

	Question	Answer
1	Components of DFD (Data Flow Diagram)	<p><b>External entity:</b> an outside system that sends or receives data, communicating with the system being diagrammed. They are the sources and destinations of information entering or leaving the system. They might be an outside organization or person, a computer system or a business system. They are also known as terminators, sources and sinks or actors. They are typically drawn on the edges of the diagram.</p> <p><b>Process:</b> any process that changes the data, producing an output. It might perform computations, or sort data based on logic, or direct the data flow based on business rules. A short label is used to describe the process, such as "Submit payment."</p> <p><b>Data store:</b> files or repositories that hold information for later use, such as a database table or a membership form. Each data store receives a simple label, such as "Orders."</p> <p><b>Data flow:</b> the route that data takes between the external entities, processes and data stores. It portrays the interface between the other components and is shown with arrows, typically labeled with a short data name, like "Billing details."</p>
2	Type of DFD used in analysis and design	<p><b>Logical DFD</b> - This type of DFD concentrates on the system process, and flow of data in the system. For example in a Banking software system, how data is moved between different entities.</p> <p><b>Physical DFD</b> - This type of DFD shows how the data flow is actually implemented in the system. It is more specific and close to the implementation.</p> <p><b>Levels of DFD</b></p> <p><b>Level 0</b> - Highest abstraction level DFD is known as Level 0 DFD, which depicts the entire information system as one diagram concealing all the underlying details. Level 0 DFDs are also known as context level DFDs.</p> <p><b>Level 1</b> - The Level 0 DFD is broken down into more specific, Level 1 DFD. Level 1 DFD depicts basic modules in the system and flow of data among various modules. Level 1 DFD also mentions basic processes and sources of information.</p> <p><b>Level 2</b> - At this level, DFD shows how data flows inside the modules mentioned in Level 1.</p>
3	Steps in Producing a Level DFD of the Current Physical System	<p>There are 4 Approach listed::</p> <p>Approach 1 :</p> <p>Identify the major data flows into and out of the system, together with their respective starting and finishing points (the source and recipient of the data). The source and recipient will normally become external entities on the DFD.</p> <ul style="list-style-type: none"> <li>Identify the processes which receive the incoming data and the stores used to hold such data.</li> <li>Identify the processes which generate outward flows together with the relevant data stores, for example</li> </ul> <p>Draw DFD</p> <p>Add any additional processes, flows and data stores</p> <p>Review.</p> <p>Approach 2:</p> <p>Add any additional processes, flows and data stores</p> <p>Identify the source and recipient of each document and construct a physical document flow diagram</p> <ul style="list-style-type: none"> <li>Review the system with the user to agree system boundary</li> </ul> <p>Approach 3:</p> <p>Draw a number of partial DFDs, for example, for each function within the system, and then link these together.</p> <p>Approach 4</p> <ul style="list-style-type: none"> <li>Draw a separate flow diagram for each major document in the system, showing processes, stores and external entities involved, and then link these together.</li> </ul>
4	Components of a Function	A function consists of the input, the processes (update and enquiry) required to respond to that input, and the output produced by those processes
5	Function Types	<p>Functions can be categorised in three ways:</p> <ul style="list-style-type: none"> <li>Enquiry or update (note that an update function may also include enquiries)</li> <li>On-line and off-line - a function can include both types of processing</li> <li>Method of initiation, e.g. by the action of a user of the system, a time clock, an error, etc.</li> </ul>
6	The products of (Derive System) Functions	The products of this step are new, rather than amended versions of existing products, and demand much cross-referencing, consultation with users and discussion between project team members. The products are Function Definitions, Input/Output Structures and a User Role/Function Matrix.
