

CHAPTER 1 – BUSINESS PROCESS MANAGEMENT & IT

1. WHAT IS A PROCESS?

A process is defined as a sequence of events that uses inputs to produce outputs. From a business perspective, a process is a coordinated and standardized flow of activities performed by people or machines.

From a business perspective, a process is a coordinated and standardized flow of activities performed by people or machines, which can traverse functional or departmental boundaries to achieve a business objective and creates value for internal or external customers.

2. PROCESS MANAGEMENT

To manage a **process**,

- ✓ The first task is to **define it**. This involves defining the steps (tasks) in the process and mapping the tasks to the roles involved in the process.
- ✓ Once the process is mapped and implemented, **performance measures** can be established. Establishing measurements creates a basis to improve the process.
- ✓ The last piece of the process management definition describes the **organizational setup** that enables the standardization of and adherence to the process throughout the organization.

3. BUSINESS PROCESS MANAGEMENT (BPM)

- ✓ BPM refers to the closed loop, iterative management of business processes over their complete lifecycle.
- ✓ **BPM may be defined as: “The achievement of an organization’s objectives through the improvement, management and control of essential business processes”.**
- ✓ All the key terms of the definition are explained below:
 - Achievement: Realizing the strategic objectives.
 - Organization: an enterprise or parts of an enterprise, perhaps a business unit that is discrete in its own right.
 - Objectives: BPM is not an objective in itself, but rather a means to achieving an objective. It may range from the strategic goals to the individual process goals.
 - Improvement: making the business processes more efficient and effective
 - Management: organizing all the essential components and subcomponents for a process.
 - Control: managing end-to-end business processes and involves plan–do–check–act.
- ✓ Primary benefit of using technology for BPM:
 - The effectiveness gains for enterprises through the automated coordination of activities;
 - Distribution of tasks to process participants and the amalgamation of applications; and
 - Creation of basic operational value proposition – which is the ability to process more with less effort and higher quality.

4. BPM PRINCIPLES AND PRACTICES

The primary objective of BPM is

- ✓ to improve products and services through
- ✓ structured approach to performance improvement that
- ✓ centers on systematic design and management of a company's business processes.

Key BMP principles :

1. BPM's first principle is processes are assets that create value for customers. Being assets they should be carefully managed.
2. A managed process produces consistent value to customers and has the foundation for the process to be improved.
3. The third principle is continuous improvement of processes. Business processes are central to an organization's value creation due to which continuous improvement is required.

BPM's Practices

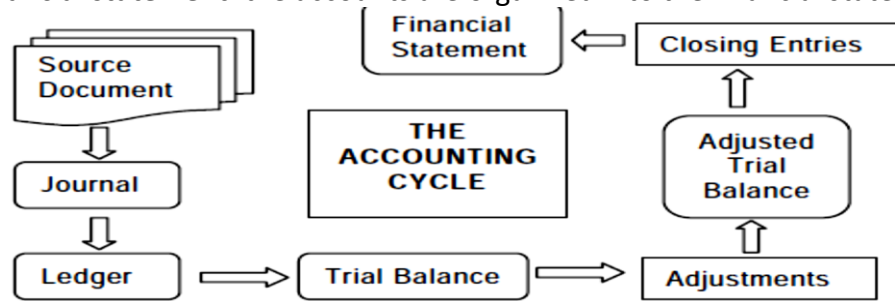
1. **Process-oriented organizational structure**: Processes are the core assets of an organization, and they produce the values that justify an organization's existence. It is of 3 types:
 - a. Process Organization
 - b. Case management organization
 - c. Horizontal process management organization
2. **Appoint Process Owners**: The process owners are assigned to the core processes who are responsible for the performance of the process assigned. The process owner should be a senior member of the organization who has the power to influence other senior managers.
3. **Top-Down Commitment, Bottom - Up Execution**: In order for BPM to work, top management needs to commit to it and support the process-focused management approach it requires.
4. Use Information Technology (IT) to Manage Processes
5. Continuous Learning and Process Improvement
6. Utilize BPR, TQM, and Other Process Improvement Tools
7. Align Employee Rewards to Process Performance
8. Continuous Learning and Process Improvement:

Now, let's discuss few business processes.

Accounting

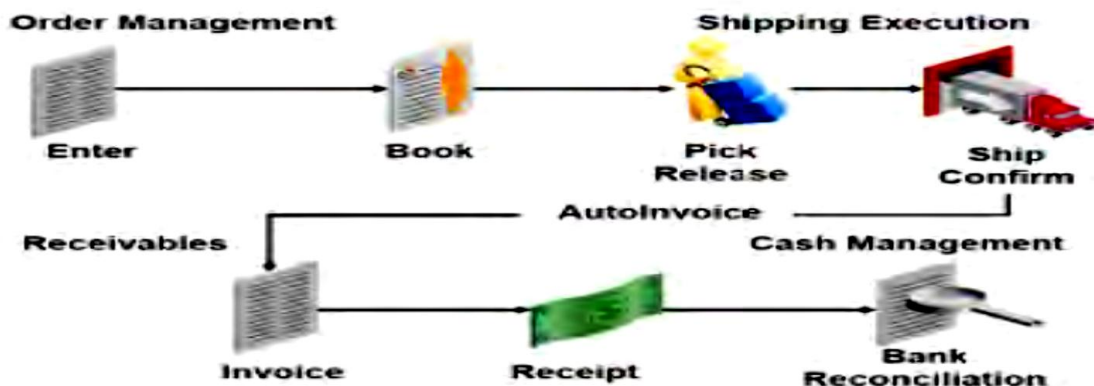
- ✓ Accounting or Book keeping cycle covers the business processes involved in recording and processing accounting events of a company.
- ✓ It begins when a transaction or financial event occurs and ends with its inclusion in the financial statements.
- ✓ A typical life cycle of an accounting transaction include the following transactions as:
 - **Source Document**: a document the capture data from transactions and events.
 - **Journal**: transactions are recorded into journals from the source document.
 - **Ledger**: entries are posted to the ledger from the journal.
 - **Trial Balance**: unadjusted trial balance containing totals from all account heads is prepared.
 - **Adjustments**: appropriate adjustment entries are passed.

- **Adjusted Trial balance:** the trial balance is finalized post adjustments.
- **Closing entries:** appropriate entries are passed to transfer accounts to financial statements.
- **Financial statement:** the accounts are organized into the financial statements.



