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# Describe the steps involved in designing a Gantt chart using MS Project or any other PM software.

**Answer**:

For a Gantt chart, we follow the below steps:

* 1. List the activities or the actions to be taken at a high level.
  2. Each activity should be broken down into each granular level tasks.
  3. Finalize the resources or project members.
  4. Assign each task to one of the projects members or more.
  5. Add the time required for each task
  6. As you create the dependencies, and Auto-schedule option is selected, the timeline would be created automatically, which gives you the completion date.
  7. Add milestones if required.
  8. Format the MS project file as required.
  9. Now the file can be shared among the stakeholders and project members.

# In which phase of the systems development life cycle (SDLC) the project planning typically occur? and In which phase does project management occur?

**Answer**:

Project planning is the first phase of the SDLC. Project planning is about finding the basics; such as the problem that needs to be solved, resources and staff who will be involved, and what will be implemented. By definition, planning is a part of project management. However, project management can also be defined as the detailed level management, which includes breaking down the tasks, assign them to staff and schedule them too. This typically happens after the project plan is created and submitted for approval by the project sponsor.

# What are some of the potential consequences of not assessing technical risks associated with information systems development projects?

**Answer**:

As part of the technical feasibility assessment process, the below risks are analyzed.

1. *Familiarity with the application* – In case of the analysts not having the required amount of experience working on the application or a similar application, there is a chance of misunderstanding the requirement and missing out on the opportunities for improvement. Technical risks are higher in case of a brand-new project than building additional features upon an existing system.
2. *Familiarity with the technology* – This is the most critical requirement for system development. The technology that needs to be used to develop an application must be familiar with the development team. If the technology is new to the development team, it becomes very difficult to innovate using it.
3. *Project size* – Larger projects tend to have more risk, because they are more complicated to manage and because some critical application requirements may get missed or misinterpreted.
4. *Compatibility* – If the new application is not compatible with the existing application, it may give rise to many missing links. For example, if the new application is not compatible with existing downstream systems, the application may become completely ineffective and may require to be rebuilt from scratch.

# How prototyping can be used during the requirements determination?

**Answer**:

The end-users typically know their issues. However, they are not able to visualize what they exactly want to automate or want the new system flow. Creating a prototype:

* helps them visualize what to expect.
* gives an idea about what the system can do, enabling them to add more requirements.
* helps them validate the requirements and identify errors.
* gives the users an idea about system navigation and assess the same.

# How can data-flow diagrams be used as analysis tools?

**Answer**:

Data-flow diagrams represent application parts. It has processes, data sources and external systems. By having a DFD, it helps understand the flow of the entire system and how it moves from one component part to others. The requirement documents can be compared with this visual representation and will help find the gaps between the analysis. It also helps in making sure if the developers are building the right product.

# How can data-flow diagrams be used in a business process redesign?

**Answer**:

When a business process is represented in a data flow diagram with shapes of processes and data sources, it gives a holistic view of the entire process. It can be used to redesign the business process, because

* When each of the processes is analyzed, the inefficiencies can be identified.
* For complex systems, each of the processes can be split into smaller Data flow diagrams to analyze the issues.
* These help to pinpoint the buggy processes in the systems.

Once the issues are found out the systems can be redesigned to fix them.

# What characteristics of data are represented in an E-R diagram?

**Answer**:

An entity-relationship diagram (ERD) is a diagram that graphically represents the relationship between entities. Entities are nothing but tables. These relationships show how the attributes or columns in a table is referenced in another related table. Two entities can have One to One, One to Many, Many to One and Many to Many relationships. These relationships are represented in different ways in an ERD. The “many” side of a relationship is displayed as a crow’s foot.

# List the four types of E-R diagrams produced and analyzed during conceptual data modeling.

**Answer**:

The four ERDs during the conceptual data modeling are:

1. The ERD that covers only the data required by the project's application.
2. The ERD is required when there is a current application and there is a new application that is replacing it.
3. As the databases can be shared and reused by multiple applications, an E-R diagram that is required to represent the whole database from which the new application's data are extracted.
4. Similarly, an ERD that is required to document the whole database design from which the existing application is extracting data and will be used in the replacing system.

# How do analysts generate alternative solutions to information systems problems?

**Answer**:

Generally, the analysts have prior experiences in different fields using various technologies. Based on their previous experiences, they try to analyze the system from their perspective and try to find alternatives and potential failure points. Usually, three ranges of alternatives are generated.

