Week 1LabI

1. Describe the process and characteristics of building a house following the waterfall way of working. Describe the advantages and disadvantages of building a house this way

The Waterfall model follows a **linear and sequential approach** where each phase is completed before moving to the next.

Steps include:

* **Requirements Gathering** – Define house specifications (size, materials, budget).
* **Design** – Create architectural blueprints.
* **Construction Planning** – Detailed scheduling, budgeting, and permits.
* **Foundation & Structure** – Laying the foundation, framing, walls, and roofing.
* **Finishing** – Plumbing, electrical, painting, flooring.
* **Inspection & Handover** – Ensure compliance and handover to the owner.

**Advantages:**  
Clear structure and well-documented phases.  
Easier to manage large projects with strict requirements.  
Predictable costs and timelines.

**Disadvantages:**  
No flexibility; changes are difficult to implement.  
Late detection of issues, leading to costly fixes.  
Slow process; delays in one phase delay the entire project.

2. Describe the process and characteristics of building a house following the RUP way of working. Describe the advantages and disadvantages of building a house this way.

RUP follows an **iterative and incremental** approach, breaking the project into cycles:

* **Inception** – High-level requirements, feasibility studies.
* **Elaboration** – Refined blueprints, budget adjustments.
* **Construction** – Iterative building (e.g., finishing sections before the entire house is done).
* **Transition** – Final inspections and modifications based on feedback.

**Advantages:**  
Allows adjustments and refinements during construction.  
Risks are identified early due to iterations.  
Ensures stakeholder involvement throughout.

**Disadvantages:**  
Requires more management overhead.  
Can lead to scope creep if requirements keep changing.  
Might result in inconsistent progress if phases are not well-managed.

3. Describe the process and characteristics of building a house following the SCRUM way of working. Describe the advantages and disadvantages of building a house this way.

Scrum is an **agile methodology** where work is done in short, iterative cycles (sprints).

Steps:

* **Backlog Creation** – List all features (foundation, walls, roofing, plumbing).
* **Sprint Planning** – Prioritize tasks for each sprint (e.g., complete roofing in 2 weeks).
* **Development (Sprints)** – Construct in small increments, get feedback.
* **Review & Adjust** – Inspect work, adjust based on feedback.
* **Finalization & Deployment** – Deliver the finished house.

**Advantages:**  
High flexibility to incorporate changes.  
Continuous stakeholder feedback ensures satisfaction.  
Issues are identified early and resolved quickly.

**Disadvantages:**  
Difficult to predict exact timelines and costs.  
Requires high collaboration and involvement from stakeholders.  
Risk of incomplete documentation.

4. Describe how devOps is different from other software development methods. What are the advantages and disadvantages of devops.

Unlike traditional methods, DevOps integrates **development (Dev) and operations (Ops)** to enable continuous integration, continuous deployment (CI/CD), and automation. This ensures faster software delivery and updates, and faster release cycles as the developers are closely working with the operations team.

**Advantages:**  
Faster software delivery and updates.  
Fewer bugs due to continuous testing.  
Better scalability and reliability.

**Disadvantages:**  
Requires significant investment in tools and skills.  
More complex setup with cultural shifts in teams.  
Security risks due to rapid releases.

5. What kind of projects can be best done using the waterfall way of working? What kind of projects can be best done using the RUP way of working? What kind of projects can be best done using the SCRUM way of working? What kind of projects can be best done using the devops way of working?

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| **Methodology** | **Best For** |
| **Waterfall** | Large, well-defined projects like government contracts, bridges, and structured applications (e.g., banking systems). |
| **RUP** | Complex, evolving systems like large-scale software, enterprise solutions, and product lines requiring continuous refinement. |
| **Scrum** | Fast-changing projects like startups, mobile apps, and software requiring frequent updates. |
| **DevOps** | Continuous software services like cloud applications, web platforms, and high-demand services (e.g., e-commerce, streaming). |

6. What are the characteristics of documentation in a software project? How do you think we should document our software system: extended and detailed documentation or only small overview documents. What are the consequences or problems of your choice and how can we manage these problems?

**Characteristics of Documentation:**

* Requirements documentation
* Design documentation
* API and code documentation
* User manuals
* Maintenance and deployment guides

**Approach: Extended vs. Minimal Documentation**

**Extended & Detailed Documentation**

* Useful for large, complex systems.
* Helps onboarding new developers.
* Requires time and effort, might become outdated.

**My choice is minimal documentation (Overview Only)**

* Faster development with focus on coding.
* Easier to maintain.
* Difficult for new team members to understand the system.

**Managing the Consequences of minimal document**

* Use **automated documentation tools** (e.g., Swagger for APIs).
* Keep **critical documentation up-to-date** while minimizing unnecessary details.
* Maintain **living documentation** with wikis or version control.