Sales (Order to Cash / O2C)

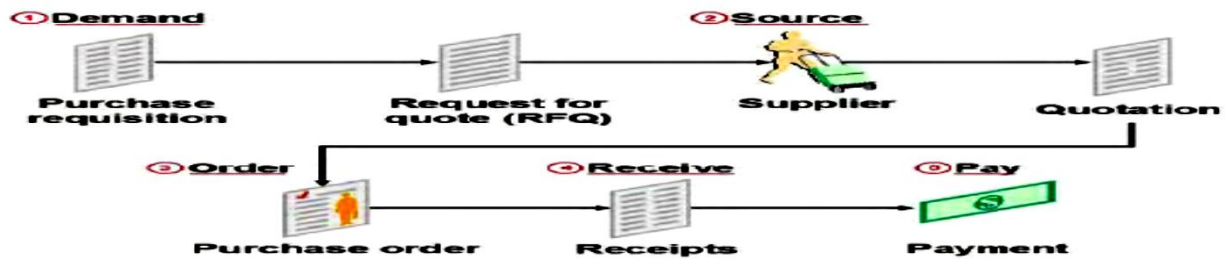
- ✓ Order to Cash covers all the business processes relating to fulfilling customer requests for goods or services.
- ✓ It involves transactional flow of data from the initial point of documenting a customer order to the final point of collecting the cash.
- ✓ The life cycle of a sales transaction which may include the following transactions:
 - **Customer Order:** a purchase order received from a customer specifying the type, quantity and agreed prices for products.
 - **Recording:** availability of the items is checked and customer order is booked.
 - **Pick release:** the items are moved from the warehouse to the staging area.
 - **Shipping:** the items are loaded onto the carrier for transport to the customer.
 - **Invoice:** invoice of the transaction is generated and sent to the customer.
 - **Receipt:** money is received from the customer against the invoices.
 - **Reconciliation:** the bank reconciliation of all the receipts is performed.



Purchase (Purchase to Pay or P2P)

- ✓ Procure to Pay cycle covers all the business processes relating to obtaining raw materials required for production of a product or for providing a service.
- ✓ It involves the transactional flow of data from the point of placing an order with a vendor to the point of payment to the vendor.
- ✓ life cycles of a purchase transaction which may include the following transactions:
 - **Purchase requisition:** a document is prepared requesting the purchase department to place an order with the vendor specifying the quantity and time frame.
 - **Request for quote:** an invitation is sent to the vendors to join a bidding process for specific products.
 - **Quotation:** the vendors provide cost quotations for the supply of products.

- **Purchase order:** a commercial document is issued to the vendor specifying the type, quantity and agreed prices for products.
- **Receipts:** the physical receipt of goods and invoices.
- **Payments:** the payments are made against the invoices.



Finances

- ✓ Finance is one of the most important and limited resources available with government.
- ✓ Its proper use can help target areas of need, bring in efficiency and improve services.
- ✓ Governments and their agencies use their funds better is one of the tenets of good governance bringing in efficient systems and accountability in management of the limited public resource.
- ✓ The financial planning stage to resource allocation, monitoring and analysis, at every step of the way, governments and agencies ensure that public resources are used effectively and reach the intended beneficiaries.

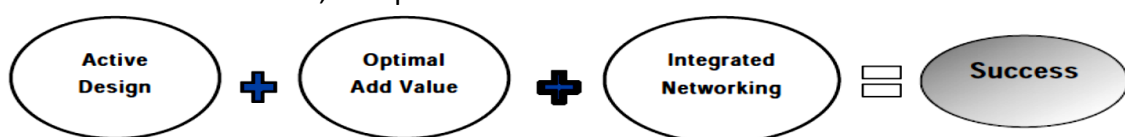


5. BPM IMPLEMENTATION

- ✓ The organization should develop a mindset that implementing BPM technology can contribute towards an organization becoming process-centric.
- ✓ BPM implementation is enormous in any economic surroundings.
- ✓ But achieving business quickness in a turbulent, competitive global market is all the easier with BPM tools
- ✓ BPM helps organizations optimize both work and revenues.

6. KEY FACTORS AND RELATED CONSIDERATION IN IMPLEMENTING BPM

- 1) Scope – A single process, A department , the entire company
- 2) Goals – Process understanding, improvement, automation, re-engineering, and optimization.
- 3) Skills required-basic education, formal certification, consultants.
- 4) **Sponsorship Needed** - Executive Level, Department Level, Process Owner Level, Employee Level.
- 5) **Methods to be used:** Six Sigma, BPM Life Cycle Method, TQM, Informal methods
- 6) **Tools to be used:** White-Boards, Sticky Notes, Software For Mapping, Documenting, Software for Simulation, Comprehensive BPMS



7. BENEFITS OF BPM

- ✓ BPM determines the right person for the task at the right time since the business Analyst is in control.
- ✓ Managing large amounts of documents and data.
- ✓ The business can rearrange process steps and add in manual steps quickly.
- ✓ Reduced Process Costs due to increased quality / reduced no of errors.
- ✓ Reduced training time, expenses and internal support request.
- ✓ Intangible benefits= Better information quality.

8. LEVELS OF BUSINESS PROCESS MANAGEMENT

1. At highest level, the strategy of the company is specified, its long- term concepts to develop a sustainable competitive advantage in the market. An example :- strategy of cost leadership
2. At second level, the business strategy is broken down to operational goals.
3. At third level, 'Organizational' Business Processes can be found.
4. Operational' Business Processes are the basis for developing implemented business processes.

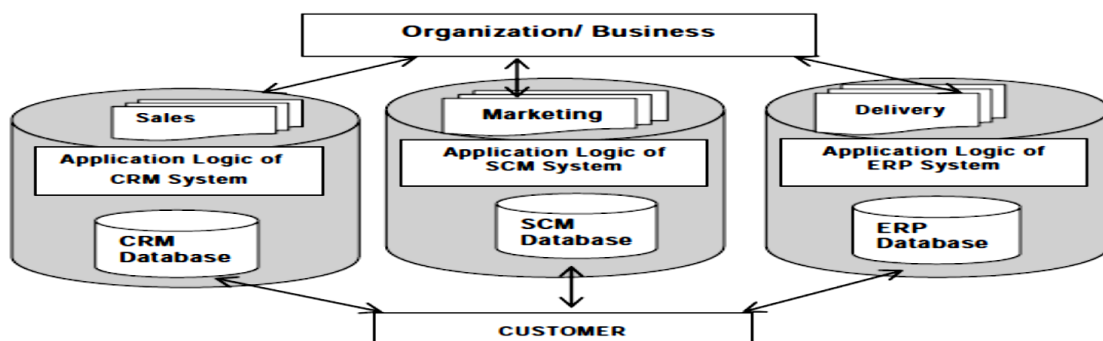


9. NEED FOR A BPM IMPLEMENTATION

1. Create the long-term future positioning of the business and enhance its future capability
2. Create short-term cost effectiveness and improvement to current customer service
3. Introduce a knowledge of product and customer profitability
4. Re-engineer the business radically
5. Provide clear future competitive differentiation;
6. Introduce leadership and a role for managers and staff.
7. Initiate continuous improvement from the base of the current, but improved, processes.

