SOLUTION 1

(a) In a centralized system, the data or information processing is done in a central place such as an Information Systems (IS) unit at head office. Data generated at remote locations are sent by appropriate means to the central point.

At the central location there will be:

- A central computer which may be a mini or mainframe;
- Central files for the entire system.

Advantages include:

(i) Each person uses data or information from the single set of files.

(ii) There will be economies of scale in the purchase of equipment and other supplies, including consumables.

(iii) Head office is in a better position to know what is going on at any time.

(iv) There is better data security and control over files.

Disadvantages include:

(i) Possible delays in local office processing activities.

(ii) Undue reliance on head office means that a breakdown of the controlling machine jeopardizes the cycle of operations.

(b) In an outsourcing agreement, a third party supplier assumes responsibility for the supply of a particular good or service. This supply contract is usually made to an agreed price and quality and is arranged, by the customer, for a defined period of time.

The aim is for the customer to focus on its core business activities. The outsourcing vendor may be required to take on the current full-time staff of the customer/client as part of the agreement.

By this agreement, the firm can:

- Concentrate in-house staff on core activities.
- Reduce management time spent on various non-core activities. For example, employees who provide IT training will be better served by working for an organization where training is the core activity.
- Provide a better quality of service because the service (eg. traininig) is the core business of the supplier. Failure to achieve the required level of service will lead to the termination of the contract.
- Provide a cheaper service. It should be cheaper to buy training when and where it is required, rather than paying the staff whether they are delivering the service or not.

SOLUTION 2

(a) Electronic commerce (e – commerce) may be defined as 'trading on the internet', that is, (i) the use of the internet and websites in the sale of products or services. It is the application of advanced technology to increase the effectiveness of commercial practices.

The use of the internet allows businesses to reach, potentially, millions of consumers worldwide, and extends trading time to seven days around the clock. For established companies, e-commerce reduces expensive sales and distribution workforces, and offers new marketing opportunities.

(ii) Electronic links with key suppliers and customers should allow ThetaConstruct Group to:

- Reduce the costs associated with paper documentation and duplicated input and output.
- Provide financial advantages by establishing supply arrangements with suppliers and customers so that excessive stocks are not maintained and long-term contracts are agreed to eliminate unnecessary sales and marketing costs.
- Open up the market place to a wide range of customers who have access to the technology to place orders with the ThetaConstruct Group.
- Reduce the cost of capturing and entering data for online orders. This was traditionally a cost to the company involving the entry and validation of orders.

(b) Economies of scale and enforcement of development standards

- The centralized arrangements should result in economies of scale in the purchase of hardware, software and consumables. This will be achieved through bulk buying and through Group-wide licensing agreements.

- A stronger, centrally-driven IT arrangement will allow easier definition and enforcement of standards in systems development. Common hardware and software used in one physical site provides a much better basis for standards definition and enforcement.

SOLUTION 3

SOLUTION 4

(a) (i) A password is a sequence of characters that may be presented to a computer system before it will allow access to the system or parts of that system.

(ii) Potential problems with passwords include:

- The password may be observed by someone else when the user is entering it into the system, and used by that person later to gain unauthorized access.
- Unimaginative user-defined passwords may be easy to guess.
- Some passwords may be difficult to remember.
- Passwords may sometimes be used for so long that they easily become common knowledge.

(iii) The potential problems may be overcome in the following ways:

- When passwords are entered the actual characters do not usually appear on the screen. The characters may be displayed as asterisks or bullets.
- Unimaginative user-defined passwords may be easy to guess. Passwords should be computer generated. They should be case-sensitive and use numbers as well as letters to give greater variety.
- Instead of passwords that are difficult to remember, shorter passwords may be used.
- Password changes must be enforced.

(b) Performance (or load) testing is conducted to evaluate the compliance of the system or component with specified performance requirements. This is used to test the system to find out how much load (or volume of transactions) will make the system performance degenerate.

SOLUTION 5

(a) (i) A pull-down list is a list of the acceptable values that can be entered into a particular field.

A pull-down list makes a system easier to use in the following circumstances:

- Where the user is unsure about what value to enter.
- If the user enters an invalid value for that field, the system can reject it and then offer a set of valid codes which the user can highlight and enter.

(ii) Default values are fields entered by the system during data entry (i. e. when the user decides not to enter any value).

A default value:

- Makes the system easier to use and speeds up data entry as the value for that field has only to be confirmed but not entered;
- Makes for more accurate data entry.

(iii) Icons are pictorial symbols that may be used to invoke a particular software command.

Icons make a system easier to use for reasons as:

- They require fewer user movements than the command alternative.
- The common use of icons across systems makes it much easier for users to pick up basic commands in an unfamiliar software package.

(b) Prototyping is the term used to describe a working model of a system or part of a system under development. At a number of places in systems development users need to see a physical system to help them formulate ideas about their requirements or to make decisions about the design of the system.

Many users find it difficult to abstractly define their requirements for a system. They often find it easier to evaluate a prototype of a system that allows them to focus on the functions they require and to eliminate features that are irrelevant or unimportant.

SOLUTION 6

(a) (i) A PID should contain at least the following sections:

- Purpose statement - this explains why the project is being undertaken.
- Scope statement – this puts boundaries to the project by outlining the major activities of the project.
- Cost and time estimates – these estimates will necessarily be modified later in the project but are necessary to give a starting point for planning.
- Objective – a clear statement of the mission, critical success factors and milestones of the project.
- Stakeholders – a list of the major stakeholders on the project.
- Chain of command – a statement (and diagrams) of the project organization structure.

ii. Project Management Software (PMS) is used to automate the procedures used in project management. It helps in the planning, scheduling and controlling the people, costs and resources required to complete a project on time.

In the planning process, PMS can be used to enter activities, estimates, procedures and resources, to automatically produce the network diagram showing the critical path, and a Gantt chart showing resource usage.

The software allows simple "what if" experiments with the objective of meeting the required delivery date. Resource profiles can also be printed off as a planning tool for staff used on the project.

(b) In systems development, feasibility should be measured throughout the life of the project. This is what is known as the creeping commitment approach to systems development, a strategy in which feasibility and risks are continuously re-valued throughout a project, adjusting project-budgets and deadlines accordingly.

This is done to consider the following options:

- Cancel the project if it is no longer feasible.
- Re-evaluate and adjust the costs and schedule if the project scope is to be increased.
- Reduce the scope if the budget and schedule are fixed and not sufficient to cover all the project objectives.

SOLUTION 7

(a) (i) Feasibility study is a formal study to decide what type of system can be developed to meet the needs of an organization. The goal of feasibility is to identify as quickly as possible whether the benefits of a proposed project appear to outweigh its expected cost and disruption based on what is already known.

(ii) User Acceptance Testing is usually performed by users and is meant to determine whether or not a system meets previously defined acceptance criteria. The aim is for users to determine whether or not to accept the system.

(iii) An entity life history (ELH) is a type of state model and is a diagram of the processes that happen to an entity from when it comes into existence up to when it leaves the system. It identifies how an entity changes over time.

(b) (i) Expectation is an average and can be regarded simply as the average result obtained if a particular situation arose time and time again. It is computed as the sum of the products of an events outcome and the probability of its occurrence.

(ii) At a probability branch of a decision tree, there may be more than one expectation value. These values give the alternative expectations. That is, an 'alternative' expectation is the expectation from the given alternative.

(iii) A decision expectation is the expectation from the alternative decided upon. Bayes' rule states that when confronted with a number of alternative expectations, the decision maker should opt for the highest expectation. This then becomes the decision expectation.