Solved
Scanner
Appendix
CS Professional Programme M - II (New Syllabus)
(Solutions of December - 2014)

Paper - 4: Information Technology and Systems Audit

Chapter - 1: Information Technology Law

2014 - Dec [1] (a)

Digital Signature: As per Section 2(1) (p) of Information Technology Act "Digital signature" means authentication of any electronic record by a subscriber by means of an electronic method or procedure in accordance with the provisions of Section 3.

A Digital signature (standard electronic signature) takes the concept of traditional paper-based signing and turns it into an electronic "fingerprint". This "fingerprint," or coded message, is unique to both the document and the signer and binds both of them together. The digital signature ensures the authenticity of the signer. Any changes made to the document after it is signed invalidate the signature, thereby protecting against signature forgery and information tampering. Digital signatures help organizations sustain signer authenticity, accountability, data integrity and non-repudiation of electronic documents and forms.

A digital signature is issued by a Certification Authority (CA) and is signed with the CA's private key. A digital signature/electronic signature typically contains the: Owner's public key, the Owner's name, Expiration date of the public key, the Name of the issuer (the CA that issued the Digital ID), Serial number of the digital signature and the digital signature of the issuer. Digital

signatures deploy the Public Key Infrastructure (PKI) technology.

According to the Information Technology Act, 2000, Section 38, a digital signature can be revoked by the Certifying Authority under the following circumstances:

(i) When the person in whose name it has been registered requests, by himself or through an authorized representative and gives it in writing that he wishes for it to be cancelled.

(ii) When the subscriber expires.

(iii) When he becomes insolvent.

(iv) When the company or firm that is the subscriber is wound up or dissolved.

(v) When the Certifying Authority is of the opinion that the certificate has been obtained by misrepresentation of a material fact or by fraud.

(vi) When some essential requirement for obtaining the certificate has not been fulfilled.

(vii) When the private key of the certificate has been breached.

In all the cases where the revocation takes place by an action taken *suo moto* by the Certifying Authority, the subscriber will be given an opportunity of being heard and upon the revocation of the certificate, the subscriber will be intimated of the fact.

2014 - Dec [2] (a) (i), (ii)

(i) Section 2(1)(j) defines 'Computer network' as the interconnection of one or more computers through -

- The use of satellite, microwave, terrestrial line or other communication media; and
- Terminals or a complex consisting of two or more interconnected computers whether or not the interconnection is continuously maintained.

(ii) Civil court not to have jurisdiction: No court shall have jurisdictions to entertain any suit or proceeding in respect of any matter which an adjudicating officer appointed under this Act or the Cyber Appellate Tribunal constituted under this Act is empowered by or under this Act to determine and no injunction shall be granted by any court or other authority in respect of any action taken or to be taken in pursuance of any power conferred by or under this Act.

Appeal to High Court: Any person aggrieved by any decision or order of the Cyber Appellate Tribunal may file an appeal to the High Court within sixty days from the date of communication of the decision or order of the Cyber Appellate Tribunal to him on any question of fact or law arising out of such order: Provided that the High Court may, if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal within 45 days, it may allow it to be filed within a further period not exceeding sixty days.

2014 - Dec [2] (b) (i), (ii)

(i) Compensation for failure to protect data: As per Section 43A of IT Act, 2000 as amended, where a body corporate, possessing, dealing or handling any sensitive personal data or information in a computer resource which it owns, controls or operates, is negligent in implementing and maintaining reasonable security practices and procedures and thereby causes wrongful loss or wrongful gain to any person, such body corporate shall be liable to pay damages by way of compensation to the person so affected.

(ii) Punishment for Violation of privacy: As per Section 66E of the IT Act, 2000 as amended whoever, intentionally or knowingly captures, publishes or transmits the image of a private area of any person without his or her consent, under circumstances violating the privacy of that person, shall be punished with imprisonment which may extend to three years or with fine not exceeding ₹ 2 lakh, or with both.

2014 - Dec [3A] (Or) (i)

The Cyber Appellate Tribunal shall have, for the purposes of discharging its functions under this Act, the same powers as are vested in a Civil Court under the Code of Civil Procedure, 1908, while trying a suit, in respect of the following matters, namely:

(a) summoning and enforcing the attendance of any person and examining him on oath;
(b) requiring the discovery and production of documents or other electronic records;
(c) receiving evidence on affidavits;
(d) issuing commissions for the examination of witnesses of documents;
(e) reviewing its decisions;
(f) dismissing an application for default or deciding it ex-parte;
(g) any other matter which may be prescribed.

