work Breakdown Structure and Schedule as well as the processes to be followed during the project development life cycle. The Work Breakdown structure provides details of the overall task and disseminates it into smaller and more manageable pieces. Information from all project knowledge areas is required for planning activities which are to fulfil the needs of the project. It also provides detail so that a ‘new member’ could read the document and understand how the project is being managed and the processes used. It is designed for use by the project team while developing the project.

A Reflective Review is a useful process to consolidate information and feedback from team members. Through this, the team can improvise and strategise their plan.

#### Project Development

Described previously, the Software Requirement Specification and ER Diagram can also be classed as part of the Project Development process because they are used as references to ensure that the final product matches the requirements.

Test plan is required to provide a quality implementation by considering what aspects of the system should be tested, and how they will be tested. Often, it is not possible to extensively test all the parts of the project because of time and resource limitation. Therefore, to effectively test the system and its deliverables, larger tasks are broken down to manageable ones. It helps to determine which areas to focus on and which testing types to use, and examine the risks that are critical to the system. It is to be used by the development team members.

### Question 2

#### What purpose was the project plan intended to serve?

The plan was intended to ensure that the project was well planned in advance, to allow allocation of time appropriately, describe processes to be followed, and take contingencies like risks into consideration.

#### From where or which information sources did you obtain the information to complete it?

We primarily used lecture notes, but also included team members’ past experiences and knowledge. It was adjusted throughout the project life cycle with practices the team were doing that were working well and changing those processes which weren’t.

#### What reasons are there for inaccuracies in the project schedule?

Planned project schedules are rarely accurate when planned so far in advance of the actual activities taking place and along with the project team’s lack of experience and knowledge in that area. We also realised members who had been allocated to specific tasks were more effective on other tasks.

#### After a schedule is produced, how much effort each week should be devoted to maintaining it (keeping it up-to-date with actuals)?

Every effort should be made to ensure that the figures are up to date. A project manager should then be able to tell if the project is on time and budget. If not, then tasks can be reallocated or given more resources to bring the schedule back on track. It would also give an indication of where resources had been misallocated to a particular task so that the project manager can see where the strength of each resource lies and tasks can be allocated more appropriately in the future.

### Question 3

#### When you delivered the final product, what did you actually hand over to the client?

The items that we hand over to the client are those that we have agreed upon during the sign off. It is a web based application which runs in any internet browser, comprising several interfaces for different users and access controlled via user accounts. It has a comprehensive online help facility for the environmental officer users. The system is developed in Java using an Oracle database and all source code is provided as well as scripts for creating and populating the database. All executables and configuration files along with a system manual which contains configuration and maintenance information were handed over, as well as a User Manual for environmental officers.

#### Provide a rule-of-thumb formula for determining the effort required to produce these items.

The effort required to produce these items can be estimated based on a size measure, such as lines of code (LOC) and function points (FP).

Line of Code:

This is the number of lines of the delivered source code of the application, excluding comments and blank lines and is commonly known as LOC. The exact LOC can only be obtained after the project has completed, however, it can be estimated by using experts’ judgment together with the PERT method. The PERT method involves experts’ judgment of three possible code-size: , the lowest possible size; , the highest possible size; and , the most likely size. The estimate of the code-size S is computed as:

PERT method can also be used for individual components to obtain an estimate of a software application by summing up the estimates of all the components.

Function Points:

This is a measurement based on the functionality of the program. The total number of function points depends on the counts of distinct types in the following five classes:

1. User-input types: data or control user-input types
2. User-output types: output data types to the user that leaves the system
3. Inquiry types: interactive inputs requiring a response
4. Internal file types: files (logical groups of information) that are used and shared inside the application
5. External file types: files that are passed or shared between the system and other systems

Each of these types is individually assigned one of three complexity levels of 1 (simple), 2 (medium) and 3 (complex) and given a weighting value that varies from 3 (simple inputs and outputs) to 15 (complex internal and external files). The unadjusted function-point counts (UFC) is given as

Where and are respectively the number and weight of types of class I with complexity j

This initial function-point count is either directly used for effort estimation or is further modified by factors whose values depend on the overall complexity of the project. The value can be further adjusted by take into account the degree of distributed processing, the amount of reuse and the performance requirement, etc. The final function-point count is the product of the UFC and these project factors. The advantage of the function-point measurement is that it can be obtained based on the system requirement specification in the early stage of the application development.

Once the size of the application is obtained, the effort can be estimated by using an algorithmic method. The algorithm is based on mathematical models that produce cost estimate as a function of a number of variables which are considered to be the major effort factors. The algorithm has the form:

Where denotes the effort factor (i.e. LOC, FP …etc.)

The algorithmic methods differ in two aspects: the selection of effort factors and the form of the function f. The most commonly used is the form of the function which has many different models for different kind of projects. One of the simplest models is the linear model which has the form:

Where denotes the effort factors and are the coefficients chosen to best fit the application.

