

# MANAGEMENT INFORMATION SYSTEM - BLOCK REVISION MOCK 2

## QUESTIONS

### NUMBER ONE

- a) Computer hardware and software are usually supplied separately. However, the process of evaluation and acquisition should be related to each other as the functioning of each depends on the other. Usually, companies develop an invitation to tender (ITT) which provides guidelines for the tendering process.

**Required:**

Outline the contents of an ITT. (8 marks)

- b) Explain the following terms as they relate to data storage: (2 marks)
- i) Archiving
  - ii) Back-up
- c) What do you understand by the term audit trail? (2 marks)
- d)
- i) The Data Protection Act 1998 gives individuals seven specific rights in respect of personal data held about them by others. Briefly outline any four of these rights. (4 marks)
  - ii) What controls must a company have to ensure its compliance with the requirements of Data Protection Act? (4 marks)

### NUMBER TWO

- a) At the start of a project, a Project Initiation Document (PID) may be drawn up setting out the terms of reference for the project. Outline the contents of a PID (6 marks)
- b) Outline the duties and responsibilities of the project manager (10 marks)
- c) Many modern information systems utilise multimedia technology to deliver information products to users. Explain giving the main applications of multimedia (4 marks)

## **NUMBER THREE**

- a) MIS projects if not well managed can fail. What causes project failure? (6 marks)
- b) What could lead to changes to the original project plan? (4 marks)
- c) What is the role of the accountant in IS management, delivery and quality assurance (4 marks)
- d) State the THREE advantages and THREE disadvantages of using CASE tools in the systems development process. (6 marks)

## **NUMBER FOUR**

- a) Identify the main participants in the systems development process (6 marks)
- b) In fact finding for systems development a number of techniques for investigating and recording user requirements exist. State the four main techniques. (4 marks)
- c) What could form the source of information for developers of a new system? (4 marks)
- d) After the system is operational, post-implementation evaluation performed. How is this conducted and what is its significance? (6 marks)

## **NUMBER FIVE**

- a) With the aid of an appropriate example, explain the following tools for documenting and modelling user requirements
  - i) Data Flow Diagrams (2 marks)
  - ii) Structured English statements (2 marks)
  - iii) Decision tables (2 marks)
  - iv) Decision trees (2 marks)
- b) How is the data dictionary important to the design of systems? (4 marks)

- c) Using a representative graphical entity-relationship model describe the purpose and notation of this model using a simple example; and explain why the ER-model improves the definition of user requirements. (4 marks)
- d) Kazi Ltd uses a computer program to compute wages for casual workers. This involves multiplying the hours worked with the fixed hourly rate. There is a tax charge of 15% on Gross Pay of 25,000 and over, tax of 10% is charged on pay 10,000 and above and no tax for Gross pay less 10,000. Net pay is computed as Gross Pay less Tax. Present this information in a detailed flow chart. (4 marks)

## NUMBER SIX

It is important that information systems designers develop user interfaces that are flexible and which accommodate the different human perceptions.

- a) Provide a guideline for effective data entry screen design. (5 marks)
- b) Identify the common ways in which users interact with and control computer systems. (4 marks)
- c) Batch and online data capture are two main methods of data entry methods. Explain what batch and online capture mean and relate these to source data automation. (6 marks)
- d) Computer Aided Software Engineering (CASE) tools are used systems development process. Explain the importance of CASE to systems development. (5 marks)

## NUMBER SEVEN

Organisations can acquire IT software through in-house development (bespoke) or they can purchase off-the-shelf (software package approach) packages.

- a) Explain the relative merits and demerits of the software package approach in acquisition of systems. (12 marks)
- b) What are the main reasons why a company would choose to buy a software package?