7	Products of entity-event modelling	Entity Life Histories
8	Producing the ELH	in 9.pdf
9	Construction of the Effect Correspondence Diagram	

10	Logical Data Modelling (Steps)	<p>Select Entities Investigate Interrelationships Produce a Logical Data Structure Matrix Convert the Matrix to a Logical Data Structure Entity Descriptions Exclusive Relationships Recursive Relationships Rationalise the Structure Naming Relationships Create from LDS after: Data Store/Entity Cross Reference</p>
11	Components of Logical Data model	<p>Includes entities (tables), attributes (columns/fields) and relationships (keys)</p> <p>An entity is an object of the real world about which information is held in a particular system Attributes are properties of entities.</p>
12	Content of an Entity Description	During the process of producing the LDS, details of the attributes of each of the entities will evolve. In order to keep a record of these attributes an Entity Description is produced (see Appendix 4). The description shows all the attributes, including those which will take key values, that is, a field or fields used to define uniquely a single occurrence of a record
13	THE UNIFIED PROCESS- The Most Important UP Idea	A standardized approach to analysis and design helps to ensure that all necessary tasks are understood and completed in software development.
14	What Is Design	<p>Design emphasizes a conceptual solution (in software and hardware) that fulfills the requirements, rather than its implementation. For example, a description of a database schema and software objects. Design ideas often exclude low-level or details obvious to the intended consumers. Ultimately, designs can be implemented, and the implementation (such as code) expresses the true and complete realized design.</p> <ul style="list-style-type: none"> <li>• A design is not an implementation, although a good design can be implemented when it is complete.</li> <li>• There are subsets of design, including architectural design, object design, and database design.</li> </ul>
15	What is Object Oriented Analysis	<p>During object-oriented analysis there is an emphasis on finding and describing the objects or concepts in the problem domain. For example, in the case of the flight information system, some of the concepts include Plane, Flight, and Pilot. In a Library Information System, some of the concepts include Book, Library, and Patron.</p> <p>During object-oriented design (or simply, object design) there is an emphasis on defining software objects and how they collaborate to fulfill the requirements.</p> <ul style="list-style-type: none"> <li>• The emphasis is on finding and describing the objects (or concepts) in the problem domain.</li> </ul>
16	Use Case	<p>Requirements analysis may include stories or scenarios of how people use the application; these can be written as use cases. Use cases are not an object-oriented artifact they are simply written stories. However, they are a popular tool in requirements analysis.</p> <ul style="list-style-type: none"> <li>• Writing Use Cases is not a specifically Object Oriented practice.</li> <li>• But it is a best practice for elaborating and understanding requirements.</li> </ul> <p>Structured document, with events, actors, pre- and post conditions, scenarios, steps, non-functional requirements.</p>
17	Types of Requirements	Requirements – Functional – Non-functional
18	What are System Sequence Diagrams?	<p>A system sequence diagram (SSD) is a fast and easily created artifact that illustrates input and output events related to the systems under discussion. They are input to operation contracts and most importantly object design.</p> <p>The UML contains notation in the form of sequence diagrams to illustrate events from external actors to a system.</p>
19	What is a Domain Model	<p>Object-oriented analysis is concerned with creating a description of the domain from the perspective of objects. There is an identification of the concepts, attributes, and associations that are considered noteworthy.</p> <p>The result can be expressed in a domain model that shows the noteworthy domain concepts or objects.</p> <p>Note that a domain model is not a description of software objects; it is a visualization of the concepts or mental models of a real-world domain. Thus, it has also been called a conceptual object model.</p>
20	Use Case Diagrams	<p>The UML provides use case diagram notation to illustrate the names of use cases and actors, and the relationships between them</p> <p>Use case diagrams and use case relationships are secondary in use case work. Use cases are text documents. Doing use case work means to write text.</p> <p>A use case diagram is an excellent picture of the system context; it makes a good context diagram, that is, showing the boundary of a system, what lies outside of it, and how it gets used. It serves as a communication tool that summarizes the behavior of a system and its actors.</p>

21	Describe the functional organizational structure	<p>Functional structure divided into functions or departments Functions perform specialized tasks or activities Processes cut across functions</p> <p>The most common organizational structure you are likely to encounter is the functional structure. Organizations that utilize a functional structure are divided into functions, or departments, each of which is responsible for a set of closely related activities. For example, the accounting department sends and receives payments, and the warehouse receives and ships materials. Typical functions or departments found in a modern organization include purchasing, operations, warehouse, sales and marketing, research and development, finance and accounting, human resources, and information systems.</p>
22	What is a business process?	A business process, is a set of tasks or activities that produce desired outcomes. Every process is triggered by some event, such as receiving a customer order or recognizing the need to increase inventory.
