

MASTER MINDS
I.T. – MAY 2010 EXAM SOLUTIONS

1.

a. Describe briefly the following terms

- **RISC:** Reduced Instruction Set Computer (RISC) is computer architecture that has Reduced chip complexity by using simpler processing instructions.
- **SCSI:** Small computer system interface (SCSI) is an interface consisting of a standard port between a computer and its peripherals that is used in some computers used to solve the problem of insufficient number of expansion slots.
- **WiFi:** Wi-Fi stands for Wireless Fidelity is a local area network that uses high frequency radio signals to transmit and receive data over distances of a few hundred feet based on IEEE 802.11 specifications. Wifi is a brand originally licensed by the Wi-Fi Alliance and this technology is designed for mobile computing devices such as laptops in LANs.
- **Linked List:** A linked list is a data structure that consists of a sequence of data records such that in each record there is a field that contains a reference (i.e., a link) to the next record in the sequence.
- **Metadata:** Metadata is loosely defined as data about data. Metadata describes how and when and by whom a particular set of data was collected, and how the data is formatted. Metadata is essential for understanding information stored in data warehouses.

b. Explain each of the following

- **Mirror Log:** A mirror log is an optional file and has a file extension of .mlg. It is a copy of the transaction log and provides additional security against the loss of data and it is very much useful when the transaction log becomes unusable.
- **Open source software :** Software available free of charge as an alternative to conventional commercial models. Open source software can be used and disseminated at will, and the source code is open and can be changed as required. The best known example of open source software is the Linux operating system.
- **Firewall:** A firewall is a device that guards the entrance to a private network and keeps out unauthorized or unwanted traffic. It is a technological barrier designed to prevent unauthorized or unwanted communications between sections of a computer network
- **Intranet:** A computer network, based on Internet technology, that is designed to meet the internal needs for sharing information within a single organization or company.
- **Multitasking :** Concurrent execution of several different programs by a single-user computer. In other words Multi-tasking refers to the operating system's ability to execute two or more tasks of a single user concurrently. Most of the operating systems used in micro computers were single-user operating systems. These operating systems allow the user to work on one task at a time

2. a) Explain the value added services that a data center provides

Some of the value added services that a data center provides are:

➤ **Database monitoring:**

- This is done through a database agent, which enables the high availability of database through comprehensive automated management.

➤ **Web monitoring:**

- The main objective is to assess and monitor website performance, availability, integrity and the responsiveness from the visitor's point of view.
- It also reports on HTTP, FTP service status, monitors URL availability, response times, verifies web content accuracy and changes.

➤ **Backup and restore:**

- They provide centralized, multi-system management capabilities.
- They also provide an integrated management solution for enterprise data storage using specialised backup agents for operating system, database, open files and applications.

➤ **Intrusion detection system (IDS):**

- ID stands for Intrusion Detection, which is the art of detecting inappropriate, incorrect, or anomalous (=irregular, strange) activity.
- The term intrusion is used to describe attacks from the outside. Whereas, misuse is used to describe an attack that originates from the internal network.
- ID systems that operate on a host computer to detect malicious activity on that computer are called host-based ID systems.
- ID systems that operate on network data flows are called network-based ID systems.
- The IDS is scalable.

➤ **Storage on demand:**

- It provides back-end infrastructure as well as expertise, best practices and proven processes to give robust, easy and cost effective storage strategy.
- It provides data storage infrastructure that supports access to information at any given moment.
- It also gives security, reliability and availability needed to meet company demands.

b) Explain the different core phases that are required in developing a backup and recovery strategy

Following are the steps in the development of a back up and recovery strategy:

1. Understand what backup and recovery means to the business:

How long can a business survive without access to the corporate data? Express the answer in terms of minutes, hours or days.

If the recovery time is in minutes then database backup and recovery is critical to the business and it is very important to implement some kind of backup and recovery strategy. If recovery time can take hours then we can have more time to perform the tasks. If recovery can be expressed in terms of days then time appears to be less important.

2. Management commits time and resources for the project:

Management must commit some financial resources towards the development and implementation of a backup and recovery strategy. The strategy can be basic or quite extensive depending upon the business needs of the company. After developing a backup and recovery strategy, management should be informed of the expected backup and recovery times. Anticipate management countering the timings by preparing alternative solutions. Then, management will decide the best solution.

MASTER MINDS

3. Develop, test, time, document, health check, deploy and monitor:

These are the most important phases in the development of a backup and recovery strategy:

- Create backup and recovery commands. Verify whether these commands produce the desired results.
- Prepare time estimates for executing backup and recovery commands. Use this information to identify what commands will be executed and when.
- Document the backup commands and create written procedures for outlining
 - where the backups are kept,
 - identify the naming convention used and the kind of backup performed.
- Incorporate health checks into the backup procedures to ensure that the database is not corrupt.
- Deployment of backup and recovery consists of setting up of backup procedures on the production server. Provide necessary hardware and any other supporting software to perform these tasks.
- Monitor backup procedures to avoid unexpected errors. If any changes take place in the process, reflect those changes in the documentation.