Chapter - 2: Information Systems
2014 - Dec [1] (b)

Generally human, financial, physical and knowledge factors that provide a corporate the means to perform its business processes are considered as corporate resources.

Information can be considered as the raw material used in producing each and every decision taken in an organization. Organizations need to decide regularly on what objectives to be achieved, what actions to be taken to achieve these objectives, how and when these actions are to be taken and the resources to be used for all these activities. These decisions are taken by all the people in the organization who work at different level of organizational hierarchy and handle different aspect of the organizational work.

The exact decision that in individual takes varies from person to person and from time to time, depending on nature of organizational tasks being performed. Also some people need to do more of decision making as compared to implementing the decisions. But everyone in the organization needs has to takes some decisions for which availability of adequate information is critical.

Information is also required to convey decisions taken to the people responsible for implementing the decisions taken and for monitoring the actual results achieved as the work progresses. In want of information many decisions cannot be taken and in some cases it results into poor decisions. Therefore information is acting as a resource, which should be managed, so that needy people may get it in time when required. In this way information plays a role of corporate resource in every organization. Like any other resource it need to be formalized, must have some identified and systematize way of generation and dissemination.

2014 - Dec [2A] (Or) (iv)
Transaction Processing Systems (TPS)

As the name implies, Transaction Processing Systems (TPS) are designed to process routine transactions efficiently and accurately. A business will have several (sometimes many) TPS; for example: Billing systems to send invoices to customers. Systems to calculate the weekly and monthly payroll and tax payments, Production and purchasing systems to calculate raw material requirements, Stock control systems to process all movements into, within and out of the business etc.

Management Information Systems (MIS)
An organized approach to the study of the information needs of an organization's management at every level in making operational, tactical and strategic decisions. Its objective is to design and implement procedures, processes and routines that provide suitably detailed reports in an accurate, consistent and timely manner.

It is mainly concerned with internal sources of information. MIS usually take data from the transaction processing systems and summarize it into a series of management reports. MIS reports tend to be used by middle management and operational supervisors.

Executive Support Systems (EIS)
An executive information system (EIS) is a type of management information system intended to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to meeting the strategic goals of the organization. It is commonly considered as a specialized form of decision support system (DSS).

2014 - Dec [3A] (Or) (ii)
It is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle. Agile technology is being widely used by the organization in developing information system now a days and it is resulting in various advantages.

Agile methods break tasks into small increments with minimal planning and do not directly involve long-term planning. Iterations are short time frames (time boxes) that typically last from one to four weeks. Each iteration involves a team working through a full software development cycle, including planning, requirements analysis, design, coding, unit testing and acceptance testing when a working product is demonstrated to stakeholders.

This minimizes overall risk and allows the project to adapt to changes quickly. Stakeholders produce documentation as required. Iteration might not add enough functionality to warrant a market release, but the goal is to have

an available release (with minimal bugs) at the end of iteration. Multiple iterations might be required to release a product or new features.

Team is usually cross-functional and self-organizing and members take responsibility for tasks that deliver the functionality iteration requires. They decide individually how to meet iteration's requirements.

Chapter - 4: Computer Software – An Overview

2014 - Dec [2A] (Or) (i)

Batch processing is execution of a series of programs ("jobs") on a computer without manual intervention. Jobs are set up so they can be run to completion without manual intervention. So, all input data are preselected through scripts, command-line parameters, or job control language. This is in contrast to "online" or interactive programs which prompt the user for such input. A program takes a set of data files as input, processes the data and produces a set of output data files. This operating environment is termed as "batch processing" because the input data are collected into batches of files and are processed in batches by the program.

Online processing means users directly enter information online (usually, online, in this case, means online to a central processor, rather than its modern connotation of the Internet, but it could mean both!), it is validated and updated directly onto the master file. No new file is created in this case. Therefore, there is near immediate input process and output. Imagine a cash dispenser transaction or booking a holiday at travel agents or over the Internet. Compared with batch processing the number of transactions will be few.

Real time processing is usually found in systems that use computer control. This processing method is used when it is essential that the input request is dealt with quickly enough so as to be able to control an output properly. For example, the computer inside the Engine Control Unit in a car has to manage the engine at every moment based on what the driver wants to do.

Real time processing has to be programmed very carefully to ensure that no input events are missed.