23	What is the silo effect? Why does it exist? What problems does it create?	<p>The functional structure served organizations well for a number of years because it enabled them to cope with the challenges generated by their rapid growth. Over time, however, this system developed a serious drawback. Put simply, people in the different functional areas came to perform their steps in the process in isolation, without fully understanding which steps happen before and which steps happen next. They essentially complete their part of the process, hand it off to the next person, and then proceed to the next task.</p> <p>By focusing so narrowly on their specific tasks, they lose sight of the “big picture” of the larger process, be it procurement, fulfillment, or any number of other common business processes. This tendency is commonly referred to as the silo effect because workers complete their tasks in their functional “silos” without regard to the consequences for the other components in the process.</p> <p>A key point here is that the silo nature of the functional organizational structure and the cross-functional nature of processes are at odds with each other. That is, while workers focus on their specific function, each business process involves workers located in multiple functional areas. A major challenge facing organizations, then, is to coordinate activities among the different functional areas. Viewing a company from a process perspective requires employees to “think sideways”—in other words, to view the business across functional boundaries and focus on the end-to-end nature of the process and its intended outcomes. Learning to view a process from end to end is essential to understanding how enterprise systems help businesses manage their processes efficiently. Not surprisingly, then, this understanding has become a critical skill that companies have come to demand from their employees.</p>
24	The procurement process includes	<p>The procurement process includes all of the tasks involved in acquiring needed materials externally from a vendor.</p> <p>The process begins when the warehouse recognizes the need to procure materials, perhaps due to low levels of inventory. The warehouse then documents this need in the form of a purchase requisition, which it sends to the purchasing department. In turn, the purchasing department identifies a suitable vendor, creates a purchase order, and sends it to the vendor. The vendor ships the materials, which are received in the warehouse. The vendor then sends an invoice, which is received by the accounting department. Accounting then sends payment to the vendor, thereby completing the process.</p>
25	PRODUCTION—MAKE – Process elements	Other times, however, a company uses the production process to acquire needed materials internally. As we explained in the previous paragraph, a customer order can trigger the production process. Alternatively, the material planning process can trigger in-house production. Subsequently, it will request production. In turn, the production department will approve the request. The approval authorizes the warehouse to release the materials needed to complete production. Once the production department has completed its task, the warehouse places the finished goods into storage. Note that this last step in the production process, which is concerned with the storage of the finished goods, could trigger IWM processes.
26	FULFILLMENT—SELL – Process steps	Fulfillment is concerned with efficiently processing customer orders. It is triggered by a customer purchase order that is received by the sales department. Sales then validates the order and creates a sales order. The sales order communicates data related to the order to other parts of the organization, and it tracks the progress of the order. The warehouse prepares and sends the shipment to the customer. Once accounting is notified of the shipment, it creates an invoice and sends it to the customer. The customer then makes a payment, which accounting records. As this scenario illustrates, fulfillment triggers processes in IWM where the materials are stored. Of course, in many cases the ordered materials are not available in the warehouse. In such cases fulfillment will trigger external procurement and/or production.
27	ASSET MANAGEMENT	Asset management is concerned with both the preventive and corrective maintenance of an organization's equipment. Preventive maintenance is performed periodically—for example, the routine maintenance of a machine in a factory. In contrast, corrective maintenance is done as needed—for example, repairing a machine when it breaks down. The trigger is a maintenance request, which can be either preventive or corrective. Production approves the request, and the maintenance is performed. The final stage, settlement, involves an internal charge for the work done.
28	CUSTOMER SERVICE—SERVICE	A similar process is used for service requests from customers, for example, to repair a product they purchased. In such cases, different functional areas may be involved. Sales receives a service request, which it approves and forwards to the department responsible for completing the repairs. Settlement will depend on whether the service is covered by a warranty. If it is, then the organization will absorb the cost of the repair. Otherwise, the organization will send an invoice to the customer and then record payment, similar to the steps in the fulfillment process.

