SUGGESTED SOLUTION

IPCC MAY 2017EXAM

INFORMATION TECHNOLOGY

Test Code - I M J 7 1 2 1

BRANCH - (MULTIPLE) (Date : 20.11.2016)

Answer-1(a) :

Cloud Computing: Cloud computing is the use of various services, such as software development platforms, servers, storage, and software, over the Internet, often referred to as the "Cloud."The Cloud Computing environment can consist of multiple types of clouds based on their deployment and usage. They are Public Cloud, Private/Internal Cloud, Community Cloud and Hybrid Cloud. **(1 Mark)**

- Public Clouds: The public cloud is made available to the general public or a large industry group. They are administrated by third parties or vendors over the Internet, and services are offered on pay-per-use basis. It is widely used in the development, deployment and management of enterprise applications, at affordable costs; and allows organizations to deliver highly scalable and reliable applications rapidly and at more affordable costs. **(1 Mark)**

- Private/Internal Clouds: This cloud computing environment resides within the boundaries of an organization and is used exclusively for the organization's benefits. They are built primarily by IT departments within enterprises who seek to optimize utilization of infrastructure resources within the enterprise by provisioning the infrastructure with applications using the concepts of grid and virtualization. The Private Cloud enables an enterprise to manage the infrastructure and have more control. **(1 Mark)**

- Community Clouds: This is the sharing of computing infrastructure in between organizations of the same community. For example, all Government organizations within India may share computing infrastructure on the cloud to manage data. The risk is that data may be stored with the data of competitors. **(1 Mark)**

- Hybrid Clouds: It is a composition of two or more clouds (Private, Community or Public) and is maintained by both internal and external providers. Though they maintain their unique identity, they are bound together by standardized data and application portability. With a hybrid cloud, organizations might run non-core applications in a public cloud, while maintaining core applications and sensitive data in-house in a private cloud. **(1 Mark)**

Answer-1(b) :

Major concerns relating to mobile computing are given as follows:

1. Mobile computing has its fair share of security concerns as any other technology. **(1 Mark)**

2. Dangers of misrepresentation - Another problem plaguing mobile computing are credential verification. **(1 Mark)**

3. Power consumption: When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power. **(1 Mark)**

4. Potential health hazards. **(1 Mark)**

Answer-2 :

An Operating System (OS) is a set of computer programs that manages computer hardware resources and acts as an interface with computer applications programs. The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function that provides a convenient environment to users for executing their programs. Computer hardware with operating system can thus be viewed as an extended machine which is more powerful and easy to use. Some prominent Operating systems used nowadays are Windows 7, Windows 8, Linux, UNIX, etc. **(2 Marks)**

A variety of activities are executed by Operating systems which include

- **Performing hardware functions**: Application programs to perform tasks have to obtain input from keyboards, retrieve data from disk & display output on monitors. Achieving all this is facilitated by operating system that acts as an intermediary between the application program and the hardware. **(1 Mark)**

- **User Interfaces**: An important function of any operating system is to provide user interface. DOS has a Command based User Interface (UI) i.e. text commands were given to computer to execute any command, whereas Windows has Graphic User Interface (GUI) which uses icons & menus. **(1 Mark)**

- **Hardware Independence**: Every computer could have different specifications and configurations of hardware. Operating system provides Application Program Interfaces (API) which can be used by application developers to create application software, thus obviating the need to understand the inner workings of OS and hardware. Thus, OS gives us hardware independence. **(1 Mark)**

- **Memory Management**: Memory Management features of Operating System control how memory is accessed and maximizes available memory & storage. Operating systems also provides Virtual Memory by carving an area of hard disk to supplement the functional memory capacity of RAM. **(1 Mark)**

- **Task Management**: Task Management feature of Operating system helps in allocating resources to make optimum utilization of resources. This facilitates a user to work with more than one application at a time i.e. multitasking and also allows more than one user to use the system i.e. timesharing. **(1 Mark)**

- **Networking Capability**: Operating systems can provide systems with features & capabilities to help connect computer networks. Like Linux & Windows 8 give us an excellent capability to connect to internet. **(1 Mark)**