2014 - Dec [6] (c)

The three characteristics of a good software are:
1. Operational Characteristics
2. Revision Characteristics
3. Transition Characteristics

Various Operational Characteristics of software are:
1. **Correctness:** The software should meet all the specifications stated by the customer.
2. **Usability/Learnability:** The amount of efforts or time required to learn how to use the software should be less. This makes the software user-friendly even for IT-illiterate people.
3. **Integrity:** Software should be integrated with other applications and it should not affect the working of another application.
4. **Reliability:** The software should not have any defects. Not only this, it shouldn't fail while execution.
5. **Efficiency:** The software should make effective use of the storage space and execute command as per desired timing requirements.
6. **Security:** The software shouldn't have ill effects on data / hardware. Proper measures should be taken to keep data secure from external threats.
7. **Safety:** The software should not be hazardous to the environment/life.

Various Revision Characteristics of software are:
1. **Maintainability :** Maintenance of the software should be easy for any kind of user.
2. **Flexibility:** Changes in the software should be easy to make.
3. **Extensibility:** It should be easy to increase the functions performed by it.
4. **Scalability:** It should be very easy to upgrade it for more work (or for more number of users).
5. **Testability:** Testing the software should be easy.

Transition Characteristics of the software are:
1. **Interoperability:** Interoperability is the ability of software to exchange information with other applications and make use of information transparently.
2. **Reusability:** If we are able to use the software code with some modifications for different purpose then we call software to be reusable.
3. **Portability:** The ability of software to perform same functions across all environments and platforms, demonstrate its portability.

Chapter - 5: Database Management
2014 - Dec [1] (c)
The Advantages of using a data warehouse are:
1. Enhanced and user access to a wide variety of data.
2. Increased data consistency.
3. Increased Productivity and decreases computing costs.
4. It is able to combine data from different sources, in one place.
5. It provides an infrastructure that could support change to data and replication of the changed data back in to the operational systems.

In its simplest form, data mining automates the detection of relevant patterns in a database, using defined approaches and algorithms to look into current and historical data that can then be analyzed to predict future trends. Because data mining tools predict future trends and behaviors by reading through databases for hidden patterns, they allow organizations to make proactive, knowledge-driven decisions and answer questions that were previously too time-consuming to resolve.

Data mining is not particularly new — statisticians have used similar manual approaches to review data and provide business projections for many years. Changes in data mining techniques, however, have enabled organizations to collect, analyze and access data in new ways. The first change occurred in the area of basic data collection. Before companies made the transition from ledgers and other paper-based records to computer-based systems, managers had to wait for staff to put the pieces together to know how well the business was performing or how current performance periods compared with previous periods. As companies started collecting and saving basic data in computers, they were able to start answering detailed questions quicker and with more ease.

2014 - Dec [2A] (Or) (ii)

S. No.	Basis	Data Definition Language	Data Manipulation Language
1	**Meaning**	Data definition language is the link between the logical and physical structure of the database.	Data manipulation language provide techniques for processing the database.

2	**Used for**	It is used to define the physical characteristics of each record.	It is used to perform operations on data such as retrieval, sorting and display.
3	**Independence**	Physical and logical independence provided by it.	It provides for independence of programming languages.
4	**Physical Storage**	It takes care as how the data is maintained in physical storage.	It separates the user from physical storage.
5	**Description and Process-ing**	It describes the schema and sub-schemas.	It enables the user and application programs to process data on a symbolic logic basis rather than on physical location basis.

2014 - Dec [3A] (Or) (iii)

There are a number of characteristics that distinguish the database approach with the file-based approach.

1. **Self-Describing Nature of a Database System**
   A Database System contains not only the database itself but also the descriptions of data structure and constraints (meta-data). This information is used by the DBMS software or database users if needed. This separation makes a database system totally different from the traditional file-based system in which the data definition is a part of application programs.

2. **Insulation between Program and Data**
   In the file based system; the structure of the data files is defined in the application programs so if a user wants to change the structure of a file, all the programs that access that file might need to be changed as well. On the other hand, in the database approach, the data structure is stored in the system catalog not in the programs. Therefore, one change is all that's needed.

3. **Support multiple views of data**
   A view is a subset of the database which is defined and dedicated for particular users of the system. Multiple users in the system might have different views of the system. Each view might contain only the data of interest to a user or a group of users.

4. **Sharing of data and Multiuser system**
   A multiuser database system must allow multiple users access to the database at the same time. As a result, the multiuser DBMS must have concurrency control strategies to ensure several users access to the same data item at the same time and to do so in a manner that the data will always be correct–data integrity.

5. **Control Data Redundancy**
   In the Database approach, ideally each data item is stored in only one place in the database. In some cases redundancy still exists so as to improve system performance, but such redundancy is controlled and kept to minimum.