29	Employee/ person related concepts in a HR system within an enterprise.	<p>Recruiting Process, The Interviewing and Hiring Process Human Resources Duties After Hiring The Human Resources department has responsibilities that continue beyond the hiring and job start of an employee. The HR department should maintain a good and continual line of communication with the employee and the supervisor to make sure the employee is performing well. Like most companies, issues performance evaluations to new and current employees. The supervisor performs an initial evaluation and reviews it with the employee. After the review, the supervisor may modify the evaluation, which both the supervisor and the employee sign. The employee may submit a written response to the review, listing any disagreements or explanations. Other senior employees, such as the plant manager, may add a separate written comment, and should also review the performance evaluation and employee response. The complete package is then forwarded to the HR department, where all documents become part of the employee's file. These files are critically important when an employee consistently fails to perform adequately. If an employee must be terminated, the company needs sufficient documentation to demonstrate that the termination is warranted; otherwise, if the employee sues the company for wrongful termination, the company may have problems substantiating the termination decision. Because it does not have an effective information system, it is frequently difficult to manage all of the performance evaluation data. This makes it difficult for the Human Resources Department to identify problems with an employee and take corrective action (such as counseling or a transfer) before the problems lead to termination of the employee. With its paper-based system, an employee's file can be viewed by only one person at a time, and it is possible to lose track of an employee's file—temporarily or permanently. Also, it is difficult to maintain proper control of sensitive personal information when it's maintained in paper files. Employee turnover can be a significant problem. In its 2002 Cost-per-Hire (CpH) Staffing Metrics Survey, the Society for Human Resource Management reported that hiring costs for an employee may be as high as \$70,000. This figure represents both the direct costs of hiring an employee and the less tangible losses that occur during a new employee's first year or so. While new employees are learning their jobs, other employees have to take time from their normal jobs to train them. Another cost that is difficult to quantify is an employee's historical knowledge of the job, which is lost when he or she leaves a company. For example, if a purchasing manager leaves a company, then all of the manager's knowledge about supplier relations is lost. The company does have a record of the contract signed with the supplier, but details of the negotiations that led to the contract may not be documented. Such details can be crucial in successfully negotiating the next contract. The manager may have developed good relations with the supplier and know whom to contact when there are problems. These relationships are not specified as part of the purchasing manager position, but accrue over time with the individual holding the position. When companies experience high rates of turnover, they lose knowledge and skills that may be crucial to keeping them competitive. Employee turnover is strongly related to job satisfaction and compensation. If employees have satisfying jobs and are well compensated, they are less likely to leave the company. Human Resources can help maintain a satisfying work environment through a number of means, such as holding training programs for supervisors and managers, conducting periodic employee satisfaction surveys, and gathering data from employee exit surveys. Human Resources also has a critical role to play in compensation, which should be related to the skills and tasks required by the job and the performance of the employee. An important function of the HR department is to make sure compensation levels are competitive and are applied fairly to all employees. Failure to do so can result in high rates of turnover as well as discrimination lawsuits. Pages 162-164</p>
30	Processes of HUMAN CAPITAL MANAGEMENT—PEOPLE	Human capital management (HCM) consists of numerous processes related to all aspects of managing people in an organization. Examples of HCM processes are recruitment, hiring, training, compensation and benefits management, and payroll administration. In our brief discussion of processes in this chapter, we focused on tasks and the functional areas where they are completed. Clearly, however, it is the people in the functional areas who actually perform the tasks. Consequently, HCM touches every process in the organization. Moreover, it is not uncommon for people in different functional areas to complete many of the tasks in HCM processes. For example, the trigger for recruitment and hiring is a need for people with the requisite skills to complete process tasks. Consequently, the functional area in need of new employees will be involved in this process.