4. Beware of external factors that affect recovery:

External factors that affect database recovery are time, hardware and software. Allow additional recovery time for performing miscellaneous tasks such as entering recovery commands or retrieving and loading tapes. Factors that influence time are size of database files, recovery medium, disk space and unexpected errors. As the backup and recovery strategy develops it is necessary to check the performance of the equipment and software to ensure that it meets our expectations.

5. Protect database backups by performing health checks:

Database health checks are run against the database and log files to ensure that they are not corrupt. If the database file is found to be corrupt, we need to recover it from the previous database backup.

3. a) Discuss the various attributes of Local are networks (LAN)

LAN is a digital communication system capable of interconnecting large number of computers, terminals and other peripheral devices within a limited geographical area. Major parameters considered in LAN's are the topology, the transmission media and the speed of transmission. Common topologies include Star, Bus and Ring. Coaxial and twisted pair cables are used for data transmission.

The two main purposes of LAN are to link computers within an organisation so that they can share expensive peripheral devices (for e.g., high speed printers or magnetic disks) and to allow these computers to communicate with each other.

Characteristic features / Important requirements of LAN:

- **Compatibility:**
- A local area network must be compatible so that software can be easily written and widely distributed. A LAN operating system must be flexible i.e. it must support large variety of hardware.

- **Internetworking:**
It should be possible to interconnect 2 LANs. Bridge acts as a mediator between LANs of similar topology and protocol. Bridging of different LANs together is one of the most important requirements of any network. Users should easily access resources from all workstations on the bridge network in a transparent way i.e. no special commands should be required to cross the bridge.
- **Growth path and Modularity:**
Another important feature of a LAN is its modularity. A set of PCs should be easily converted into LAN. It should be able to grow simply by adding additional workstations. For e.g. if more storage is required, one should be able to add another hard disk drive or another server.
- **System reliability & maintenance:**
In LAN, all computers are prone to system lockups, power failures and other catastrophes (=disaster, calamity). If the central processing system goes down, all users connected to it will also fail to work. However, a LAN operating system should be powerful enough to withstand such accidents.

b) What are integrated services Digital Network (ISDN)? Write its advantages?

Meaning:

Integrated Services Digital Network (ISDN) is a circuit switched telephone network system, designed to allow digital transmission of voice and data over ordinary telephone copper wires, resulting in better quality and higher speeds. ISDN is a set of protocols for establishing and breaking circuit switched connections and for advanced call features for the user.

Types of channel:

- Bearer channels (B channels): Data and voice are carried by these channels having a bandwidth of 64 kilobits per second.
- Delta channels (D channels): It carries signals and controls. But it can also be used for carrying data.

Types of ISDN services:

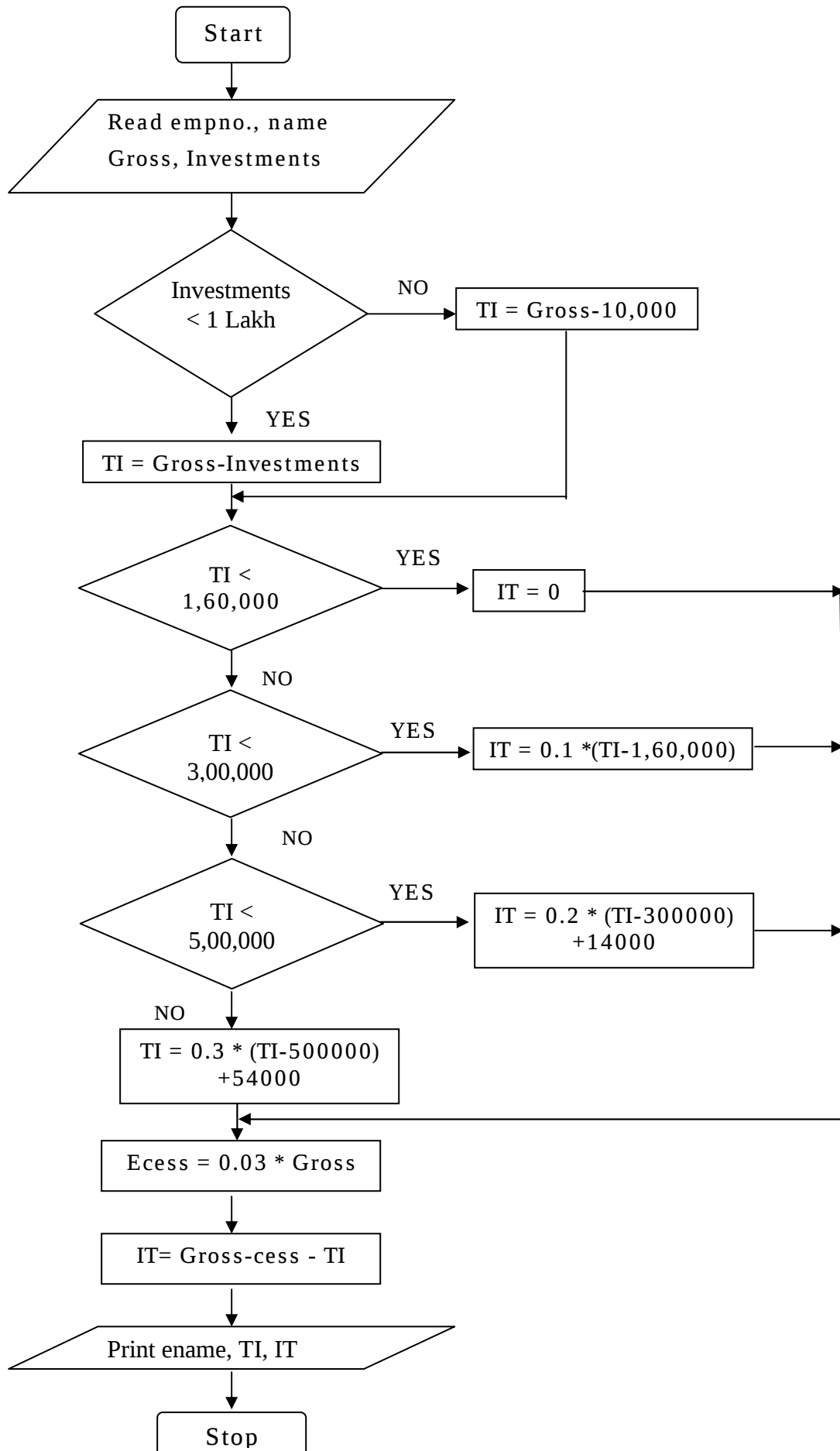
- Basic Rate Interface (BRI):
 - It consists of two 64 kbps B channels and one 16 kbps D channel to form a total of 144 kbps.
 - It is suitable for individual users.
- Primary Rate Interface (PRI):
 - It consists of 23 B channels and one 64 kbps D channel to form a total of 1536 kbps.
 - It is suitable for users with higher capacity requirements.