6. **Data Sharing**
   The integration of the whole data in an organization leads to the ability to produce more information from a given amount of data.

Chapter - 6: Programming – An Overview

2014 - Dec [2] (c)

Assembler: Assembler is a computer program which is used to translate program written in Assembly Language in to machine language. The translated program is called as object program. Assembler checks each instruction for its correctness and generates diagnostic messages, if there are mistakes in the program.

Compiler: A compiler is a program that translates a programme written in HLL to executable machine language. The process of transferring HKK source program in to object code is a lengthy and complex process as compared to assembling. Compilers have diagnostic capabilities and prompt the programmer with appropriate error message while compiling a HLL program. The corrections are to be incorporated in the program, whenever needed and the program has to be recompiled. The process is repeated until the program is mistake free and translated to an object code.

Interpreter: The basic purpose of interpreter is same as that of compiler. In compiler, the program is translated completely and directly executable version is generated. Whereas interpreter translates each instruction, executes it and then the next instruction is translated and this goes on until end of the program. In this case, object code is not stored and reused. Every time the program is executed, the interpreter translates each instruction freshly. It also has program diagnostic capabilities.

2014 - Dec [3A] (Or) (iv)

Some of the Programming methodologies are stated below:

1. **Procedural Programming:** A procedural program is a series of steps, each of which performs a calculation, retrieves input, or produces output. Concepts like assignments, loops, sequences and conditional statements are the building blocks of procedural programming. Major procedural programming languages are COBAL, FORTRAN, C, AND C++.

2. **Functional Programming:** A functional program is a collection of mathematical functions, each with an input (domain) and a result (range). Interaction and combination of functions is carried out by functional compositions, conditionals and recursion. Major functional programming languages are Lisp, Scheme, Haskell and ML.

3. **Logic (Declarative) Programming:** A logic programme is a collection of logical declarations about what outcome a function should accomplish rather than how that outcome should be accomplished. Logic programming provides a natural vehicle for expressing non-determinism, since the solutions to many problems are often not unique but manifold. The major logic programming language is Prolog.

4. **Object-Oriented (OO) Programming:** The OO program is a collection of objects that interact with each other by passing messages that transform their state. The fundamental building blocks of OO programming are object modelling, classification and inheritance. Major object-oriented languages are C++, Java etc.

5. **Event Driven Programming:** An event driven program is a continuous loop that responds to events that are generated in an unpredictable order. These events originate from user actions on the screen (mouse clicks or keystrokes, for example), or else from other sources (like readings from sensors on a robot). Major event-driven programming languages include Visual basic and Java.

6. **Concurrent Programming:** A concurrent program is a collection of cooperating processes, sharing information with each other from time to time but generally operating asynchronously. Concurrent programming languages include SR, Linda and High performance FORTRAN.

2014 - Dec [4] (c)

The required flowchart is shown as below
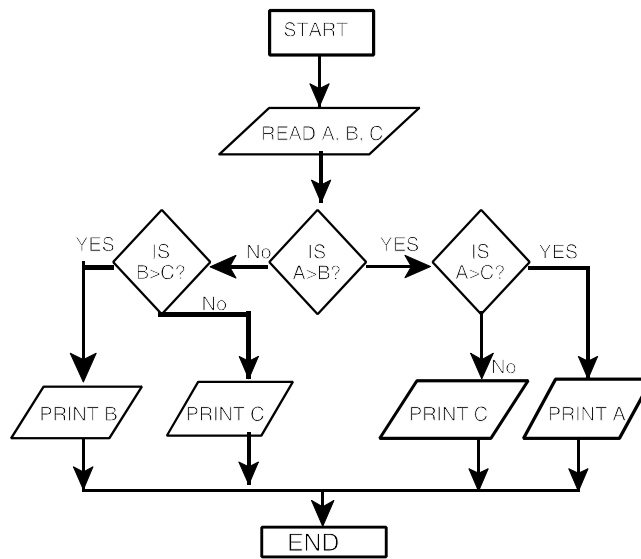
Chapter - 7: Internet and Other Technologies

2014 - Dec [2] (d)

Electronic Payment Portal: Payment portal or Payment gateway is an e-commerce application service provider service that authorizes payments for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar. It is the equivalent of a physical point of sale terminal located in most retail outlets. Payment gateways protect credit card details by encrypting sensitive information, such as credit card numbers, to ensure that information is passed securely between the customer and the merchant and also between merchant and the payment processor.