- **Logical Access Security**: Operating systems provide logical security by establishing a procedure for identification & authentication using a User ID and Password. It can log the user access thereby providing security control. **(1 Mark)**

- **File Management**: The Operating System keeps a track of where each file is stored and who can access it, based on which it provides the file retrieval. **(1 Mark)**

Answer-3(a) :

Information System Life Cycle is commonly referred as Software/System Development Life Cycle (SDLC) which is a methodology used to describe the process of building information systems. SDLC framework provides a sequence of activities for system designers and developers to follow. It consists of a set of steps or phases in which each phase of the SDLC uses the results of the previous one. Various phases for developing an Information System are given as follows: **(1 Mark)**

Phase 1: System Investigation: This phase examines that 'What is the problem and is it worth solving'? A feasibility study is done under the dimensions – Technical, Economical, Legal, Operational etc. **(1 Mark)**

Phase 2: System Analysis: This phase examines that 'What must the Information System do to solve the problem'? System analyst would be gathering details about the current system and will involve interviewing staff; examining current business; sending out questionnaires and observation of current procedures. The Systems Analyst will examine data and information flows in the enterprise using data flow diagrams; establish what the proposed system will actually do (not how it will do it); analyze costs and benefits; outline system implementation options. (For example: in-house or using consultants); consider possible hardware configurations; and make recommendations. **(2 Marks)**

Phase 3: System Designing: This phase examines that 'How will the Information System do what it must do to obtain the solution to the problem'? This phase specifies the technical aspects of a proposed system in terms of Hardware platform; Software; Outputs; Inputs; User interface; Modular design; Test plan; Conversion plan and Documentation. **(1 Mark)**

Phase 4: System Implementation: This phase examines that 'How will the solution be put into effect'? This phase involves coding and testing of the system; acquisition of hardware and software; and either installation of the new system or conversion of the old system to the new one. **(1 Mark)**

Phase 5: System Maintenance and Review: This phase evaluates results of solution and modifies the system to meet the changing needs. Post implementation review would be done to address Programming amendments; Adjustment of clerical procedures; Modification of Reports, and Request for new programs. **(1 Mark)**

Answer-3(b) :

Major benefits of DBMS are given as follows:

- Permitting data sharing: One of the principle advantages of a DBMS is that the same information can be made available to different users. **(1 Mark)**

- Minimizing Data Redundancy: In a DBMS duplication of information or redundancy is, if not eliminated, carefully controlled or reduced i.e. there is no need to repeat the same data over and over again. Minimizing redundancy can therefore significantly reduce the cost of storing information on hard drives and other storage devices. **(1 Mark)**

- Integrity can be maintained: Data integrity is maintained by having accurate, consistent, and up-to-date data. Updates and changes to the data only have to be made in one place in DBMS ensuring Integrity. The chances of making a mistake increase if the same data needs to be changed at several different places than making the change in one place. **(1 Mark)**

- Program and file consistency: Using a DBMS, file formats and programs are standardized. This makes the data files easier to maintain because the same rules and guidelines apply across all types of data. The level of consistency across files and programs also makes it easier to manage data when multiple programmers are involved. **(1 Mark)**

- User-friendly: DBMS makes the data access and manipulation easier for the user. DBMS also reduce the reliance of users on computer experts to meet their data needs. **(1 Mark)**

- Improved security: DBMSs allow multiple users to access the same data resources which could lead to risk to an enterprise if not controlled. Security constraints can be defined i.e. Rules can be built to give access to sensitive data. Some sources of information should be protected or secured and only viewed by select individuals. Through the use of passwords, database management systems can be used to restrict data access to only those who should see it. **(1 Mark)**

- Achieving program/data independence: In a DBMS data does not reside in applications but data bases program & data are independent of each other. **(1 Mark)**

- Faster application development: In the case of deployment of DBMS, application development becomes fast. The data is already therein databases, application developer has to think of only the logic required to retrieve the data in the way a user needs. **(1 Mark)**

Answer-4(a) :