10. AUTOMATION OF THE FUNCTIONAL UNITS

- ✓ The consumer is often confronted with poor customer service due to broken processes inefficient processes and manual processes
- ✓ The same consumer is becoming more and more demanding with respect to delivery time – where customers used to expect and accept days or weeks for delivery, same time, the consumer is demanding higher quality of the products or services.
- ✓ Finally, the product or service is becoming more and more personalized (and thus more complex), supported by increased customer services.



11. CHALLENGES IN IMPLEMENTING BPA

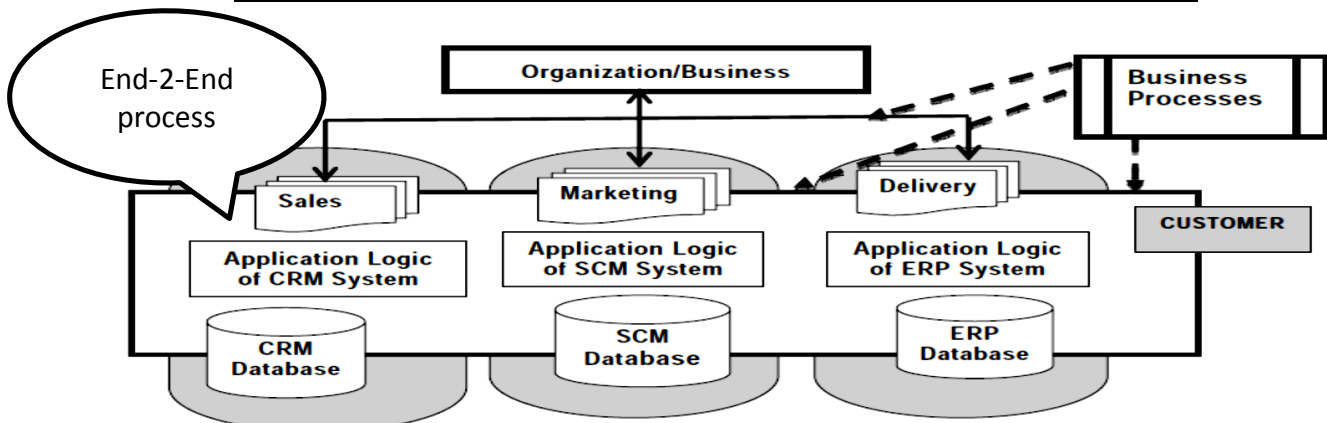
An organisation faces so many challenges while implementing BRP, few of them are as follows:

- ☒ The number of interfaces with the customers is growing (e.g. phone, fax, email, sms, PDA, etc.)
- ☒ The product, service and price options have increased the complexity of the business.
- ☒ Budgets are being cut

12. BPM TECHNOLOGY

- ❖ *BPM technology can complement existing (and future) investments in applications and give organizations the ability to implement a real – time process improvement without the extensive process conversion efforts. To achieve these benefits, Business Process Layer is introduced in the Traditional IT architecture.*
- ❖ BPM provides an independent process layer, linking the various independent applications needed to execute a single end-to-end business process.
- ❖ BPM technology can then manage the flow of activities along different applications, and the people involved and also reduce execution time.

BPM = process and organization (including people) as well as technology



13. VALUE CHAIN AUTOMATION

- ✓ Value chain refers to separate activities which are necessary to strengthen an organization's strategies and are linked together both inside and outside the organization.
 - ✓ In value chain, we see a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs.
 - ✓ Six business functions of the value chain are as follows:
- | | |
|----------------------------|--|
| ❖ Research and development | ❖ Design of products, services, or processes |
| ❖ Production | ❖ Marketing and sales |
| ❖ Distribution | ❖ Customer service |
- ✓ Value Chain Analysis is a useful tool for working out how we can create the greatest possible value for our customers.

14. BUSINESS PROCESS AUTOMATION (BPA): BENEFITS & RISKS

Benefits

1. **Saving on costs**: Automation leads to saving in time and labor costs.
2. **Staying ahead in competition**: Today, in order to survive, businesses need to adopt automation

3. **Fast service to customers**: This was not the initial reason for adoption of BPA but gradually business managers realized that automation could help them to serve their customers faster and better.

Risks

1. **Risk to jobs**: Jobs that were earlier performed manually by several employees would post-automation would be mechanized, thereby posing a threat to jobs.
2. **False sense of security**: Automating poor processes will not gain better business practices.

15. ACCOUNTING SYSTEMS AUTOMATION

- ❖ An Accounting Information System which is known as AIS is defined as a system of collection, storage and processing of financial and accounting data that is used by decision makers.
- ❖ An accounting information system is generally a computer-based method for tracking accounting activity in conjunction with information technology resources.

Basic Functions of an Accounting Information System (AIS)

1. The accounting information system is the mechanism that allows accountants to perform their accounting functions and tasks.
2. In automation of AIS, accountants and auditors need to be actively involved in evaluating which software to purchase, how to design the software or systems and implementation of the software or systems.
3. As auditors in auditing AIS, understanding of AIS is critical for collecting and evaluating evidence to provide an opinion/report on the completeness and accuracy of accounting information which is processed through AIS to produce the financial reports.
4. There are **three basic functions** of AIS and these are explained here.
 - a. Collect and store data
 - b. Record transaction
 - c. Safeguarding organisational assets

16. PROCESSING CYCLES OF AN ACCOUNTS BPM

RTP

The processing cycles of an Accounts BPM covers financing cycle, revenue cycle, expenditure cycle, human resource and the general ledger & reporting systems and the flow of data between them.

Financing Cycles: The cycle consists of a set of transactions leading to the recognition of a major economic event on the financial statements.

Revenue Cycle: It includes transactions relating to revenue and involves accounts like Sales, Accounts Receivable, Inventory and General Ledger. It involves capturing and recording of customer orders; shipment of the goods to ultimately recording of cash receipts.

Expenditure Cycle: It includes transactions relating expenditures and involves accounts like Purchases, Accounts Payable, Cash Disbursements, Inventory and General Ledger. It includes preparation and recording of purchase orders; receipt of goods and the recording of the cost of inventory; receipt of vendor invoices etc.

Human Resource Cycle: Common Source Documents & Functions are as follows:

Source Document	Function
W4 forms	Collect employee withholding data.
Time cards	Record time worked by employees.
Job time tickets	Record time spent on specific jobs.