* Low end – Least expensive in terms of cost, time and effort. Sometimes, the analysts may suggest solutions which do not involve any technology at all. Rather, they may use paper flows to make it more efficient and very inexpensive. This may be a minimum viable solution.
* High end – This solution is complete automation and implementation of the requirement. This may go above and beyond the asked requirement and add extra features that what has been asked. This typically is functionality oriented than being cost-oriented.
* Medium end – This is a compromise between the high- and low-end alternatives. This solution may combine the frugality of low-end alternatives with the focus on the functionality of high-end alternatives.

Usually, the minimum requirements for the new system are listed, without which the application cannot be operated or be useless. The extra (nice to have) features are also listed which will be an enhancement to the current requirement. The mandatory solutions are implemented first and depending on the time and budget, the additional features may be built upon.

# Describe the process of designing interfaces and dialogues.  What deliverables are produced from this process?  Are these deliverables the same for all types of system projects?  Why or why not?

**Answer**:

Five steps of designing the user interface.

* 1. DFDs are analyzed which were developed during the analysis phase. Also, users are interviewed to understand the commonly employed patterns of actions.
  2. The interface structure diagram (ISD) is created that displays the basic structure of the user interface, how the systems are connected.
  3. The interface standards are defined, which becomes the basis of interface design elements.
  4. The UI design prototypes are created, such as navigation controls, input/ output pages, reports.
  5. Each of the UI designs is then reviewed by the stakeholders and the end-users for any suggestions for improvement.

The deliverables are the documents with screen elements with example screenshots, descriptions of each element with input validation rules. These documents also contain screen navigation control and output design.

The deliverables differ by types of systems. For example, a website for a restaurant will be different from that of a banking application. So, during the user interface creation, the documents are created keeping the target system type in mind.

# Why is it especially important to eliminate data-entry errors on an electronic commerce Web site?

**Answer**:

In general, data-entry errors must be eliminated in all kinds of websites. However, they are critical in the case of E-commerce websites. Common data entry errors are,

* + - Ambiguous data – For example, if a user id of a customer account is not validated for uniqueness, then merchandise may be delivered to an incorrect customer.
    - Invalid values – Invalid values may lead to wrong or failed transactions.
    - Missing values – An invalid or missing value within a transaction will fail the fulfillment process.
    - Value representation consistency – The use of dropdowns became inevitable to avoid value representation inconsistencies.

# Consider a system that produces inventory reports at any typical small business retailer. Alternatively, consider the system that produces your student academic records for the records office at UMGC. For whichever system you choose, answer these design questions: Who will use the output? What is the purpose of the output? When is the output needed, and when is the information that will be used within the output available? Where does the output need to be delivered? How many people need to view the output?

**Answer**:

For example hardware store inventory reports, here are the answers.

* *Who will use the output?* – The inventory manager needs to keep track of the items that are currently available or back-ordered.
* *What is the purpose of the output?* – The output of this report can be used for ordering the items that are not available or going to be back-ordered soon. Also, this gives the idea of demand and supply of each item in the inventory. If some items are abundantly available, and not being sold soon, the inventory manager can discuss this with the store owner about this and they may decide not to order or order less amount of this specific item in the future.
* *When is the output needed, and when is the information that will be used within the output available?* – This report is needed almost all the time of the operation. Since purchases happen daily and the merchandise flow keeps happening constantly, being on top of the inventory report is very critical.
* *Where does the output need to be delivered*? – The inventory availability report can be a periodical email or a report that can be run on-demand basis. On-demand basis reports are very useful since it gives the real-time status of the inventory items.
* *How many people need to view the output*? – Generally, for a small business, there may be one or two inventory managers are employed. However, this inventory report can be used by the persons who are at the checkout counters of the store, who may need to answer the customers who are enquiring about a certain item.

# What is the purpose of a Relational Database?

**Answer**:

In the early ages of databases, the tables were flat with a large number of rows with many columns with repetitive and redundant values. This made queries take a long time to respond with a result. Managing tables was difficult. Relational databases were introduced to have the data segregated based on their category and requirement. It is a structured form of data storage with established relationships between table to table. The purpose of having a relational database is to,

* Organize the data based on their type.
* Make tables shorter by reducing the repetition and reducing redundancy.
* Make query execution faster.