The Benefits of Electronic Payments

1. **Speed:** Sending cash or cheques by post for goods is slow and has security and currency conversion implications.
2. **Convenience:** Electronic payments ensure that your store is open for business globally, 24-hours a day, seven days a week.
3. **Efficiency:** The following points contribute to its efficiency.
   (a) Electronic payment systems leave behind an electronic documented audit trail, streamlining your auditing and accountancy processes.

(b) Bank wires are cumbersome and expensive.

(c) Accepting payments online streamlines the buying cycle. By making your order, stock, purchase, payment and dispatch processes electronic, from website to back office, you don't have to re-key order data.

(d) Shopping site software can be easily integrated with popular back office packages, such as Sage, to automate ordering, stock control, invoicing and accounting systems.

4. **Reduced costs:** Accepting online payments means that many banking processes become automatic.

5. **Increased customer base:** Online payments take advantage of impulse buyers. 95 per cent of electronic purchases are by credit card. If your website doesn't offer payment by credit cards as an option, you could lose out on this market.

2014 - Dec [2A] (Or) (iii)

Internet: The Internet is a global system of interconnected computer networks. It is a network of networks that consists of millions of private, public, academic, business and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies.

The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support email. It uses the standard Internet protocol suite (TCP/IP) to serve billions of users worldwide.

Intranet: It refers to a private network which is designed to meet the internal information needs of the employees. It is accessible only by authorised employees, contractors and customers.

The need for intranet is the result of many factors such as:

(a) Cost effectiveness.

(b) Prompt availability of information to company and users.

(c) Less expensive means of communication to remain in touch with employees located in scattered offices.

(d) Custom support.

Extranet: It refers to private network which operates similarly to an intranet but is directed at customers or suppliers (people outside the organization) rather than at employees. An extranet is a computer which allows controlled

access from the outside, for specific business or educational purposes. In a business-to-business context, an extranet can be viewed as an extension of an organization's internet that is extended to users outside the organization, usually partners, vendors and suppliers, in isolation from all other Internet users.

2014 - Dec [4] (a)

M-commerce is a term that is used to refer to the growing practice of conducting financial and promotional activities with the use of a wireless handheld device. The term m-commerce is short for mobile commerce and recognizes that the transactions may be conducted using cell phones, personal digital assistants and other hand held devices that have operate with Internet access. While still in its infancy, the concept of m-commerce has been refined in recent years and is beginning to become more popular.

Characteristics of Mobile Commerce:

1. **Fast Processing:** One important characteristic of mobile commerce is that it allows the user to process a transaction fast. Not only does the customer receive his item almost instantly via download, e-mail or another form of electronic delivery, the business owner receives payment for his product or service more quickly compared to traditional methods.

2. **Reduced Business Costs:** Mobile commerce also helps reduce costs for the seller. She rarely needs to pay for a separate office space, overhead costs or employees. In some cases a small business owner who sets up a mobile commerce operation doesn't need an office at all. The seller can monitor sales online or by receiving statements from a processing service.

3. **Little Need for Maintenance:** Another characteristic of mobile commerce is that it requires very little maintenance from the seller. The owner sets the product up for mobile delivery one time and then receives payment for sales automatically.

2014 - Dec [4] (d)

B2B or Business to Business: It is considered as one of the most perspective and extensively developing E-commerce trend nowadays. It refers to electronic commerce between businesses and also supplies chain technology, which is the largest and most successful e-commerce technology nowadays. The parties of B2B schema are "Business Partners".

Internet platforms give an opportunity to considerably simplify all steps of the operations, make the trade more immediate. An example of a schema B2B is selling site templates to companies for using as a design base, besides any other interactions involving bulk deliveries are included. B2B means an established working relationship therefore it is a better solution to deliver comparing to B2C, although it needs to link together two complex accounting systems.

Supplier-Centric B2B E-commerce: In a supplier centric B2B E-commerce, a supplier sets up the electronic commerce market place for various buyer businesses to interact with the supplier at its electronic market place. Typically, a dominant supplier in the domain of products sets up such a market place. The supplier may provide customized solutions and pricing to fit the needs of buyers' businesses. Usually, differential price structure is dependent upon the volume and loyalty discount. Example, Cisco Connection Online (CCO).

Buyer-Centric B2B E-commerce: In a Buyer centric B2B E-commerce, the major business with high volume purchase capacity creates an electronic marketplace for purchase and acquisition. The electronic marketplace is used for placing requests for quotations (RFQs) and carry out the entire purchase process on-line by the buyer. This kind of facility may be utilized by high volume and well recognized buyers, as they may have adequate capacity and business volumes to lure suppliers to bid at the site. Example, General Electric's Trading Process Network.