31	The Interviewing and Hiring Process	<p>Requesting department develops a short list of candidates based on data provided by HR</p> <p>Human Resources department:</p> <ul style="list-style-type: none"> <li>Contacts candidates on the short list</li> <li>Schedules interviews</li> <li>Creates a file for each candidate</li> <li>If a candidate accepts an interview offer, HR makes arrangements for the interview</li> <li>After the initial interview, HR updates candidate's file to indicate whether he or she is a possibility for hire</li> <li>Second interview may be scheduled</li> <li>HR representative and supervisor of requesting department decide which candidates are acceptable and rank them</li> <li>HR person makes the highest-ranking candidate a job offer</li> <li>Acceptance of job offer by candidate</li> <li>Company hires HR consulting firm to perform a background check</li> </ul>
32	Human Resources (HR) department responsibilities	<p>The responsibilities of an HR department usually include:</p> <ul style="list-style-type: none"> <li>● Attracting, selecting, and hiring new employees using information from resumes, references, and the interview process</li> <li>● Communicating information regarding new positions and hires throughout the organization and beyond</li> <li>● Ensuring that employees have the proper education, training, and certification to successfully complete their duties</li> <li>● Handling issues related to employee conduct</li> <li>● Making sure employees understand the responsibilities of their jobs</li> <li>● Using an effective process to review employee performance and determine salary increases and bonuses</li> <li>● Managing the salary and benefits provided to each employee and confirming that the proper benefits are disbursed to new and current employees</li> <li>● Communicating changes in salaries, benefits, or policies to employees</li> <li>● Supporting management plans for changes in the organization (expansion, retirements, and so on) so that competent employees are available to support business processes</li> </ul>

33	ADVANCED ERP HUMAN RESOURCES FEATURES	<p>Time Management – The SAP ERP system uses Cross Application Time Sheets (CATS) to record employee working times and provide the data to applications</p> <p>Payroll - The remuneration elements of an employee's pay include the base pay, bonuses, gratuities, overtime, sick pay, and vacation allowances that the employee has earned during the pay period. The statutory and voluntary deductions include taxes (federal, state, local, Social Security, and Medicare), company loans, and benefit contributions. The process of determining each employee's pay is called a payroll run. In the payroll run, the SAP ERP system evaluates the input data and notes any discrepancies in an error log.</p> <p>Travel Management - Because airfare, hotel, and rental car costs can vary widely, companies frequently require employees to make reservations through either a company travel office or a travel agency under contract to the company. The employee must keep receipts for expenses incurred during the trip in order to complete an expense report and receive reimbursement.</p> <p>Training and Development - Requirements are skills or abilities associated with a position, while qualifications are skills or abilities associated with a specific employee. One of the most important reasons for managing the development and training of employees is succession planning.</p> <p>Mobile Time Management, Management of Family and Medical Leave, Domestic Partner Handling, Administration of Long-Term Incentives, Personnel Cost Planning, Management and Payroll for Global Employees, Management by Objectives</p>
34	Processes of MANAGEMENT ACCOUNTING — TRACK FOR INTERNAL REPORTING	<p>Management accounting or controlling (CO) processes (track–internal ) focus on internal reporting to manage costs and revenues. Whereas financial accounting is concerned with external reporting that is mandated by laws and regulations, management accounting, or controlling, is concerned with tracking costs and revenues for internal reporting that is intended to help management control costs and revenues and assess the profitability of various products and market segments. Management creates these reports to support its decision making. Unlike financial accounting reports, management accounting reports are produced as needed and can contain any information that management deems necessary. Among the major costs management accounting tracks are materials costs, labor costs, and overhead costs. Management takes these costs into account when it establishes prices for its products or services. It then combines these data with information concerning revenues to determine the profitability of various products and services in different market segments. Ultimately, management utilizes all of this information to make key strategic decisions that affect the organization's products market mix as well as tactical decisions that influence day-to-day operations.</p>