(5  
marks)

- c) What do you understand by the term prototype? What is the relevance of prototyping to systems development?  
(3 marks)

## NUMBER EIGHT

- a) The MIS project team comprises people who report directly or indirectly to the project manager. The team has a major role to play in the success or failure of the project.
- i) State the factors to consider when constituting a project team (5 marks)
- ii) Outline the methods of monitoring and reporting progress (5 marks)
- b) i) Briefly explain the following classifications of systems. (4 marks)
- Closed and open systems
  - Deterministic and probabilistic systems
- ii) State the features of systems theory (6 marks)

## ANSWERS

### NUMBER ONE

#### a) Structure and contents of an Invitation to Tender (ITT)

An **invitation to tender** sets out the specifications for the required system explaining how it is to be used and setting out a time scale for its implementation. It will set out the performance requirements for the new system. *Typical contents include:*

- Background information
- Volume of data to be processed
- Complexity of processing
- Number of offices to be connected
- Speed of processing required
- Inputs and outputs desired.
- File processing needed
- Estimated life of the system
- Upgrades anticipated
- Contacts with the company
- Form of submissions
- Closing dates
- Address for submission

#### Various sources of information on suppliers

- Retailers
- Computer manufacturers
- Industry trade journals
- Systems consultants
- Companies that perform software testing/evaluation
- Users of the package

b)

- i) Archiving is the process of moving data from primary storage such as a hard disk to portable media for long-term storage. It provides a legally acceptable business history while freeing up hard disk space.
- ii) Back-up means making a copy of data/system files in anticipation of future failure or corruption. A back-up copy of a file is a duplicate copy kept separate from the main system and only used if the original fails.

c) Audit trail

An AUDIT TRAIL is a record of file updating that takes place during a specific transaction. It enables a trace to be kept of all operations on files. Outputs can be traced back to their inputs. Computer audits occur through the computer or around the computer.

d)

- i) **The 1998 Data Protection Act gives individuals seven specific rights in respect of personal data held about them by others.**

These are:

- 1 **Right of subject access:** Upon making a written request and paying a reasonable fee (currently £10) individuals are entitled to be told whether the data controller, or someone on their behalf, holds personal data about them and if so to be given:
  - A description of the personal data;
  - The purposes for which they are being processed; and
  - Those to whom they may be disclosed.
- a) **Right to prevent processing likely to cause damage or distress:** Individuals can, by written notice, request that a data controller does not process data that might cause substantial damage or distress.
- b) **Right to prevent processing for the purposes of direct marketing:** An individual can, by written notice, require a data controller to cease processing data for the purposes of direct marketing.
- c) **Rights in relation to automated decision-making:** An individual can, by written notice, require a data controller to ensure that no decision is made about them by purely automated means. Where a decision has been made affecting an individual by solely automated means, the data controller must inform the individual of the decision.
- d) **Right to take action for compensation for damages caused by the data controller:** Where an individual has suffered damage and/or distress because of a data controller's contravention of the Act, damages can be claimed.
- e) **Right to take action to rectify, block, erase or destroy personal data:** A data subject may apply to a court requesting that any inaccurate data relating to them, including any expressions of opinion based upon inaccurate data, be rectified, blocked, erased or destroyed.

**Right to request that the Commissioner assesses whether any contravention of the Act has occurred:** Any person may ask the

commissioner to assess whether or not it is likely that any processing of personal data is being, or has been, carried out in accordance with the Act.

- ii) **To ensure compliance with Data Protection Act** a company should appoint someone responsible to carry out the duties of Data Protection Officer. These duties must include:
  - a) Performing a regular check that the company's entry in the Register of Data Controllers is up to date;
  - b) Ensuring that any processing carried out is in accordance with the purpose(s) stated in the register;
  - c) Ensuring that there are adequate controls in place such that communication from data subjects is promptly dealt with in accordance with their rights;
  - d) Maintaining a system of controls ensuring compliance with the eight data protection principles.

## NUMBER TWO

### a) Contents of a PID include:

- The business objectives.
- The project objectives.
- The scope of the project.
- Constraints.
- The ultimate customer of the project.
- Resources that will be used.
- Risk analysis.
- Preliminary project plan.
- Purchasing and procurement policy.

### b) Duties and responsibilities of the project manager

The project manager is the person who takes the ultimate responsibility for ensuring the desired result is achieved on time and within budget.

Duties include:

- Outline planning. Setting project targets, determining activities and their sequencing.
- Detail planning. Breaking down the project into activities and tasks, determining resource requirements and network planning.
- Teambuilding. Motivation and leadership.
- Communication. Both within the project team and with senior management.
- Co-ordination. Between team members, users and third parties.

- Monitoring and control. Through feedback and corrective action.
- Problem resolution. For any unexpected problems.
- Quality control. Trade-off between timely completion and project quality.

Responsibilities to management include:

- Efficient use of resources.
- Keeping management informed.
- Ethical behaviour.
- Maintaining customer orientation.