An Expert System (ES) is a computerized information system that allows non-experts to make decisions comparable to those of an expert. The aim of the expert system is to have a team of seasoned specialists holding industry-wide experience who further spread across implementations like in Defense, Government, Finance, Telecom, and Engineering sectors. **(1 Mark)**

Components of an Expert System are as follows:

(a)   Knowledge Base: This includes the data, knowledge, relationships, rules of thumb (heuristics), and decision trees used by experts to solve a particular problem. A knowledge base is the computer equivalent of all the knowledge and insight that an expert or group of experts develop through years of experience in their field. The knowledge base of expert system encloses both realistic and heuristic knowledge. Realistic knowledge is that knowledge of the job domain that is extensively shared, characteristically found in textbooks or journals whereas heuristic knowledge is the fewer rigorous, extra empirical, supplementary judgmental knowledge of performance.   **(2 Marks)**

(b)   Database of Facts: This holds the user's input about the current problem. The user may begin by entering as much as they know about the problem or the inference engine may prompt for details or ask whether certain conditions exist. Gradually a database of facts is built up which the inference engine uses to come to a decision. The quality and quantity of data gained from the user influences the reliability of the decision.   **(1 Mark)**

(c)   Inference Engine: This program contains the logic and reasoning mechanisms that simulate the expert logic process and deliver advice. It uses data obtained from both the knowledge base and the user to make associations and inferences, form its conclusions, and recommend a course of action.   **(1 Mark)**

(d)   Explanation facility: This facility provides the user with an explanation of the logic the Expert System used to arrive at its conclusion.   **(0.5 Mark)**

(e)   User Interface: This program allows the user to design, create, update, use and communicate with the expert system.   **(0.5 Mark)**

Answer-4(b) :

Knowledge Management Systems (KMS) refers to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the knowledge management process   **(1 Mark)**

KMS treats the knowledge component of any organization's activities as an explicit concern reflected in strategy, policy, and practice at all levels of the organization.   **(0.5 Mark)**

Two broad categories of knowledge exist – Explicit and Tacit. Explicit Knowledge is formalized, articulated and written whereas Tacit Knowledge resides in a few often-in-just one person and has not been captured by the organization.   **(1 Mark)**

Knowledge base is a special kind of database for knowledge management. It is an information repository that provides a means for information to be collected, organized, shared, searched and utilized. It can be either machine-readable or intended for human use.   **(1 Mark)**

A Knowledge Discovery in databases system is a value-added intranet with facilities to search and identify captured knowledge, or identify experts who have the knowledge. The system will also help us establish contact with the expert and have a dialogue with them. It will then capture and make available the transcripts of such discussions, whether they be on chat, e-mail or discussion forums.   **(1.5 Marks)**

Answer-4(c) :

1.   **Word Processing:** Use of a computer to perform automatically many of the tasks necessary to prepare typed or printed documents.   **(1 or**

2.   **Electronic mail:** Use of a computer network that allows users to send, store and retrieve messages using terminals and storage devices.   **(1 or**

3.   **Voice Mail:** Requires computers with an ability to store audio messages digitally and convert them back upon retrieval.   **(1 or**

4. **Electronic Calendaring:** Use of a networked computer to <u>store and retrieve a manager's appointment calendar.</u> Allows other managers' calendars to be accessed and facilitates scheduling.

(1 or

5. **Video Conferencing**: Use of <u>television equipment to link geographically dispersed conference participants.</u>

(1 or

6. **Desktop Video Conferencing:** Video and audio equipment are<u> attached to each workstation in the network enabling the two-way communication </u>of picture and way communication of picture and sound.

(1 or

7. **FAX:** Uses <u>special equipment that can read a document at one end of a communication channel</u> and make a<u> copy at the other end.</u>

(1 or

8. **Imaging**: Uses <u>Optical Character Recognition (OCR) to convert data on paper to a digital format for storage in a secondary storage device.</u>

(1 or

9. **Desktop Publishing:** Uses a computer to <u>prepare output that is very close in quality to that produced by a typesetter.</u>

(1 Mark)