Intermediary-Centric B2B E-commerce: In Intermediary-Centric B2B E-commerce, a third party may set up the electronic marketplace and attract both the buyer and seller businesses to interact. The Buyers and Sellers, both benefit from the increased options in terms of pricing, quality, availability and delivery of goods. The third party electronic marketplace acts as a hub for both the suppliers and buyers, where buyers place their request for the quotations and sellers respond by bidding electronically leading to a match and ultimately to a final transaction. It is essential that Intermediary Company represent large number of the members in that specific markets segment, i.e., both the buyers and the sellers. The Intermediary reduces the need of buyers and sellers to contact a large number of potential partners on their own. Example, IndiaMart.com.

2014 - Dec [6] (d)

Electronic funds transfer is one of the oldest electronic payment systems. EFT is the groundwork of the cash-less and check-less culture where and paper bills, cheques, envelopes, stamps are eliminated. EFT is used for transferring money from one bank account directly to another without any paper money changing hands. The most popular application of EFT is that instead of getting a pay-check and putting it into a bank account, the money is deposited to an account electronically. EFT is considered to be a safe, reliable and convenient way to conduct business.

The advantages of EFT contain the following:

  (i)   Simplified accounting
  (ii) Improved efficiency
  (iii) Reduced administrative costs
  (iv) Improved security.

Chapter- 8: Management Information Systems – An Overview

2014 - Dec [3] (a)

Database is consolidation of many files, which contain the data of the organization. The data in a database is organized in such a way that access to the data is improved and data redundancy is reduced. It also increases the data integrity.

The main feature of database is that all subsystems will utilize the same database kept in different files. The other important features of databases are:

I.   **Avoiding uncontrolled data redundancy and inconsistency:** Application shares the data stored in a database, rather than owning private files that would often store redundant data. This reduces the storage costs; there is no need to update multiple copies of the same data. This prevents the possibility that inconsistent data will reside in multiple files.

II. **Program-Data Independence:** When the database is managed by a DBMS, programs can be written independent of the actual physical layout of the data or even of the total logical structure of the data. DBMS knows these structures; it thus provides the mapping from a logical view of the data in a given application to the actual physical layout of the data on the storage device.

III. **Flexible Access to shared data:** The database approach has opened data for access to users and applications. Query languages enable end

users to access data directly. Applications can be written to use any data stored in corporate databases, rather than to rely only on specially created files.

IV. **Reliability:** The reliability of the stored data is ensured by the DBMS managed databases themselves, rather than by special programming. A variety of relationships between entities may be rather easily defined.

2014 - Dec [6] (a)

Expert Systems: It is a knowledge intensive computer program that captures the expertise of a human in a limited domain of knowledge and experience. It helps in organization's value added work. The users of an expert system are the people who do value added work which requires a special skill or expertise. It provides tools, information and structured methods for decision making. It stores and provides expert knowledge to support decisions in specific areas.

Limitations of Expert system:
 (i) Expert systems are sometimes overrated.
 (ii) Expert systems can be expensive to develop and maintain.
 (iii) It is difficult to elicit the knowledge of experts
 (iv) It lacks common sense
 (v) Expert system cannot learn.
 (vi) The validation of expert systems can be difficult.

Chapter - 9: Enterprise Resource Management

2014 - Dec [5] (b)

Enterprise Resource Planning (ERP) involves the organization of computing systems, business processes and procedures under one umbrella designed to improve business efficiency.

ERP systems are being implemented by most of the organisation for innumerable benefits. Some of them are as given:

1. **Integrated Information:** The key benefit of implementing ERP is integration. ERP helps in reducing operational costs by coordinating various departments of the organization. The major idea behind ERP is to control accuracy as well as redundancy of data and data entry. This centralized working system is able to replace multiple, disconnected databases with a single system, incorporate different applications and data sources.

2. **Standardization of processes:** A manufacturing company that has grown through acquisitions is likely to find that different units use different methods to build the same product. Standardizing processes and using an integrated computer system can save time, increase productivity and reduce head count.

3. **Standardization of human resource information:** This is especially useful in a multi-site company. A unified method for tracking employee time and communicating benefits is extremely beneficial, because it promotes a sense of fairness among the workforce as well as streamlines the company as a whole.

4. **Effective Management of Repeatable Processes:** One of the fundamental objectives of ERP systems are repeatable processes. By creating repeatable processes, management is able to ensure that tasks are done using organization-wide best practices. Employees are able to improve quality by performing tasks the same way each time.