## Part TWO

### Consider what you have learned from this project and how this might scale to a larger more complex project.

We believe the experience that we have acquired in this project is beyond description and it will definitely help us with our future endeavours. The current project simulated a replica of how the real industry functions and it trained us with all the appropriate protocols and documents required to undertake any future project. Regardless of the scale of the project, a proper documentation and administration process and formalisation of requirements is a necessity.

Apart from all the documentation experience that we have gained, we were also introduced to a substantial amount of programming and design which makes us flexible in both the given roles which we were originally designated with and those we found ourselves performing. This made every member indispensable to the team. Even so, through this we also learned the key fundamentals of teamwork which are, mutual understanding, compromise, and the most crucial of all, communication. Without these, even the smallest task could result in disaster, let alone a larger and complex project in future.

### Your group may or may not have used your project plan to assist in controlling the implementation of the project. If you did, answer this question on the basis of your experience with it.

Fortunately, our project plan was tailored to be as realistic as possible and was structured in a concise manner as to cater for the demand of the ever changing industrial environment with extra room for improvement without having to revamp the entire plan. The level of its adaptability together with some of our member’s real life past experience and knowledge greatly contributed to the overall results.

Our team effectively accomplished every component listed in the Project Plan in accordance with what was required. And as described earlier, a project plan is a crucial document which consists of Work Breakdown Structure and schedule and assists us in managing the project. The Work Breakdown structure provided details of the overall task and disseminated it into smaller and manageable pieces. These tasks were then evenly distributed to the team members so as to achieve full utilisation of human resources and ensured our project is completed before the agreed deadline.

### What difficulties may arise in the implementation of a complex product with a team of people? What is the impact of these difficulties on the quality of the?

Even before the beginning of this project, there were a few hurdles which we had to overcome as a team. They were allocation of task according to team members strength, time management between courses, and the one that we were concerned with most was communication barrier.

Our team has a fair mixture of IT gurus and business oriented students of different education levels. Therefore assignment of tasks was not really an enormous issue to address. However, even with a perfect project plan and schedule planned out for the team, we often ended up burning away our weekends to complete our given tasks as none of us were able to cope with multiple assignments from other courses as well as other external factors. With the diversity of nationality, we soon discovered a problem in conveying our intended message because English is not the first language for some of the group members. Fortunately this problem was soon overcome as the team was very spontaneous and willing to take the extra effort to elaborate further to eliminate any possibilities of misunderstanding the specification required from the system. With our well established Risk Management Plan, any escalating fault will be dealt with appropriately to mitigate risk and avoid jeopardizing the entire project.

Certainly it can be advantageous and beneficial if everyone in the team thinks as a single person does. This will greatly cut down the amount of time spent on explaining and planning. However it is equally advantageous that they do not share the same perspective, because this generates ideas which could be out of the box and multiple solutions can be derived out of it too, achieving high quality and meeting deadlines.

What made us a better team is the amount of inevitable teamwork and frequent communication that we have in this project to overcome all difficulties we had faced together, the bond between us grew exponentially with mutual understanding and respect.

***“Coming together is a beginning. Keeping together is progress. Working together is success.”***

* *Henry Ford*

### How does a project plan assist in the control of these difficulties?

Sufficient amount of planning in advance may help streamline processes before problems can escalate and evolve into hindrance. A well documented Project Plan should consist of meticulous planning for risk management to prevent that. It is one of the most crucial parts and not to be omitted as it is used to prepare the team with contingency plans to see through the completion of the project. It provides the means to identify, assign, and respond to risk throughout the life of the project, in the best interests of meeting project objectives. Risk is often a natural occurrence which may impact on any project even if it is professionally organised. Therefore planning on how to reduce, mitigate and perhaps even avoid these risks is a crucial part of the project planning.

### What part does the schedule play in this?

A well documented project schedule is more likely to be profitable and less tedious to maintain. It manages the whole project and keeps track of deadlines, progress and tasks to be done and who by. This allows us to determine realistic deadlines and plan well ahead before the start of the next task. Not only that, the project schedule also indicates which tasks are dependent on each other so deadlines can be adjusted accordingly in advance. This way we will not set unrealistic deadlines and penalised for it.

### Why would a list of tasks (instead of a schedule) not be sufficient?

As the development phase gets underway, the Project Manager needs to keep track on not only progress, but also the dependencies between tasks and whether there are any critical paths which may arise. Unlike a schedule, a list of tasks are just a snapshot of what is required to be completed and that does not indicate to us if a certain task requires the completion of a previous task before it can be started, and whether additional resource allocation is required. With so many hidden agendas, the consequences of using a list instead of a schedule can be risky and likely to cost the project overhead.