Responsibilities to the project and the project team are:

- Keeping the project on target.
- Ensuring availability of required resources.
- Integrating new team members.
- Provision of the necessary support if members leave.

### c) Multimedia technology definition

Multimedia refers to the delivery of text, sound and pictures through a single terminal, using communications and computer technology

*Multimedia applications include:*

- a. Provision of training by use of interactive training materials and film demonstrations.
- b. Provision of computerised brochures and reports that could include audio and video clips.
- c. Enabling workgroup collaboration with users viewing each other on screen.

## NUMBER THREE

### a) Projects can become unsuccessful due to:

- Inadequate resources
- Taking shortcuts
- Expectations mismanagement
- Missed schedules
- Poor estimating techniques
- Lack of or unreasonably precise targets
- Budget overruns
- Lack of management and leadership
- Conflicting requirements

**b) Changes to the original project plan could result from:**

- New technology.
- Changes in personnel.
- Changes in user requirements.
- Changes in business requirements.
- New legislation.

**c) Role of the accountant in IS management, delivery and quality assurance**

- Investment appraisals;
- Cost-benefit analysis;
- Internal audits;
- Performance measurements;
- Presenting user concerns; and
- Assessing usability.

**d) CASE tools in the systems development process**

**Advantages**

- Automate manual tasks
- Encourage standard methods
- Improve accuracy and overall quality of end product

**Disadvantages**

- Cost of CASE software and hardware needed
- Lack of CASE standards
- Other issues
- CASE does not replace need for analyst's skills
- Initial preparation effort not always worthwhile

## **NUMBER FOUR**

**a) Main participants in the systems development**

- Users
- Management
- System analysts
- System programmers
- Application programmers
- External vendors / service providers

**b) Fact-finding techniques**

- Interviewing
- Documentation review
- Observation
- Questionnaires

**c) Research**

- Journals, periodicals, books
- Internet sites
- Hardware and software vendors
- Independent firms that provide information
- Newsgroups
- Professional meetings, seminars, discussions
- Site visits to observe a system in use

**d) Post-implementation evaluation performance**

These establish whether the objectives and targeted performance criteria have been met, and if not, why not, and what should be done about it. Comparisons are made between actual and predicted performance in terms of:

- Throughput speeds
- Use of computer storage
- Numbers and types of errors/queries
- Costs of processing

The post implementation reviews should be conducted some time after the system implementation to take consideration of initial teething problems.

Post-implementation evaluation feedback

Includes various areas:

- Accuracy, completeness, and timeliness of output
- User satisfaction
- System reliability and maintainability
- Adequacy of system controls and security
- Hardware efficiency/platform performance
- Effectiveness of database implementation
- Performance of the IS team
- Completeness and quality of documentation
- Quality and effectiveness of training
- Accuracy of cost-benefit estimates and development schedules

A post-implementation evaluation is based on fact-finding methods similar to techniques used during the systems analysis phase

## NUMBER FIVE

### a) Tools

#### DFDs

Data flow diagrams (DFDs) are graphical aids that describe an information system  
DFDs represent a logical model that shows **what** a system does, not **how** it does it

Four basic symbols

- Process
- Data flow
- Data store
- External entity

*Context diagrams/ Diagram 0*

*Lower-level diagrams- Level 1-3*

#### Structured English

Subset of Standard English

- Describes process logic
- Use only standard sequence, selection, and iteration structures
- Use indentation for readability
- Use a limited vocabulary

#### Decision tables

- Show a logical structure that describes process logic
- Every logical combination is shown initially
- Results then can be combined and simplified
- Programmers can use decision tables in developing code

#### Decision trees

- Graphical representation that shows a decision table's conditions, actions, and rules

- Logic structure is shown horizontally
- Easy to construct and understand
- Decision table is better in complex situations

### b) Data Dictionary

Documents specific facts about the system

#### *What?*

- Data flows
- Data stores
- External entities
- Processes
- Records (data structures)
- Data elements (data items, fields)

#### *Why?*

- Elements of the system will be described precisely enough to be translated into code
- Allows critical information to be communicated between users and system developers
- Enhances efficiency by avoiding confusion over names and formats
- Must document specific data-related facts, data flows, processes, data stores, external entities, data elements, records, and data dictionary reports
- Standard form or CASE tool can be used

### c) Entity relationship model

Any representative graphical model is acceptable as an answer to this part of the question. This sample answer concerns the entity-relationship model.