5. **Lower Training Costs:** Standardizing these processes also results in lower training costs. Because the processes are the same throughout an organization, training programs that are standardized, reduce overall development costs. By standardizing processes, training can be patterned and optimized to reduce the time spent in training.

6. **Reduced Inventory Costs:** Many ERP systems, especially systems designed for manufacturing industries, are customizable for lean manufacturing or other parts-control management systems. By linking repeatable processes with inventory usage, a manufacturer can maintain lower parts inventories.

7. **Improved Business Visibility:** Depending on how a system is implemented, one objective of an ERP system might focus on business performance and operations visibility. By creating reports based on actual manufacturing tasks, the overall performance of the organization can be more easily analyzed and optimized.

8. **Increased Profits:** By optimizing production through process visibility, the cost per production unit can be reduced. Reducing training costs can, again, add to the bottom line. By reducing inventory levels, less money is tied up in non-liquid business resources which increase available cash to allow a company to make faster business decisions.

Chapter - 10: E-Governance in India
2014 - Dec [3] (d)
Interactive-Service model is a consolidated model of the earlier models and opens up avenues for direct participation of individuals in the governance processes. Fundamentally, ICT have the potential to bring in every individual in a digital network and enable two-way/interactive flow of information amongst them. The potential of ICT for the governance is fully leveraged in this model and leads to greater participation, efficiency and transparency in functioning of the government as well as savings in time and costs relating to decision-making.
This model could be applied in the following possible ways:
  (i) To establish an interactive communication channel with key Policy-makers and planners.
 (ii) To conduct electronic ballots for the election of government officials and other office bearers.
(iii) To conduct public debates/opinion polls on issues of wider concern before formulation of policies and legislative frameworks.
(iv) Filling of grievances, feedback and reports by citizens with the concerned government body.
 (v) Establishing decentralized forms of governance.
(vi) Performing governance functions online such as revenue collection, filing of taxes, governmental procurement, payment transfer etc.
2014 - Dec [5] (a)
The objectives of the NSDG are
1. To act as a core infrastructure for achieving standards-based interoperability between various e-Government applications implemented at various levels and geographically dispersed locations.
2. To evolve Gateway messaging standards and build a government owned Central Gateway based on these standards.
3. Act as a catalyst in enabling the building of Standards based e-Governance applications with Gateway as the middleware to ensure interoperability.
4. Enable integration across Centre, State or Local Governments there by enabling Integrated Service Delivery and a Service Oriented Architecture (SOA) leading to joined up government.

5.   Help protect the legacy investments in software and hardware by easily integrating them with other technology platforms and software implementations.
6.   De-link the back-end departments/Service Providers (SP) from the front-end Service Access Providers thereby:
     (a) Ensuring separation of concerns of service access from the service implementation i.e. separates the Portal, CSC, Kiosks etc. from the government services which reside in the backend departments.
     (b) Encouraging competition at the front-end by allowing independent service access providers to provide services with varying levels of complexity, cost and service quality levels.
7.   Enable adding of shared services on to the core services as and when required, as special common services of the Gateway without affecting the core functionality of the Gateway, thereby providing flexibility and modularity:
     (a) encourage back-end services to be plugged into the infrastructure as and when they are ready.
8.   Reduce the cost of e-Governance Projects by rationalizing, distributing and optimizing the services framework.
9.   Use PKI infrastructure for secure transactions. Provision exists for encryption of department payload to ensure confidentiality of department data. The gateway provides digital signature and certificates to all stakeholders interacting with the gateway for identification, authentication and authorization. Transaction and audit logs help track government data.
10. Use PKI infrastructure for secure transactions. Provision exists for encryption of department payload to ensure confidentiality of department data. The gateway provides digital signature and certificates to all stakeholders interacting with the gateway for identification, authentication and authorization. Transaction and audit logs help track government data.

Chapter - 11: Systems Audit – An Overview
2014 - Dec [1] (d)
The use of test packs is the application of auditors test data (live or dummy) to client's application programs. A small sample of data is processed through the computer and output is compared with manually generated output using

the same data. This audit approach requires little computer expertise but designing of test data which will represent all the possible combinations is a time consuming and difficult process. Use of test data generators can overcome this disadvantage.

The Systems Auditor should request for the appropriate computer program to be loaded on a separate computer. He should prepare an exhaustive Test Pack. The Test Pack will consist of a comprehensive data so that the logic of the program is extensively checked.

The contents of the Test pack are left to the imagination and innovativeness of the Systems Auditor. The Test Pack would have to be developed in such a way that all of the possibilities envisaged in the Program logic would be tested. As a matter of fact, the program should even be tested for negative data. The program should be expected to come out with error messages whenever there are apparent or otherwise mistakes in the data or values.