AUTHORED BY CA KUNAL AGRAWAL [ACA, DISA(ICAI), B.Com]

General Ledger & Reporting System: Journal Voucher: Record entry posted to general ledger.

Data Processing Cycle: It may be noted, that all the above cycles of processing involves data processing activities which has been updated and stored.

- If the process of updating of the data stored is periodic, it is referred to as batch processing and if involves immediate updating as each transaction occurs, it is referred to as on-line, real-time processing.
- The controls on these data are maintained using **Audit Trials**. This is done by capturing snapshots or by tracing the flow of data.
- The Data Processing Cycle consists of following basic steps with alerts, controls and feedback at each step:
 - ❖ **Data input** - Involves the activities like capturing the data, implementing control procedures, recording in journals, posting to ledgers and preparation of reports.
 - ❖ **Data storage** - Involves organizing the data in master file or reference file of an automated system for easy and efficient access.
 - ❖ **Data processing** - Involves addition, deletion and updating of the data in the transaction file, master file or reference file.
 - ❖ **Information output** - Involves generation of documents and managerial reports in printable or electronic form for addressing queries, to control operational activities and help the management in decision making.

17. IMPACT OF IT ON BPM AND RISKS OF FAILURE OF IT

- ❖ BPM Systems (BPMS) are a new class of software that allows enterprises to devise process centric IT solutions.
- ❖ Organizations that utilize BPM systems to accomplish IT enabled business process change, gain from the following capabilities:
 - ✓ Closer business involvement in designing IT enabled business processes
 - ✓ Ability to integrate people and systems that participate in business processes,
 - ✓ Ability to monitor, control, and improve business processes in real time, and
 - ✓ Ability to effect change on existing business processes in real time.

18. BENEFITS OF BPMS

BPMS, as a technology, can deliver endless benefits to any sized organization but more importantly these benefits are unique to a company:

- 1) **Automating repetitive business processes:** Automation of processes like report creation and distribution reduces manual work thus save time & cost.
- 2) **BPMS works by 'loosely coupling' with a company's existing applications:** This enable to monitor, extract, distribute information to systems and people, in line with business rules.
- 3) **Operational Savings:** By automating task, cycle time to perform such tasks reduced significantly thus increase in cost saving.
- 4) **Reduction in the administration involved in Compliance and ISO Activities:** BPM help companies in their quest for process improvement and compliance. Companies worldwide are seeing the need to manage compliance like quality control etc. as a part of their everyday business activities.
- 5) **Freeing-up of employee time:** In business for each additional hour a manual process requires a hard cost is associated with employee time as well as soft cost associated with losing business or lowered productivity.

19. BUSINESS RISKS OF FAILURE OF IT

Reasons for failure of BPMS are:

- ☒ Superficial or deficient executive involvement
- ☒ Limited options for customization of the BPM software is required
- ☒ Failure to identify future business needs
- ☒ Inadequate assessment of the need for change management
- ☒ Resources not available when desirable
- ☒ Software fails to meet business needs
- ☒ Technological obsolescence.

20. INFORMATION AS A BUSINESS ASSET

- ❖ Information becomes an asset from an organization if it is useful, digital, accessible, relevant, accurate, trust-worthy, searchable, understandable, spatially enabled and shareable at the time when required.
- ❖ Information can be treated as a valuable commodity if it can be used effectively.
- ❖ In short, without effectively management of information the result can be information chaos.
- ❖ To achieve operational efficiency, information technology must be tailored to an organisation's need for CRM, ERP etc.

21. MAPPING SYSTEMS:

Accountants/Auditors need not to learn complex programming languages but they must understand the documents that describes how processing take place.

This document includes flowcharts, narrative and other written communication that describe Input, Processing & Output.

Why Documentation is Important???

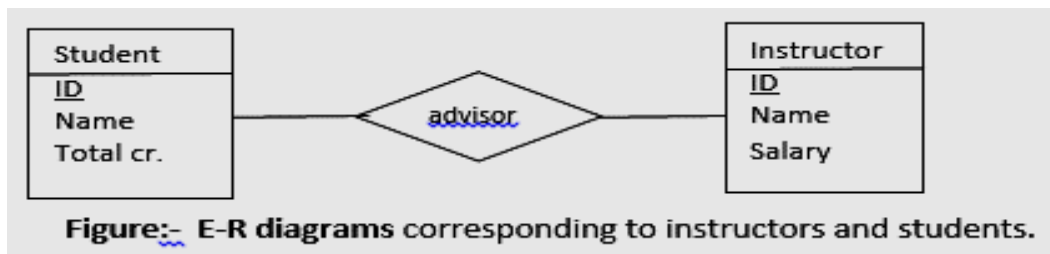
1. ***Depicting how the system works:*** As processing is invisible, documentation is required to help employees to understand systems and also help in designing controls.
2. ***Training users:*** It includes user guides, manuals etc. that help people to learn how information system operates and help in solving operational problems.
3. ***Designing new systems:*** Documents like flowchart help designers to develop new systems. IT also play key roles in reducing system failures and decreasing the time spent in correcting errors or debugging.
4. ***Controlling system development and maintenance cost:*** Good documentation help system designers to develop software that are modular, reusable code that avoid duplicate writing etc.
5. Standardizing communication with others.
6. Auditing Information System.
7. Documenting business process.

Various types of mapping systems are

1. Entity-Relationship Diagrams
2. Data flow diagrams
3. Flowcharts
4. Decision trees
5. Decision table, etc.

22. ENTITY-RELATIONSHIP DIAGRAMS

An E-R diagram can express the overall logical structure of a database graphically. E-R diagrams are simple and clear-qualities that may well account in large part for the widespread use of three-R model.



- ✓ Boxes are commonly used to represent entities.
- ✓ Diamonds represent relationship sets.

Types of Relationship

- A relationship is defined as “an association among entities”.
- The four types of relationships recognized among various data stored in the database are:-

One-to-One relationship	
One-to-Many relationships	
Many-to-One relationships	
Many-to-Many relationships	

Advantages of using E-R Diagram

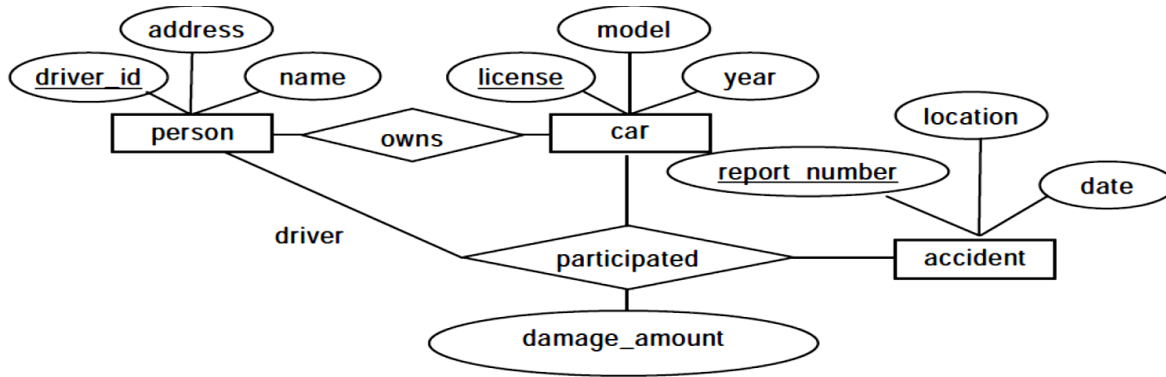
1. ER Modeling is simple and easily understandable. It is represented in business users' language and it can be understood by non-technical specialist.
2. Intuitive and helps in Physical Database creation.
3. Can help in database design.
4. Can be generalized and specialized based on needs.
5. Gives a higher level description of the system.