- i) The entity-relationship model describes the main “things” of interest to the business and defines the relationships between them. It provides a graphical representation of some of the business rules of the system and these need to be confirmed by the user. For example, an entity type **CLAIM** may be in a one-to-many relationship with another entity type **PAYMENT**. This will have to be confirmed with a representative business user – can they confirm that an individual payment is never for more than one claim? The entity-relationship model also forms a basis for subsequent file and database design.

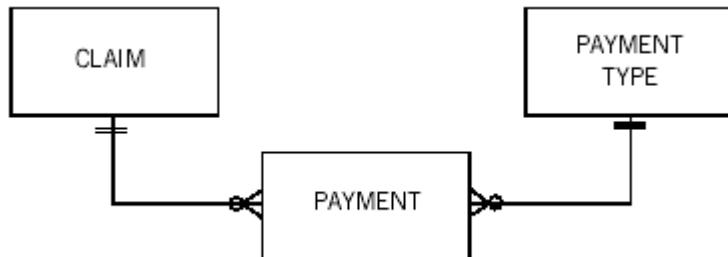
In an entity-relationship model, rectangular boxes show the main entity types (entities) of the system. Entities are defined as singular nouns that describe important business objects, events or concepts. The lines between the entities define relationships. These are usually one-to-one , one-to-many, or many-to-many. The many end of a relationship is shown as a “crow’s foot”.

The relationship is made more precise if the minimum and maximum values are specified on the relationship, as shown in the following example, using the Martin/Odell notation.

For example, in the relationship between **PAYMENT** and **CLAIM**, a **CLAIM** may be associated with a minimum of zero payments (because the CLAIM is rejected) and a maximum of many. A **PAYMENT** is for a minimum of one **CLAIM** and also a maximum of one **CLAIM**.

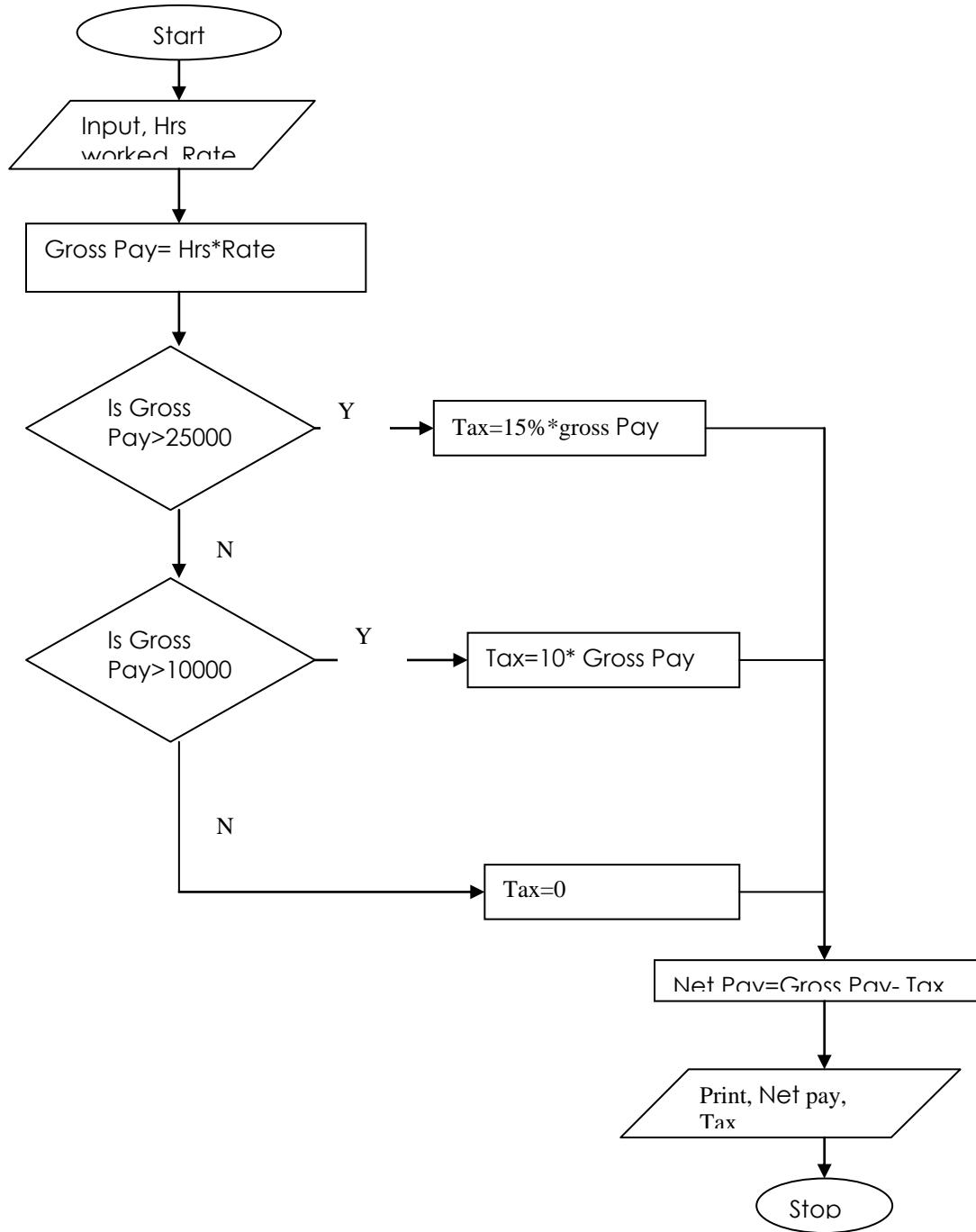
- ii) The model is an improvement on textual specification in at least two ways.

