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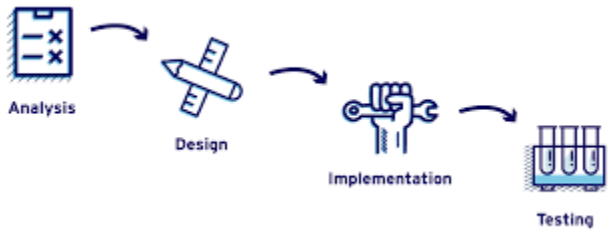
OBJECTIVE: 1. (b) To identify the suitable software development model for the given Scenario.

Background: SDLC or the Software Development Life Cycle is **a process that produces software with the highest quality and lowest cost in the shortest time possible**. SDLC provides a well-structured flow of phases that help an organization to quickly produce high-quality software which is well-tested and ready for production use.

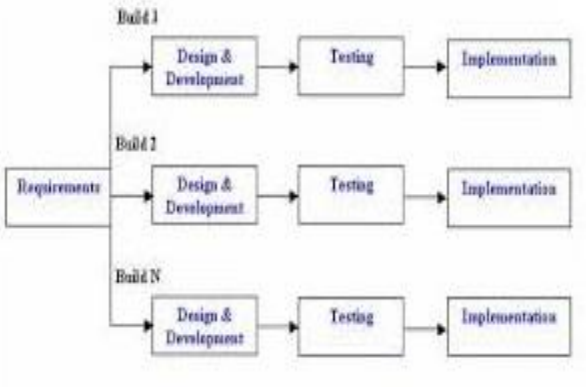
Problem Description: In the context of this background, identify the SDLC and give one real time software as an example.

1. Case Study for Model:1

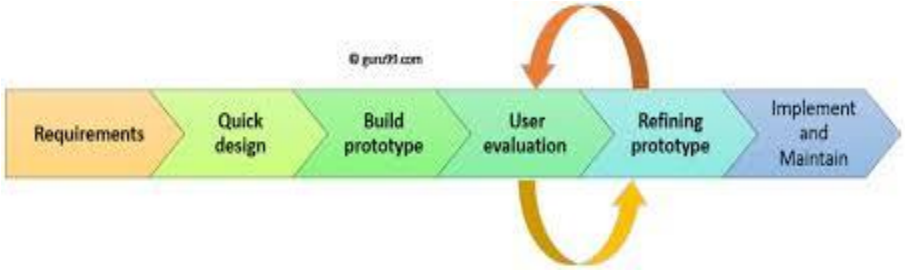


2. Case Study for Model:2

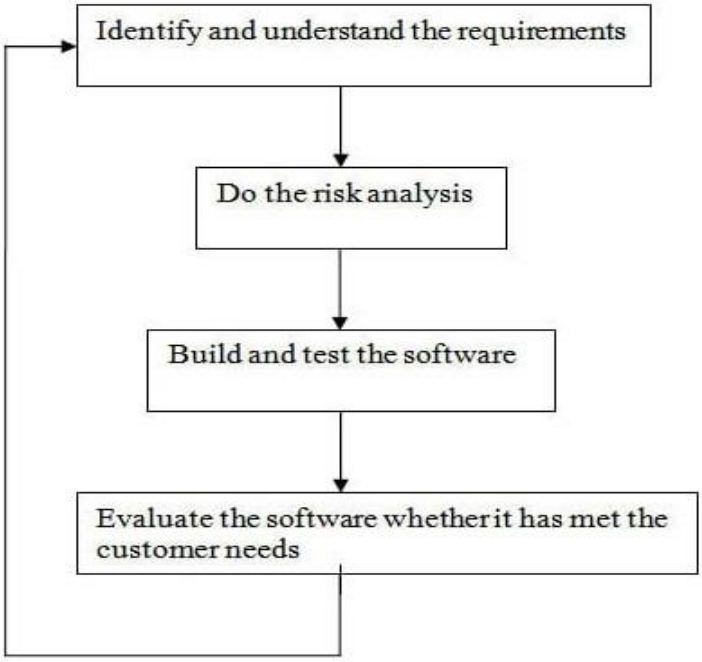
3. Case Study for Model:3



4. Case Study for Model:4



5. Case Study for Model:5



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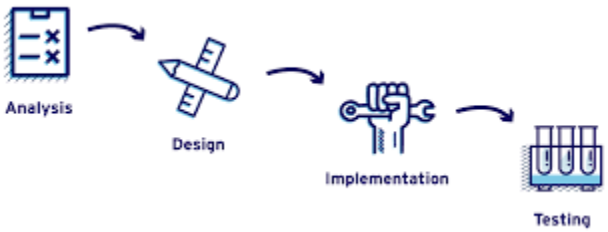
Case Study 1:



WATERFALL MODEL

When it is used:

- This model is used only when the requirements are very well known, clear and fixed.
- Product definition is stable.
- Technology is understood.
- There are no ambiguous requirements
- Ample resources with required expertise are available freely
- The project is short.

Advantages:

- Simple and easy to understand and use
- Easy to manage due to the rigidity of the model. Each phase has specific deliverables and a review process.
- Phases are processed and completed one at a time.
- Works well for smaller projects where requirements are very well understood.
- Clearly defined stages.
- Well understood milestones.
- Process and results are well documented.

Disadvantages:

- No working software is produced until late during the life cycle.
- High amounts of risk and uncertainty.
- Not a good model for complex and object-oriented projects.