While creating the test pack, we should bear in mind that it should not only be illustrative, but also comprehensive and exhaustive.

2014 - Dec [3] (b), (c)

(b) Computer Viruses are malicious programs capable of replicating themselves and destroy data or annoy users with meaningless messages. There are malicious codes known as Trojans that can seep into the system through electronic mail attachments. They can remain in the server and copy critical and secret information such as e-mail addresses of others, passwords, credit card numbers, etc. and transmit the information to their creators. In turn the creators can indulge in frauds or cause trouble by changing the password, etc.

Internet web sites are attacked by different methods. The Denial–of-Service (DoS) attacks essentially flood the web server by sending thousands of high priority system messages. The server is rendered too busy responding to such spurious messages than attending to productive work.

In "spoofing" attacks, the user is deluded to get into some unwanted site by overriding the Domain Name Service entries. It needs to be remembered that information travels in packets that have the destination IP address. All computers in the network receive all the packets though they respond only to packets destined for them. A hacker or cracker can use this information to recraft the information content in the packet.

Modern information systems are used to connect external agencies such as service providers, customers and suppliers to the internal network through the medium of Internet. This is where the major risk lies.

(c) To approach an information system, a plan has to be developed, similar to the ones used in financial auditing.

Some of the tasks involved are as follows:
 (i) Definition of scope and objectives.
 (ii) Analysis and understanding of standard procedures.
 (iii) Evaluation of system and internal controls.
 (iv) Audit procedures and documentation of evidence.
 (v) Analysis of facts encountered.
 (vi) Formation of opinion over the controls.
 (vii) Presentation of report and recommendations.

2014 - Dec [4] (b)

The most important aspect of software lifecycle is change. Change has several dimensions:

• Changes can be driven by external factors over which the organization has no control: for example, when SEBI or Company Law authorities bring about a change in disclosure formats or manner of accounting, the organization has no choice but to adopt the changed method of functioning.

• Changes can be driven by internal factors:

There is an important angle involved in managing change – the human angle. A change involves a different way of working. There is a general resistance to change. Taking ownership for change is again a major issue with many Indian companies. Change also involves many departments – thus requiring coordination and ensuring unified approach. The speed of change is another matter.

Organizations need to have proper change management processes in place. The framework consists of:

1. Setting up a change control authority in the organization with a constitution that can do justice to the subject.
2. Setting up Change Initiation, Change Review and Change Authorization mechanism.
3. Setting up change implementation process.

4. Setting up a Documentation Standard that permits complete and correct capture of the proceedings of the entire change management process.
5. Setting up Technology renewal process.

2014 - Dec [6] (b)

Systems documentation normally takes the form of narrative descriptions, flowcharts or a combination of the two.

1. **Narrative Descriptions:** A narrative description helps to give a complete picture of the system. It provides a detailed record of the system under audit.

    Narratives may cover detailed descriptions of transaction flows but in some cases these can be better recorded through flowcharts. It is often useful to use a combination of narratives and flowcharts – using flowcharts to describe more complex parts of the system. If flowcharts are used as well they and the narrative descriptions should be cross-referenced to each other.

2. **Flowcharts:** Flowcharting is a diagrammatic method of recording and describing a system, which shows the flow of documents or information and the related internal controls within a system.

    Flowcharting is likely to be most effective if a logical, top-down approach is taken by starting with an overview or summary flowchart, followed by detailed flowcharts of specific processes if necessary.

    There are various methods of and symbols for, flowcharting.

3. **Organisation Charts:** The organisational structure relating to the system under audit should be recorded. A copy of an existing organisation chart will suffice, as long as it is accurate and up to date.

    An up-to-date organisation chart will show details of the information flow, relationships in the organization and responsibilities. It is also useful in identifying staff and deciding where audit testing needs to be done. The date the chart was prepared should be recorded.

    Minimum Contents of System Documentation: Whichever method is used for documenting the procedures in each system there are certain items, which should be included on every system file.

    It may also be useful for the auditor to know the number of employees or a stratification of the transactions by value or age to assist in the evaluation of risk when a weakness is highlighted.

The Documentation Standards have been touched upon in the section on Change Management. Documentation guidelines are decided by policies.

In the Audit Approach, an IS Auditor goes through the documentation to understand the system and the controls provided for. The IS Auditor may get clues from other audits such as Financial audits to focus on areas that need attention. She/he then prepares specific test cases, which are passed through the Computer system. Deviations are noted down and covered in the report.

❀