Advantages:

- Multiple channel operation in same cable:
ISDN allows multiple digital channels to be operated simultaneously through the same regular phone cable which is meant for analog signals. However, this is possible only if the telephone company's switches can support digital connections.
- Combines different digital sources:
With ISDN, it is possible to combine several digital data sources and send the information to the proper destination. In a digital line it is easy to reduce noise and interference even after combining these signals.

MASTER MINDS

4. Flowchart



5. Writes short notes on the following

a. Stages of Data Mining

Data mining is concerned with the analysis of data and the use of software techniques for finding patterns and regularities in sets of data. Data mining software extracts patterns that are previously unrecognized or so obvious that no one has noticed them before.

The analysis process starts with a set of data, uses a methodology to develop an optimal representation of the data during which time knowledge is acquired. Once knowledge is acquired this can be extended to larger sets of data basing on the assumption that the larger data set has a structure which is similar to the sample data.

Steps in Data Mining:

The data mining activity starts with raw data and ends with extracted knowledge which is acquired from the following stages:

- **Selection:** Selecting or segmenting the data according to some criteria, e.g. all those people who own a car, is the first step in data mining. In this way subsets of data can be determined.
- **Preprocessing:** This is the data cleansing stage where certain information is removed which is deemed unnecessary and may slow down the queries.
- **Transformation:** The data is not merely transferred across but transformed in that overlays may added such as the demographic overlays commonly used in market research. The data is made useable and navigable.
- **Data mining:** This stage is concerned with the extraction of patterns from the data. A pattern can be defined as a given set of facts (data) F , a language L , and some measure of certainty C . A pattern is a statement S in L that describes relationships among a subset F_s of F with a certainty C such that S is simpler in some sense than the enumeration of all the facts in F_s .
- **Interpretation and evaluation:** The patterns identified by the system are interpreted into knowledge which can then be used to support human decision-making e.g. prediction and classification tasks, summarizing the contents of a database or explaining observed phenomena.

b. Bluetooth Technology

- Bluetooth is a telecommunications industry specification that describes how mobile phones, computers and Personal Digital Assistants (PDAs) can be easily interconnected using a short range wireless connection.
- Using this technology, users can easily exchange files between computers, cellular phones, pagers, and Personal Digital Assistants over short distances.
- Users can easily synchronize the information in their portable devices with a desktop or notebook computer.
- User can also send or receive a fax, initiate a print-out and in general, have all mobile and fixed computer devices be totally coordinated.
- Bluetooth requires that a low-cost transceiver chip be included in each device. The transceiver transmits and receives in a previously unused frequency band of 2.45 GHz that is available globally
- The maximum range is 10 meters. Data can be exchanged at a rate of 1 megabit per second. A frequency hop scheme allows devices to communicate even in areas with a great deal of electromagnetic interference. Built-in encryption and verification is provided.

THE END