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Case Study 2:

SCRUM METHEDOLOGY

When it is used:

- When requirements are not clearly defined
- When the probability of changes during the development is high
- When there is a need to test the solution
- When the product owner (PO) is fully available
- When the team has self-management skills
- When contracting is time and materials
- When the client's culture is open to innovation and adapts to change

Advantages:

- Scrum can help teams complete project deliverables quickly and efficiently
- Scrum ensures effective use of time and money
- Large projects are divided into easily manageable sprints
- Developments are coded and tested during the sprint review
- Works well for fast-moving development projects
- The team gets clear visibility through scrum meetings
- Scrum, being agile, adopts feedback from customers and stakeholders
- Short sprints enable changes based on feedback a lot more easily

Disadvantages:

- Scrum often leads to scope creep, due to the lack of a definite end-date
- The chances of project failure are high if individuals aren't very committed or cooperative
- Adopting the Scrum framework in large teams is challenging
- The framework can be successful only with experienced team members
- Daily meetings sometimes frustrate team members

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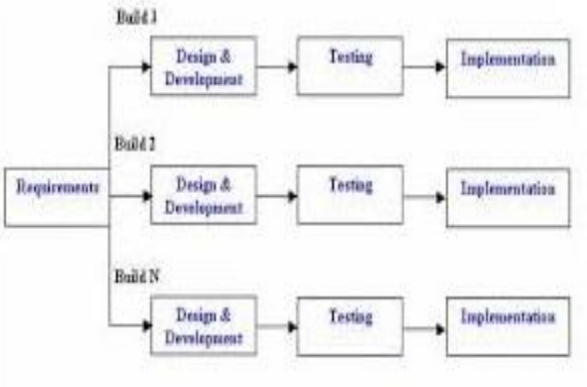
Case Study 3:



INCREMENTAL MODEL

When it is used:

- This model can be used when the requirements of the complete system are clearly defined and understood.
- Major requirements must be defined; however, some details can evolve with time.
- There is a need to get a product to the market early.
- A new technology is being used
- Resources with needed skill set are not available
- There are some high-risk features and goals.

Advantages:

- Generates working software quickly and early during the software life cycle.
- This model is more flexible – less costly to change scope and requirements.
- It is easier to test and debug during a smaller iteration.
- In this model customer can respond to each built.
- Lowers initial delivery cost.
- Easier to manage risk because risky pieces are identified and handled during it'd iteration.

Disadvantages:

- Needs good planning and design.
- Needs a clear and complete definition of the whole system before it can be broken down and built incrementally.
- Total cost is higher than waterfall.

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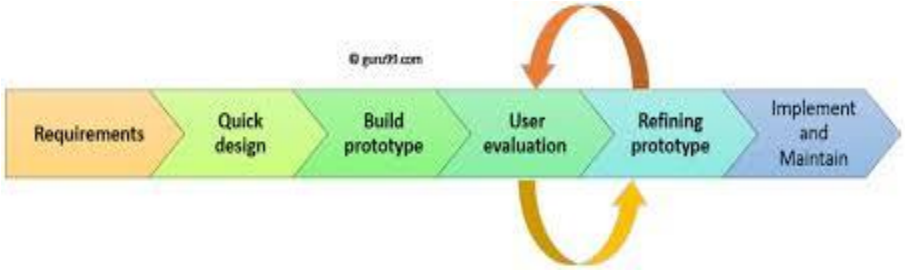
Case Study 4:



PROTOTYPE MODEL

When it is used:

- Whenever the customer is new to the software industry or when he doesn't know how to give the requirements to the company.
- When the developers are new to the domain.

Advantages:

- This model is flexible in design.
- It is easy to detect errors.
- We can find missing functionality easily.
- There is scope of refinement, it means new requirements can be easily accommodated.
- It can be reused by the developer for more complicated projects in the future.
- It ensures a greater level of customer satisfaction and comfort.
- It is ideal for online system.
- It helps developers and users both understand the system better.
- Integration requirements are very well understood and deployment channels are decided at a very early stage.
- It can actively involve users in the development phase.

Disadvantages:

- This model is costly.
- It has poor documentation because of continuously changing customer requirements.
- There may be too much variation in requirements.
- Customers sometimes demand the actual product to be delivered soon after seeing an early prototype.

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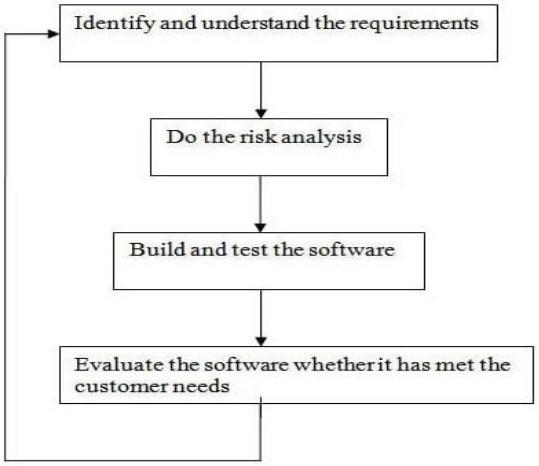
Case Study 5:



SPIRAL MODEL

When it is used:

- A Spiral model in software engineering is used when project is large
- When releases are required to be frequent, spiral methodology is used
- When creation of a prototype is applicable
- When risk and costs evaluation is important

Advantages:

- Software is produced early in the software life cycle.
- Risk handling is one of important advantages of the Spiral model, it is best development model to follow due to the risk analysis and risk handling at every phase.
- It is good for large and complex projects.
- Strong approval and documentation control.
- It is suitable for high-risk projects, where business needs may be unstable. A highly customized product can be developed using this.

Disadvantages:

- It is not suitable for small projects as it is expensive.
- It is much more complex than other SDLC models. Process is complex.
- Too much dependable on Risk Analysis and requires highly specific expertise.
- Difficulty in time management. As the number of phases is unknown at the start of the project, so time estimation is very difficult.

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