Limitations of using E-R Diagram

1. Physical design derived from E-R Model may have some amount of ambiguities or inconsistency.
2. Sometime diagrams may lead to misinterpretations.

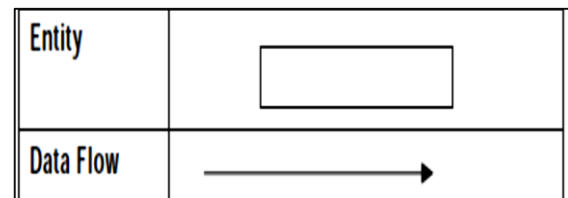
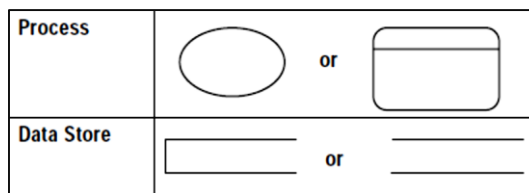
Example 1: Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.

(See next page for solution)



23. DATA FLOW DIAGRAMS

- ✓ A data flow diagram (DFD) graphically describes the flow of data within an organization. It is used to document existing systems and to plan and design new ones. DFDs can also be used for the visualization of data processing (structured design).
- ✓ A DFD shows what kinds of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel (which is shown on a flowchart).
- ✓ Each is represented on a DFD by one of the symbols shown in Figure given below



The four major DFD component's symbols

1. **Entity:**
 - a. An entity is the source or destination of data.
 - b. Entities either provide data to the system or receive data from it.
 - c. Entities are often represented as rectangles (a diagonal line across the right-hand corner means that this entity is represented somewhere else in the DFD).
 - d. Entities are also referred to as agents, terminators, or source/sink.
2. **Process:**
 - a. The process is the manipulation or work that transforms data, performing computations, making decisions (logic flow), or directing data flows based on business rules.
 - b. Process names (simple verbs and dataflow names, such as "Submit Payment" or "Get Invoice") usually describe the transformation, which can be performed by people or machines.
3. **Data Store:**
 - a. A data store is where a process stores data between processes for later retrieval by that same process or another one.
 - b. Files and tables are considered data stores.
 - c. Data store names (plural) are simple but meaningful, such as "customers" etc.
4. **Data Flow:**
 - a. Data flow is the movement of data between the entity, the process and the data store.
 - b. Data flow represents the interface between the components of the DFD.

There are two types of DFDs

1. Logical Data Flow Diagram → A logical DFD focuses on the business and how the business operates. It describes the business events that take place and the data required and produced by each event.
2. Physical Data Flow Diagram → A physical DFD shows how the system will be implemented. The physical model depicts the system.

Advantages of using Data Flow Diagram

1. It aids in describing the boundaries of the system.
2. It is beneficial for communicating existing system knowledge to the users.
3. DFDs can provide a detailed representation of system components.
4. DFDs are easier to understand by technical and nontechnical audiences
5. It supports the logic behind the data flow within the system.

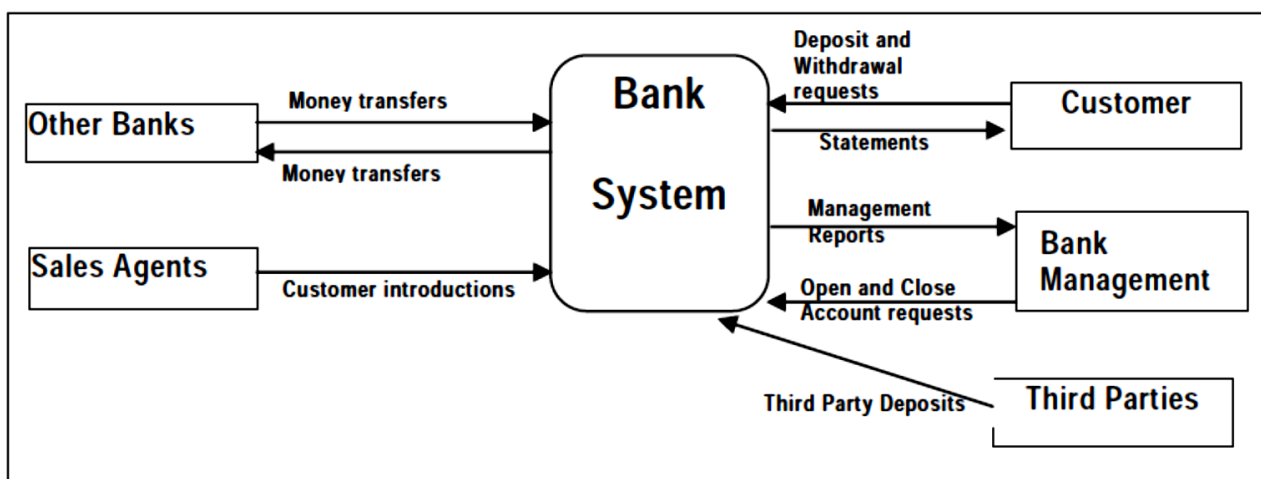
Limitations of using Data Flow Diagram

1. It make the programmers little confusing concerning the system.
2. The biggest drawback of the DFD is that it simply takes a long time to create, so long that the analyst may not receive support from management to complete it.
3. Physical considerations are left out.

Context Diagram

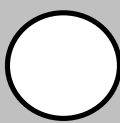
The Context Diagram is a high-level DFD that shows the entire system as a single process and shows the interaction between the system and external agents which act as data sources and data sinks, and gives no clues as to its internal organization.

E.g. Draw a Context Diagram for a Bank System that interacts with the following five agents: Customers, Bank Managers, Third Parties, Sales agents and Other Banks.