# What are the four steps in logical database modeling and design?

**Answer**:

Four steps for logical database modeling and design –

1. Use normalization principles to create a logical data model for each user interface input and output in an application.

2. View integration – Create a consolidated database model after gathering all database models from each user interface from step 1.

3. The E-R database models are converted into normalized data requirements. This step does not target a specific user interface.

4. The final logical database model is created using a view integration process comparing the combined logical database design with the E-R diagrams.

# What are the four steps in transforming an E-R diagram into normalized relations?

**Answer**:

The below four steps are followed to convert E-R diagrams to relations.

1. The entity types become relations, with the identifier becomes the primary key and the other column becomes the non-primary key.
2. The relationships should be represented in the database design. The primary key of one table may become a foreign key of another table. That’s how they are related.
3. The repetitive data should be removed. Normalization steps must be followed to reduce the redundancy.
4. The redundant relations should be merged, and the relations should be renormalized to reduce the redundancy.

# List and define the factors that are important to successful implementation efforts.

**Answer**:

The main factors for successful implementation are below:

Thorough analysis and design – The most important part of the SDLC process is to prepare for the actual system development. Sufficient time and effort must be spent to analyze the new requirements and how different it is from the legacy application. The technical design and architecture are critical as well. A badly architected application can have many drawbacks ranging from degraded performance to complete system failure. On the other hand, a well-architected system takes care of both the functional and nonfunctional requirements and also provisions the future extension to the application.

System development with detailed review and quality assurance – An early detection of a bug in the system is extremely cheaper in comparison to a bug found in the later phase of the SDLC process. So, review the process in each phase of the process is necessary and beneficial to the project.

Business contingency plan – For a new system, all the failure points must be factored in before deploying to production. In case of a feature failure, there should be an alternate process created. In case of the complete system failure, a failover system should be kept ready. So, a disaster prevention and recovery plan must be created proactively.

User training – A well-architected application becomes useless if it is not operated as it is intended to. So, users must be trained on how to use the new system. User manuals and guides can be created as well.

# What is the difference between system documentation and user documentation?

**Answer**:

There are two types of documentation. System documentation and user documentation.

*System documentation* – These are nothing but the software requirement specifications (SRS), which the analysts and the development team use to build the system or to maintain it after the application has been deployed. This is created as part of the requirement analysis phase. These documents can also be the data flow diagram documents or even more technical documents.

*User documentation* – These are created to be used by the actual end-user. They are typically user manuals, training manuals, and online help systems. They are created to help the user use the application.

# List and define the various methods of user training.

**Answer**:

Methods of user training:

1. One-on-One training – This is the process that involves a trainer and a trainee. This is the most expensive training program. However, it is necessary in case of different types of users with varying requirements and usage of the system. For small user base size, this process is very important and effective.
2. Classroom training – This is a mass training. This may or may not involve a physical trainer in the classroom. It may be conducted via prerecorded videos or live seminars over the web. The cost and effectiveness of this type of training are moderate.
3. Computer-based training – To create these training may be expensive, however, they are created to be reused for a large number of users.

# Describe the delivery methods many vendors employ for providing support.

**Answer**:

System support is provided after the system installation and during the real-time operation. It can be provided in two ways.

1. Online support – This the most common method of providing support to the users. The user guides and manuals are created for the end-users by the implementation team. These documents normally contain step by step guides and screenshots as needed. Online support can be provided as a web page too, where there may be Frequently Asked Questions (FAQ) sections.
2. Helpdesk support – Many companies employ operation teams who provide in-person support. There may be multiple layers or tiers of support teams. Typically, there will be Level 1 support, which is the direct contact of the end-users. And then Level 2 support who are contacted by the Level 1 team, when something cannot be resolved by the basic guidelines provided to them.

# List the steps in the maintenance process and contrast them with the phases of the systems development life cycle.

**Answer**:

The maintenance processes are handled as part of change requests. The steps in the maintenance process are as follows.

* + The change requests are identified after having some experience in operating the system after installation.
  + The project manager is contacted to review the change request, who involves the system analysts during the initial analysis phase.
  + Design and implementation

*Maintenance process v/s SDLC -* The change request can be of any size. Typically, the minor change requests go through a smaller version of SDLC process. For very minor change requests, one or two phases of SDLC may be skipped. However, the large changes need to go through the same SDLC process starting from feasibility analysis to implementation and installation.