Firstly, it is a more compact way of showing the business rules and specifying these in consistent detail. Secondly, it also identifies what business relationships are not supported. For example, in the above entity-relationship model there is no direct link (or relationship) between CLAIM and PAYMENT TYPE. This means there is no direct business relationship between a particular CLAIM and



the way it is settled. It is very unlikely that this unsupported business rule would be explicitly stated in a textual specification.

d) Flow chart- Kazi Ltd



## NUMBER SIX

### a) Guidelines

- i) Restrict user access to screen locations where data is entered
- ii) Provide a descriptive caption for each field and show the user where to enter the data
- iii) Do not require users to type leading zeroes or trailing spaces for alphanumeric fields
- iv) Display default values that users can accept and use default values for constant data
- v) Display a list of acceptable values for fields with a limited number of valid choices
- vi) Provide a way to leave the data entry screen without inputting the current record
- vii) Provide an opportunity to confirm the accuracy of input data before entering it
- viii) Provide a means to move among form fields in a standard, or in another, order
- ix) Design the screen form to match the layout of the source document
- x) Allow the operator to add, change, delete, and view records
- xi) Design a method to allow operators to search for a specific record

### b) Common ways in which users interact with and control computer systems

Users can control system actions with interactive menus and prompts:

- ***Menu screens***

Menus display a list of user-selectable options

Menu-driven system uses a hierarchy of main menus and submenus

- Shortcut key combinations can be used in a menu design

- ***Hot buttons***

- ***Prompt screens***

User types a response to a prompt

Responses can include commands

- Structured Query Language (SQL) can be used
- Question/answer screens can be used
- Natural language techniques can be used, similar to Internet search engines
- Graphical user interfaces

A GUI environment includes process control and data control, and are easy to use

Common features

- Menu bar
- Toolbar
- Drop-down menus

- Dialog, text, and drop-down list boxes
- Option (radio) buttons, toggle switches, and spin bars

### c) Batch and online data capture

#### ***Batch input method***

- Data entry is done over period of time
- Collection (batch) of data is input at one time

#### ***Online data entry method***

- Also called direct data entry
- Data is validated and available immediately

#### ***Source data automation***

- Combines online data entry with online data capture
- Uses magnetic data strips and swipe scanners
- Common examples: ATMS, point-of-sale terminals, bar code readers, patient ID bracelets, libraries

### d) Computer Aided Software Engineering (CASE) tools

CASE is the use of automated tools to aid in the software development process.

- CASE tools increase productivity
- Full set of CASE tools is called a toolkit
- CASE tools can handle variety of tasks
- Create and integrate data flow diagrams
- Logical and physical design
- Generation of program code

#### **Features and functions of CASE tools**

- 1 Upper CASE. Describe and document business and application requirements.
- 2 Middle CASE. Develop detailed designs.
- 3 Lower CASE. Deal with the generation of program code and database definitions.