24. FLOWCHARTS

- ✓ A flowchart is a type of diagram that represents an algorithm or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows.
- ✓ This diagrammatic representation illustrates a solution to a given problem. Process operations are represented in these boxes, and arrows; rather, they are implied by the sequencing of operations.
- ✓ Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.
- ✓ Flowcharting symbol (only relevant at our level has been taken here)

	Terminator: Used at the beginning and end of a program or subroutine.
	Process: Such as performing arithmetic.
	Decision: Used for statements that causes the computer to choose between two or more paths. The IF statement is an example of this.
	Input/output operations.
	Connector: Instead of drawing a line between two points, you can have a line going to a connector and then have a second connector at the place where a long line would have gone. The same letter is placed inside each of these two circles to distinguish them from other circles on the page.
	When Hardcopy output is required or document to be printed.

Types of flowchart:-

Document Flowchart	This flowchart traces the physical flow of documents through an organization
System Flowchart	This typically depicts the electronic flow of data and processing steps in an Information System. While Document Flowcharts focus on tangible documents, system flowchart concentrates on the computerized data flows of Information systems.
Program Flowchart	It is most detailed and is concerned with the logical/arithmetic operations on data within the CPU and the flow of data between the CPU and input/output peripherals.

BENEFITS OF FLOWCHARTS

1. ***Quicker grasp of relationships*** – Before any application can be solved, it must be understood. The programmer can chart a lengthy procedure more easily with the help of a flowchart than by describing it by means of written notes.
2. ***Effective Analysis*** – The flowchart becomes a blue print of a system that can be broken down into detailed parts for study.
3. ***Communication*** – Flowcharts aid in communicating the facts of a business problem to those whose skills are needed for arriving at the solution.
4. ***Documentation*** – Flowcharts serve as a good documentation which aid greatly in future program conversions. In the event of staff changes, they serve as training function by helping new employees in understanding the existing programs.

THE LIMITATIONS OF FLOWCHARTS ARE GIVEN BELOW:

- 1) ***Complex logic*** – Flowchart becomes complex and clumsy where the problem logic is complex
- 2) ***Modification*** – If modifications to a flowchart are required, it may require complete redrawing.
- 3) ***Link between conditions and actions*** – Sometimes it becomes difficult to establish the linkage between various conditions and the actions to be taken.
- 4) ***Standardization*** – Program flowcharts, are not such a natural way of expressing procedures as writing in English, nor are they easily translated into Programming language.

25. DIFFERENCE BETWEEN FLOWCHART AND DATA FLOW DIAGRAM

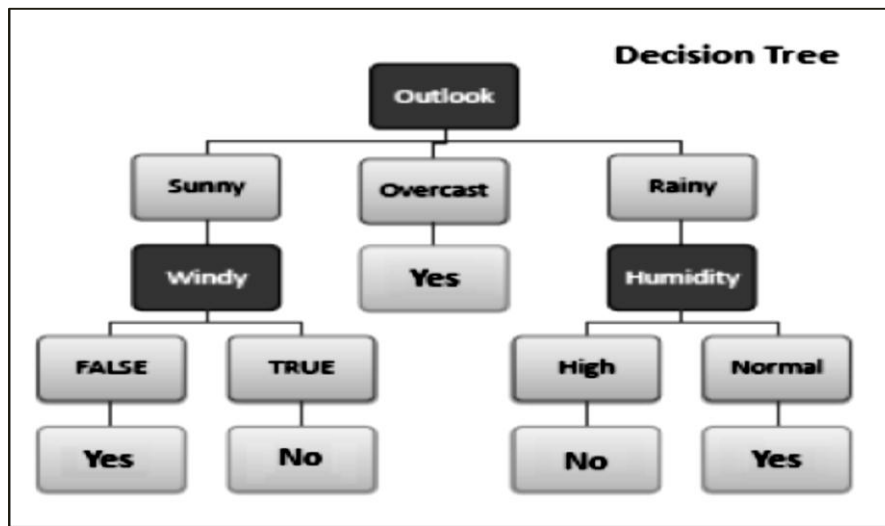
Flowchart	Data Flow Diagram
Flow chart presents steps to complete a process.	DFD presents the flow of data.
Flow charts do not have any input from or output to an external source.	DFD describes the path of data from an external source to internal source or vice versa.
The timing and sequence of the process is aptly shown by a flowchart.	Whether processing of data is taking place in a particular order or several processes are taking place simultaneously is described by a DFD.
Flow chart shows how to make a system function.	DFD define the functionality of a system.
Flow chart are used in designing a process.	DFD are used to describe the path of data that will complete that process.
Types of Flow charts – System, Data, Document and Program.	Types of DFD – physical data flow and logical data flow.

26. DECISION TREE

- ✓ A decision tree is a way of representing combinations of decisions within a system as a diagram.
- ✓ A decision tree is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. It is one way to display an algorithm.
- ✓ Decision trees are commonly used in operations research, specifically in decision analysis, to help identify a strategy most likely to reach a goal.
- ✓ A decision tree is a flowchart-like structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label
- ✓ They provide unique capabilities to supplement, complement, and substitute for
 - ❖ Traditional statistical forms of analysis (such as multiple linear regression)
 - ❖ A variety of data mining tools and techniques (such as neural networks)
 - ❖ Recently developed multidimensional forms of reporting and analysis found in the field of business intelligence.
- ✓ **Advantages** of using Decision Tree
 - ❖ Are simple to understand and interpret. People are able to understand decision tree models after a brief explanation.
 - ❖ Possible scenarios can be added.
 - ❖ Worst, best and expected values can be determined for different scenarios.
- ✓ **Limitations** of using Decision Tree
 - ❖ For data including categorical variables with different number of levels, information gain in decision trees are biased in favor of those attributes with more levels.
 - ❖ Calculations can get very complex particularly if many values are uncertain and/or if many outcomes are linked.

- ✓ Example: Decision Tree for the below mentioned problem

PREDICTORS				TARGET
Outlook	Temp.	Humidity	Windy	Play Golf
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No



27. DECISION TABLE

A decision table is a table containing various conditions that are possible in a given state of problem and the actions that are to be followed in each course. It helps understanding a given problem properly. It may or may not be accompanied by a flowchart.

PARTS OF DECISION TABLE

Condition Stub	Condition Entries
Contains all condition statements on which certain actions are to be taken	Contains all the rules or possibilities, generally in Y (Yes), N (No) or a hyphen (-) for all conditions mentioned in condition stub
Action Stub	Action Entries
Contains all the actions which are to be taken	Contains a X for actions to be taken and a blank entry for no action

Part	Meaning
Condition Statements	State the several conditions to consider in making a decision
Condition Entries	Entries that complete condition statements using Y, N, -, etc.
Action Statements	State actions or decisions to be taken when a certain combination of conditions exist.
Action Entries	Entries that complete the action statements using X, blank etc.
Rules	Unique combinations of conditions and actions to be taken under those conditions.
Header	Title identifying in the table.
Rule Identifiers	Codes R1, R2, R3... uniquely identifying each rule.
Condition Identifiers	Codes C1, C2, C3... uniquely identifying each condition statements/entry.
Action Identifiers	Codes A1, A2, A3... uniquely identifying each action statement/entry.