35	Processes of FINANCIAL ACCOUNTING—TRACK FOR EXTERNAL REPORTING	<p>Financial accounting (FI) processes (track–external ) track the financial impacts of process steps with the goal of meeting legal reporting requirements—for example, the Internal Revenue Service (IRS) or the Securities and Exchange Commission ( SEC). Financial accounting is concerned with tracking the financial impacts of processes with the primary goal of meeting legal and regulatory reporting requirements. Thus, it is externally focused. Common reports include the income statement or profit and loss (P&amp;L) statement and the balance sheet. The income statement indicates the organization's financial condition within a specified period of time. It identifies revenues, expenses, and net profit (or loss) for the period. In contrast, a balance sheet indicates the financial condition of an organization at a given point in time. It identifies assets, liabilities, and shareholders' equity. All of these reports must comply with prescribed standards, such as the generally accepted accounting principles (GAAP) in the United States and Handelsgesetzbuch (HGB) in Germany. These reports must be submitted to regulatory agencies at prescribed times, such as annually or quarterly. Finally, these reports are country specific. Therefore, an enterprise that operates in multiple countries must track financial data separately for each country, using that country's prescribed standards.</p> <p>Various steps in the different processes introduced earlier in this chapter have an impact on an organization's financial status. Organizations analyze this impact using four key processes based in financial accounting: general ledger, accounts receivable, accounts payable, and asset accounting. The general ledger process records the impacts of various process steps on a company's financial position. The impacts are recorded in a number of accounts in the general ledger that represent an organization's income, expenses, assets, and liabilities. These accounts are used to store accounting-relevant data from process steps. Accounts payable is associated with the procurement process and is used to track money that is owed to vendors. Similarly, accounts receivable is used to track money owed by customers. Accounts receivable and accounts payable automate the general ledger entries associated with the procurement and fulfillment processes so that the financial impact of these processes is recorded automatically. Finally, asset accounting is concerned with tracking financial data related to assets such as machinery and cars.</p>
36	What is a business process	It is the way a company handles a business request, eg. a loan request in a bank, or an incoming order in a shipping company. It is nothing concrete, it is the way people and systems interact to handle a business request.
37	What is a model of a business process	An abstraction of the way people and systems interact to handle a business request described in some kind of language, eg. UML Activity diagrams. A simplified view of the complex reality. Externalization and formalization of knowledge and expertise within applications and minds.
38	Business Process Modeling - UML Activity Diagram components	<p>Actions</p> <p>Control flow</p> <p>Split and Join</p> <p>Decisions</p> <p>Swimlanes</p>
39	Advantages of Workflow Management	<p>Higher productivity</p> <p>Moves knowledge from people to documented process</p> <p>Rapid adaptation to the market</p> <p>Location of bottlenecks and runtime changes of process</p> <p>Statistics about processes</p> <p>Continued optimization</p> <p>Reuse of services and processes</p> <p>All processes are implemented in same framework</p>

40	Advantages of modeling the business processes	<p>Better understanding of existing business processes</p> <p>Documents the business process</p> <p>Basis for improving existing business processes</p> <p>Basis for experiencing and simulating new concepts and impact on the organization</p> <p>Basis for continued optimization</p> <p>Basis for creating information systems that support the business processes</p> <p>One type is known as Workflow Management Systems</p>
41	A Workflow is	<p>A Workflow is also a model of the business process, but contains much more details about technical issues</p> <p>a program written in a declarative language, most often XML based executable by a runtime engine, which can interpret the workflow language</p>
42	Workflow Patterns	<p>Basic Control Patterns</p> <p>Sequence - execute two or more activities in sequence</p> <p>Parallel Split - execute two or more activities in any order or in parallel</p> <p>Synchronize - synchronize two or more activities that may execute in any order or in parallel; do not proceed with the execution of subsequent activities until all preceding activities have completed; also known as barrier synchronization.</p> <p>Exclusive Choice - choose one execution path from many alternatives based on data that is available when the execution of the process reaches the exclusive choice</p> <p>Simple Merge - wait for one among a set of activities to complete before proceeding; it is assumed that only one of these activities will be executed; typically, these activities are on different paths stemming from an exclusive choice or a deferred choice (see below)</p> <p>Terminate - terminate execution of activities upon defined event or status change</p> <p>Advanced Branching and Synchronization Patterns</p> <p>Multiple Choice - choose several execution paths from many alternatives</p> <p>Conditional Choice - choose one execution path from many alternatives according to discriminated status conditions</p> <p>Synchronizing Merge - merge many execution paths; synchronize if many paths are taken; do the same as for a simple merge if only one execution path is taken</p> <p>Multiple Merge - wait for one among a set of activities to complete before proceeding; if several of the activities being waited for are executed, the simple merge fires each time that one of them completes.