## **NUMBER SEVEN**

- a) Advantages of the software package approach

### **1. Cost savings**

The purchase of a software package is perceived as significantly cheaper than developing a bespoke alternative. In a bespoke system the cost of systems development is borne completely by the organisation commissioning the system. In a software package solution, the cost of the systems development is spread across all the potential purchasers of the system hence the reduced cost of purchase.

### **2. Time savings**

The bespoke systems development needs to be tightly specified, designed, programmed and tested. This part of the lifecycle is very time-consuming and during this period requirements may change, so complicating the process even further. The software package is a product that already exists. It can be purchased and implemented almost immediately. There is no requirement for design, programming, unit and systems testing.

### **3. Quality benefits**

The software package is a proven product that has undergone systems testing (in development) and user acceptance testing (by the users who have already bought and used the package). Hence the product should be relatively error-free, as well as fulfilling most of the functional requirements of the application.

### **4. Available documentation and training**

In the software package approach the documentation can be inspected and evaluated before purchasing the product. The documents (such as user manuals and HELP systems) are usually of high quality because they represent an important part of the selling process. In contrast, the documentation supporting a bespoke systems development is not available until very late in the lifecycle and is often sub-contracted to users who do not have the time to do the job properly.

**Training:** Prospective purchasers can attend a course prior to buying the product and so further evaluate the suitability of the package. Similarly, economies of scale allow the software vendors to produce and provide high quality training courses, supported by professional trainers, at a relatively cheap price.

### **5. Organised maintenance and enhancement**

Software products are usually supported by a formal maintenance agreement. Although this agreement costs money, it usually provides:

- Unlimited access to a help desk, where experts can sort out user problems;
- Upgrades to the software that correct known faults and also include new functionality defined and agreed with the user community.

The cost of this support and enhancement is again spread across a number of users and so can be offered relatively cheaply to each individual customer.

## 6. Try before you buy

This entails the ability to examine the product in detail before purchasing it. This is clearly not possible in the bespoke approach to systems development where the product is not ready until the end of the project. The evaluation of the package can be assisted if it can be borrowed (or rented) for a trial period and used in the target hardware and software environment. This can be supplemented by visits to actual users (reference sites) where the operation of the package can be observed and user comments and experiences documented.

### Disadvantages of the software package approach.

#### 1. Ownership

In the bespoke systems development approach, the ownership of the software usually resides with the purchaser – the customer, not the supplier. This is particularly clear if the development is undertaken ‘in-house’, because the ownership of the code clearly resides with the organisation, not the IT department or individual programmers. Even if an external software house produces the code, the contract usually specifies that the source code belongs to the commissioning agent (the customer) and not the supplier.

In the software package approach, the ownership of the software usually remains with the supplier. Customers are licensed to use the product, but they never own it. The software purchaser has little control over the future direction and ownership of the product they are buying. This is not the case with a bespoke development.

#### 2. Financial stability of the supplier

External software suppliers are subject to the vagaries of management and the markets. There is a risk that they may go out of business, or experience financial problems that affect the quality of their support and development services.

#### 3. Competitive edge

Many organisations claim that they use (or wish to use) IT and IS as a competitive edge in the market place. They develop bespoke systems to give

them that edge. In the software package approach, the software solution (or product) is open to all competitors and potential competitors. It is difficult to see how such a solution can provide a competitive edge, as all potential competitors have access to that solution.

#### **4. Failure to fit requirements**

This is the inability of the product to fit all (100%) of users' requirements. This means that either:

- Users have to make compromises and accept that they will not get all the functionality they require; or
- Tailored amendments will have to be made to the software product to deliver the required functionality.

Whichever way is chosen, it is clear that most software packages do not fulfil all the user requirements defined for a particular application.

#### **5. Legal redress**

In a bespoke development, the ultimate failure of the system to fulfil the user's functional requirements can be resolved (usually in the favour of the customer) by law. Clearly this last resort is inappropriate if the system has been developed by an internal IS department, but it is an option if the system has been developed by an external software house.

##### **b) Reasons for buying a software package**

- Lower costs
- Requires less time to implement
- Proven reliability and performance benchmarks
- Implemented by other companies
- Requires less technical development staff
- Future upgrades provided by the vendor

##### **c) Relevance of prototyping to systems development**

A prototype is an early, rapidly constructed working version of the system. The working model helps users understand the system that is being developed.