Advantages of using Decision Table

1. **Easy to Draw** – Decision Tables are easy to draw and modify as compared to flowcharts.
2. **Compact Documentation** – The documentation in the form of decision tables is compact since one decision table may replace few pages of a flowchart.
3. **Simplicity** – It is easier to follow a particular path in one column of a decision table than it is to go through several pages of the flowcharts.
4. **Better Analysis** – A decision table shows various alternatives and their respective outcomes side by side for better analysis of the problem.
5. **Non-technical** – No knowledge of computer language or CPU working is necessary for drawing decision tables.

Limitations of using Decision Table

1. All programmers may not be familiar with Decision Tables and therefore flow charts are more common
2. Flowcharts can better represent a simple logic of the system rather than a decision table.
3. Decision tables do not express total sequence of the events needed to solve the problem.

28. BUSINESS PROCESS RE-ENGINEERING (BPR):

PM

1. Business Process Reengineering (BPR) refers to the analysis and redesign of workflows and processes both within and between the organizations.
2. It is the fundamental rethinking, radical redesign of processes to achieve dramatic improvement, in critical measures of performance such as cost, quality, service & speed.
 - a. **Dramatic Achievement** means to achieve 80% or 90% reduction in delivery time, work in progress or rejection rate, not just 5%, 10% reduction.
 - b. **Radical redesign** means BPR is reinventing & not enhancing or improving.
 - c. **Fundamental rethinking** means asking the question “why do you do what you do”, thereby eliminating business processes altogether if it does not add any value to the customer.
3. Thus, BPR aims at major transformation of the business processes to achieve dramatic improvement. Here, the business objectives of the enterprise (e.g., profits, customer satisfaction through optimal cost, quality, deliveries, etc.) are achieved by “transformation” of the business processes which may, or may not, require the use of Information Technology (IT).
4. BPR is the main method by which organizations become more efficient and modern.
5. It transforms an organization in ways that directly affect its performance.

BPR Success factors

1. **Organization wide commitment**: Changes to business processes would have a direct impact on processes, organisational structures, work culture, information flows, infrastructure & technologies and job competencies. This requires strong leadership, support and sponsorship from the top management.
2. **BPR team composition**: The BPR team would include active representatives from top management, business process owners, technical experts and users as this BPR team is formed which would be responsible to take the BPR project forward and make key decisions and recommendations.
3. **Business needs analysis**: is important to identify exactly what current processes need reengineering and outline and conceptualize the desired business process. The outcome of this analysis would be BPR project plan – identifying specific problem areas, setting goals and relating them to key business objectives.
4. **Adequate IT infrastructure**: Adequate investment in IT infrastructure in line is of vital importance to successful BPR implementation. Effective alignment of IT infrastructure to BPR strategy would determine the success of BPR efforts.
5. **Effective change management**: BPR involves changes in people behavior and culture, processes and technologies. Hence, resistance would be a natural consequence which needs to be dealt with effectively. The success of BPR depends on how effectively management conveys the need for change to the people.
6. **Ongoing continuous improvement**: BPR is an ongoing process; hence innovation and continuous improvement are key to the successful implementation of BPR.

29. THEORIES OF PROCESS MANAGEMENT

Business Process Re-engineering (BPR) and incremental process improvement methodologies (i.e., Six Sigma, TQM, etc.) are tools that organizations can use to implement process improvement

Six Sigma

- ✓ Six Sigma is a set of strategies, techniques, and tools for process improvement. It seeks to improve the quality of process outputs by identifying and removing the causes of defects and minimizing variability in manufacturing and business processes.
- ✓ It follows a life-cycle having phases: Define, Measure, Analyze, Improve and Control (or DMAIC) which are described as follows:
 - ❖ ***Define***: Customers are identified and their requirements are gathered. Measurements that are critical to customer satisfaction are identified.
 - ❖ ***Measure***: Data on current process are gathered and current baseline performance for process output measures are established. Variances of output measures are graphed and process sigma are calculated.
 - ❖ ***Analyze***: Using statistical methods and graphical displays, possible causes of process output variations are identified.
 - ❖ ***Improve***: Solution alternatives are generated to fix the root cause. Cost and benefit analysis is performed to validate the financial benefit of the solution. Implementation plan is drafted and executed.
 - ❖ ***Control***: Process is standardized and documented. Before and after analysis is performed on the new process to validate expected results.

Total Quality Management (TQM)

- ✓ Total Quality Management (TQM) is a comprehensive and structured approach to organizational management that seeks to improve the quality of products and services through ongoing refinements in response to continuous feedback.
- ✓ TQM processes are divided into four sequential categories: Plan, Do, Check, and Act (the PDCA cycle):
 - ❖ **Plan**: In the planning phase, people define the problem to be addressed, collect relevant data, and ascertain the problem's root cause;
 - ❖ **Do**: In the doing phase, people develop and implement a solution, and decide upon a measurement to gauge its effectiveness;
 - ❖ **Check**: In the checking phase, people confirm the results through before-and-after data comparison;
 - ❖ **Act**: In the acting phase, document results; inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle.

30. BPM LIFE CYCLE (BPM-L) :-

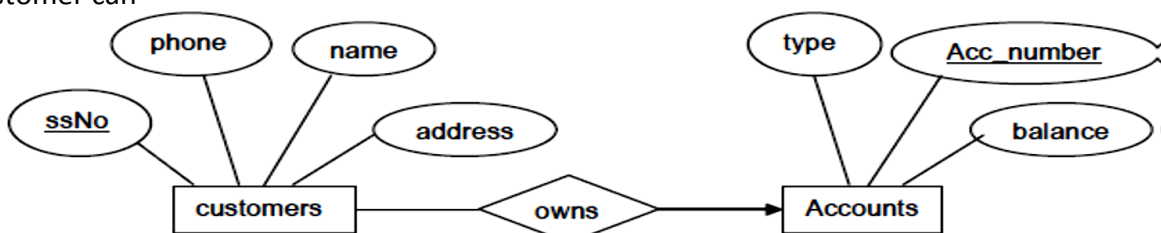
Business Process Management-Life cycle establishes a sustainable process management capability that empowers organizations to embrace and manage process changes successfully. Phases are Analysis, Design, Implementation, Run & Monitor and Optimize.