</p> <p>Discriminator - wait for one of a set of activities to complete before proceeding; if several of the activities being waited for are executed, the discriminator only fires once.</p> <p>N-out-of-M Join - same as the discriminator but it is now possible to wait until more than one of the preceding activities completes before proceeding by setting a parameter N to some natural number greater than one.</p> <p>Structural Patterns</p> <p>Arbitrary Cycle - do not impose any structural restrictions on the types of loops that can exist in the process model.</p> <p>Implicitly Terminate - terminate an instance of the process if there is nothing else to be done</p> <p>Multiple Instances (MI)</p> <p>MI without synchronizing - generate many instances of one activity without synchronizing them afterwards</p> <p>MI with a prior known design time knowledge - generate many instances of one activity when the number of instances is known at the design time (with synchronization)</p> <p>MI with a prior known runtime knowledge - generate many instances of one activity when a number of instances can be determined at some point during the runtime (as in FOR loop but in parallel)</p> <p>MI without a prior runtime knowledge - generate many instances of one activity when a number of instances cannot be determined (as in WHILE loop but in parallel)</p> <p>State-based patterns</p> <p>Deferred Choice - execute one of a number of alternative threads. The choice which thread is to be executed is not based on data that is available at the moment when the execution has reached the deferred choice, but is rather determined by an event (e.g. an application user selecting a task from the worklist, or a message being received by the process execution engine).</p> <p>Interleaved Parallel Routing - execute a number of activities in any order (e.g. based on availability of resources), but do not execute any of these activities simultaneously.</p> <p>Milestone - allow a certain activity at any time before the milestone is reached, after which the activity can no longer be executed.</p> <p>Cancellation Patterns</p> <p>Cancel Activity - stop the execution of an enabled activity</p> <p>Cancel Case - stop the execution of a running process</p> <p>Cancel Wait - continue execution of a running process without prior completion event</p>
43	Workflow Management System consist of	<p>IT infrastructure to build, execute, monitor and optimize workflows</p> <p>Consists of:</p> <p>Language(some kind of web service composition language, eg. BPEL, BPML., often based on graphs),</p> <p>Build time IDE to build the workflows. Gives a graphical user interface to the language</p> <p>Runtime engine to handle instances of the workflows</p> <p>Monitor to get overview of running and finished processes</p>

44	Requirements for implementing WFM system	Well established IT infrastructure SOA: Applications called as services Resources to model the business, to implement them and to support and monitor the running instances. The organization must be ready for change. People get new ways of working. Skilled people!
45	Workflow Execution engine	Interprets workflows based on a language Knowns how to call Web Services through different protocols Enables long running transactions (days, weeks, month) by persisting state information for the workflow Enables ACID transactions and compensation in case of exceptions
46	The Model Driven Engineering paradigm	The programming level is raised from code to models The code is generated from the models The process developer should work on the makro-flow and the code, eg. BPEL should be generated from the makro-flow Working on higher abstraction level speeds up development time, decreases the amount of errors and decreases the reaction time to changes in the marked Is still in a very early stage.
47	What is Messaging	Technology, that enables high-speed, asynchronous, program-to-program communication (with reliable delivery) Messages Channels Sender or producer Receiver of consumer
48	Why Use Messaging? Benefits:	<ul style="list-style-type: none"> <li>• Remote Communication</li> <li>• Platform/Language Integration.</li> <li>• Asynchronous Communication.</li> <li>• Variable Timing.</li> <li>• Throttling.</li> <li>• Reliable Communication.</li> <li>• Disconnected Operation.</li> <li>• Mediation.</li> <li>• Thread Management.</li> </ul>
49	The Wide World of Integration – Fields and Methods of Various Solutions	Six types of integration: <ul style="list-style-type: none"> <li>• Information Portals</li> <li>• Data Replication</li> <li>• Shared Business Functions</li> <li>• Service-Oriented Architectures</li> <li>• Distributed Business Processes</li> <li>• Business-to-Business Integration</li> </ul>
50	Why is there a Need for Integration?	Hundreds or thousands of applications are custombuilt, third-party, part of legacy systems, etc. Business applications are complex → writing them is hard ERP vendors created large business applications, but perform a fraction of the business functions required
51	Application Integration Criteria	First criterion: application integration itself Other main decision criteria are: Application coupling Integration simplicity Integration technology Data format Data timeliness Data or functionality Asynchronity

	What is Cloud Computing	In a nutshell, cloud computing is a means by which computational power, storage, collaboration infrastructure, business processes and applications can be delivered as a utility, that is, a service or collection of services that meet your demands.