- Prototyping produces a less-expensive model
- Can eliminate problems before the final version
- Goal is to develop a working model quickly
- Early way to test essential system features
- Prototype can be upgraded or replaced during later SDLC phases

## NUMBER EIGHT

### a) MIS Projects

#### i) Factors to consider when building a project team

Factors to consider when constituting a project team are:

- Skills required
- Availability of staff
- Costing considerations
- Amount of work to be done
- Levels of supervision required

To enhance performance of the project team, ensure:

- Effective communication
- Awareness of team members and results orientation
- Collaboration and creativity
- Trust and a supporting atmosphere
- Commitment
- Conflict resolution (Consider positive and negative conflicts)
- Acceptance of change

#### ii) Methods of monitoring and reporting progress

- Project budget. The amount and distribution of resources to a project. Budgeting may be top down or bottom up.
- Gantt charts.
- Network diagrams.
- Project Evaluation and Review Technique. Incorporates uncertainty in determining project duration by probabilistic consideration of task duration and computation of expected duration.
- Resource histograms. These are bar charts showing estimated resource requirements against available resources for the project duration.
- Progress reports and milestones. A progress report shows the current status of the project in relation to the planned status. A milestone is a significant event in the project, usually completion of a major deliverable.

### b)

#### i) Classification of systems

##### i. Closed and open systems

Systems may be classified as *open*, *relatively closed* or *closed*. A closed system doesn't exchange resources with its environment. This implies that the system has no input and no output relating it to the environment. E.g. A

battery run and time control system of light signals placed temporarily on the road during repairs.

Open systems exchange resources with their environment via input and output, some of which are ill-defined or even unknown. An organisation is an open system. By injecting negative entropy into its operations (i.e. by maintaining its order) an open system is able to adapt continually to its environment.

Between the two-extremes of closed and open systems is *relatively closed system*. These system exchange resources with their environment only through well defined input and output. Their input and output are defined when the system is designed, and the input are controlled to conform to these predefined form.

## **ii. Deterministic and probabilistic systems**

The operation of a deterministic system is completely predictable e.g a computer program. The present state and the inputs of such a system fully determine its operations and its next state e.g. a microprocessor chip or a correct software package.

The outputs of probabilistic (or stochastic) systems can be predicted only in terms of the probability distribution of these values or of some aggregate measure such as the value. There is always uncertainty as to their actual value at any given time. Both organisations and ISs are probabilistic.

## **ii) Systems Theory**

The systems approach or systems theory is an approach (abstract system of ideas) to problem solving - the problem being how to structure an organisation or analyse an IS - in which the entity being studied (an organisation or IS) is considered a system.

### **Features of the Systems Theory**

The fundamental consideration affecting the design of information systems stem from Systems Approach. The approach has many facets but the following are the most salient:

1. All systems are composed of inter-related parts or sub-systems and the system can only be explained as a whole. This is known as *holism* or *synergy*. The systems view is that the whole is more than just some of the parts and

those vital interrelationships will be ignored and misunderstood if the separate parts are studied in isolation.

2. Systems are hierarchical, that is, the parts and sub-systems are made up of other smaller parts. For example, a payroll system is a subsystem of the Accounting System, which is a sub of the whole organisation. One system is a sub of another...
3. The parts of a system constitute an indissoluble whole so that no part can be altered without affecting other parts. Many organisational problems arise once this principle is flouted or ignored. Changes to one department could create untold adverse effects on others - ripple effects: e.g. changing a procedure in one department could affect others e.g. changing a procedure in admissions department of a college will affect the academic departments-type of data captured, process
4. The sub-systems should work towards the goals of their higher systems and should not pursue their own objectives independently. When subsystems pursue their own objectives, a condition of *sub-optimality* arises, and with this the falling of the organisation is close at hand! Information systems designers should seek to avoid the sub-optimality problem!
5. Organisational systems contain both hard and soft properties. Hard properties are those that can be assessed in some objective way e.g. the amount of PAYE tax with tax code, size of product- quantifiable. Soft properties - constitute individual taste. They cannot be assessed by any objective standard or measuring process e.g. appearance of a product, suitability of a person for job and any problem containing a *political* element.