- 1) **Analysis phase**: This involves analysis of the current environment and current processes, identification of needs and definition of requirements.
- 2) **Design phase**: This involves evaluation of potential solutions to meet the identified needs, business process designing and business process modeling.
- 3) **Implementation phase**: This involves project preparation, blue printing, realization, final preparation, go live and support.
- 4) **Run and Monitor phase**: This involves business process execution or deployment and business process monitoring.
- 5) **Optimize**: Iterate for continuous improvement.

Topics given in RTP (Nov 2014)

Draw an E-R Diagram based on the following facts:

A bank records information about its customers and their accounts. A specific account can have many owners (customers), and a specific customer can own a have only one account at most. Information about customers includes their social security number, phone number, name and address. Information about accounts includes account number, type, and balance. Further, every customer can



Analyze the completeness of the following reduced decision table:

To check for the completeness of the decision table, do the following:

1. Count no. of dashes in each rule and sum such rules by applying 2^M where M is no. of dashes.
2. Calculate no. of rules to be made by 2^N where N is total no of condition.

$$= 2^2 + 2^1 + 2^2 + 2^0 + 2^0$$

$$= 4 + 2 + 4 + 1 + 1$$

$$= 12 \text{ -----(i)}$$

Also, 2 number of conditions = $2^n = 2^4$ (where conditions are C1, C2, C3, C4)

$$= 16 \text{ -----(ii)}$$

Since (i) and (ii) are not equal, thus the table is not complete.

	Table X	R1	R2	R3	R4	R5
C1	Condition A	Y	N	N	N	N
C2	Condition B	Y	Y	N	N	N
C3	Condition C	-	N	-	Y	N
C4	Condition D	-	-	-	N	N
A1	Action 1	X		X	X	
A2	Action 2		X			X

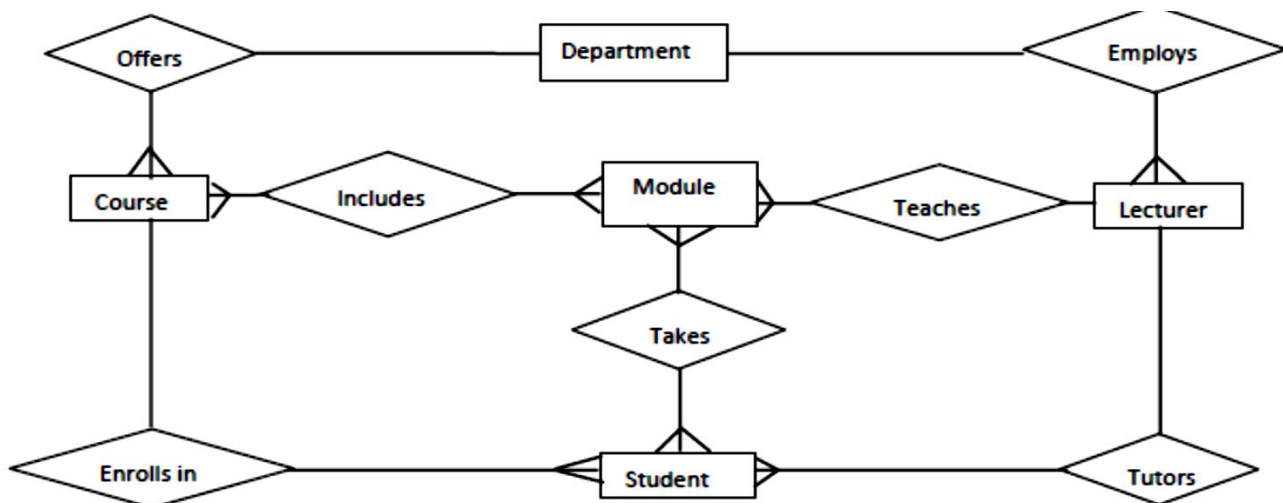
Other questions from PM

A university consists of a number of departments. Each department offers several courses. A number of modules make up each course. Students enroll in a particular course and take modules towards the completion of that course. Each module is taught by a lecturer from the appropriate department, and each lecturer tutors a group of students. Draw an E-R Diagram.

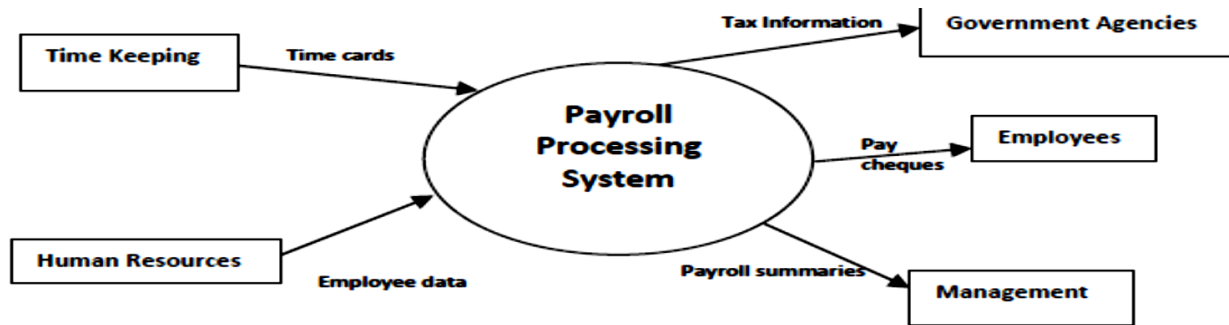
First we will identify entities which are - Department, Course, Module, Student, and Lecturer.

Further, following are the relationships:

- Each department offers several courses;
- A number of modules make up each course;
- Students enroll in a particular course;
- Students take modules;
- Each module is taught by a lecturer;
- A lecturer from the appropriate department; and
- Each lecturer tutors a group of students.



Draw a Context Level Diagram for Payroll Processing System that interacts with the following five agents: Government Agencies; Employees; Management; Time Keeping and Human Resources.



Classify each of the following items as belonging in the revenue, expenditure, human resources/payroll, production, or financing cycle.

- | | |
|--|---|
| (a) Purchase raw materials | (b) Decide how many units to make next month |
| (c) Pay for raw materials | (d) Disburse payroll checks to factory workers |
| (e) Hire a new assistant controller | (f) Update the allowance for uncollectible accounts |
| (g) Establish a 10,000 credit limit for customer XYZ Company | |

- | | | |
|-----------------------|----------------------|-------------------------------|
| (a) Expenditure Cycle | (b) Production Cycle | (c) Expenditure Cycle |
| (d) Payroll Cycle | (e) Payroll Cycle | (f) Financial Reporting Cycle |
| (g) Revenue Cycle | | |
-