52		In the need of extra processing power, it is available in an instant. No need to invest a lot of hardware to cater for peak usage. This aspect of the cloud is referred to as elasticity and is an extremely important concept within cloud computing.
53	What is Utility Computing?	The nature of utilities such as water, natural gas and electricity in the way they are provided to create an understanding of the characteristics that computing would require if it was truly a utility
54	Grid Computing	The connection and coordination of many separate personal computers (PC) as a grid would facilitate the scaling up of computational resources under the guise of a virtual organization (VO).
55	Concept of Service Orientation	The term service orientation refers to the clear demarcation of a function that operates to satisfy a particular goal. Concept of abstraction, combined with object-oriented principles such as encapsulation and cohesion, that helps define services within an organization. Service-oriented architecture (SOA) utilizes the principle of service orientation to organize the overall technology architecture of an enterprise.
56	Hardware Virtualization	Enabling 'virtual' instances of hardware to execute on disparate physical infrastructure. Virtualization layer allows data centre management to create and instantiate new instances of virtual hardware irrespective of the devices running underneath it. New hardware can be added to the pool of resource and commissioned without affecting the virtualized layer.
57	What is Autonomic Computing	Autonomic computing attempts to specify behaviors that enable the self-management of systems. Self-configuration, self-healing, self-optimizing and self-protection (self-CHOP) are the four principles defined by IBM's autonomic computing initiative.
58	Cloud Computing Service Models	Software as a Service (SaaS) - abstracts the consumer away from any infrastructure or platform level detail, Platform as a Service (PaaS) - ready for applications to be deployed, Infrastructure as a service (IaaS) - virtual infrastructure, operating systems and application software can be deployed
59	Cloud Computing: A definition National Institute of Standards and Technology (NIST)	Cloud computing is a model for enabling ubiquitous, convenient, ondemand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models.
60	Cloud Computing Deployment Models	A public cloud, as its name implies, is available to the general public and is managed by an organization  A private cloud has an exclusive purpose for a particular organization  Community clouds are a model of cloud computing where the resources exist for a number of parties who have a shared interest or cause
61	Infrastructure as a Service	IaaS is about servers, networking and storage delivered as a service Virtualized Form of computing rental where the billing is related to actual usage Suited to organizations who want to retain control over the whole platform and software stack and who need extra infrastructure quickly and cheaply
62	Platform as a Service	PaaS has parallels with web hosting Enables the complete application development life cycle within a cloud Tools for development and testing Resources are dynamically scaled
63	Software as a Service	SaaS is the easiest way into cloud computing The software automatically scales to the number of users, data is backed up SaaS is useful if you are in the situation whereby a legacy application you own has been replicated by a SaaS provider or if a particular SaaS application offers a capability that you don't currently have but can see the business benefit of having it e.g., Customer Relationship Management (CRM)
64	Web Technology for Cloud Computing	HTTP is a key to building cloud systems at low level, each interaction in a cloud application uses HTTP • HEAD which asks the server for information about a resource • PUT which stores data in a resource • POST which sends data to a program to be processed on the server • DELETE which deletes the specified resource HTML, CSS, XML, JSON (JavaScript Object Notation), JavaScript and AJAX, MVC
65	Possible Types of Virtualization	Desktop Virtualization Server Virtualization(Efficiency, Isolation, Mobility) Storage Virtualization



66	Map/Reduce – Cloud Computing Technology	<p>MapReduce is a programming model and an associated implementation for processing and generating big data sets with a parallel, distributed algorithm on a cluster. A MapReduce program is composed of a Map() procedure (method) that performs filtering and sorting (such as sorting students by first name into queues, one queue for each name) and a Reduce() method that performs a summary operation (such as counting the number of students in each queue, yielding name frequencies). The "MapReduce System" (also called "infrastructure" or "framework") orchestrates the processing by marshalling the distributed servers, running the various tasks in parallel, managing all communications and data transfers between the various parts of the system, and providing for redundancy and fault tolerance.</p>
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