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**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 is a sequential, linear process of project management. Following this process during building a house will consists of several discrete phases. No phase begins until the prior phase is complete.

**Phase 1. Requirement gathering and Documentation**

* Information gathering + documentation

Homeowner goals, needs and requirements are discussed with the architect. The architect visits the site, reviews the existing condition of the piece of land and takes as-built measurements of what is there.

* A surveyor visits the site and produces a site survey report.

**Phase 2. Design**

* Building plans. A set of as-built plans are created, and a copy is given to the homeowner for their records.

**Phase 3. Implementation**

The documents and drawings for the project are now complete and construction begins. The construction crew will prepare construction site and pour foundation.

* Complete Rough Framing
  + Floor System, Walls, Roof Systems Are Completed
* Complete Rough Plumbing, Electrical HVAC
  + Pipes and Wires
  + Sewer Lines and Vents
  + Water Supply Lines
  + Bathtubs, Shower Units
  + Ductwork for HVAC System
  + HVAC Vent Pipes

**Phase 4. Test**

**Inspection -** When the everything is complete; the building owner visits the site to make sure everything is working fine.

**Phase 5. Maintenance**

**Roles**

* Architect
* Surveyor
* Site Engineer
* Mansions
* Electricians
* Plumber
* Carpenter

**Artifacts**

* House
* Building Plans
* Survey Documents
* Electrical Wiring plans
* Site Survey Plans

**Advantages**

* Better for Management

**Disadvantages**

* Document driven
* Requirements are frozen
* Project status is not clear
* No cross discipline learning
* The customer is only involved at the beginning of the project
* Lot of Different roles
* The house can only be used at the end of the project
* Not much possibility for feedback and improvement
* No feedback only get feedback when the buyer of the house has keys and enters the house is when you can get feedback.
* There is not time for testing
* Risks mistakes very late in the 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**

The Rational Unified model builds the house as parts iteratively and incrementally so house owner can give feedback as each part is completed. This feedback makes the next the iteration process better.

The artifacts will be identified, best practices, what needs to be done, who needs to do what and how it is going to be done.

The RUP has 4 phases and has the same many different roles as the waterfall model, it is document driven and the customer is outside of the project.

**Phase 1. Inception**

The scope of the building project is decided

Initial cost and budget estimates made.

**Phase 2. Elaboration**

Building Plan designs are made here

**Phase 3. Construction**

Construction of the building starts in iterations based on the use cases.

**Phase 4. Transition**

Use case is moved from construction to completion and used by the building owner.

**Use Cases**

Examples of building use cases are bathroom, kitchen, bedrooms, living room, garage, basement, study room etc.

**User Stories**

For the bathroom can be

* the shower
* bathtub
* lights
* mirror
* sink

**Advantages of RUP**

* It forces integration to happen throughout the software development, more specifically in the construction phase.
* It allows you to deal with changing requirements regardless of whether they are coming from the customer or from the project itself.

**Disadvantages of RUP**

* It mostly relies on the ability of experts and professionals to assign the activities to individuals who should then produce pre-planned results in the form of artifacts.
* The integration in development process can also have an adverse impact on some more fundamental activities during the stages of testing
* It is a rather complex method which makes its implementation challenging, particularly for smaller businesses, teams or projects.

**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**

The building owner will meet with the builders and discuss their dream home. They talk about the property to build on, the number of bedrooms, bathrooms, and the number of cars they would like to be able to fit into the garage. And, also talk about the quality of the finishes, the flooring and how they want the yard landscaped.

After that, the building owner meets with the architect. They become very specific about the room layout, the number of floors, the layout of the basement, and the placement of the house on the lot.

After breakdown of the features or attributes of the building into smaller components to be built in a specific period of time (Sprints). These parts will be prioritized based on e.g. cost, importance etc.

The result will be a blueprint and elevation for the house. A line item budget for construction costs, material costs and miscellaneous tools and supplies. Every line item represented some feature or attribute of the house that the building owner would care about when the house was complete.

**Scrum Roles**

The Scrum Team consists of the Building Owner, the Development Team and the Scrum Master. The team is self-organized and cross-functional.

**Scrum Artifacts**

* **The Product Backlog**

Prioritized list of different Items (e.g. creating floor plans, defining the fire protection concept, designing load bearing elements). Each Item is divided into Tasks and represents a simple and detailed description of what needs to be done by the Development Team.

* **The Sprint Backlog**

Contains a number of Items which are selected by the Product Owner and the Development Team from the Product Backlog. This list (i.e. Sprint Backlog) contains the Items that the Development Team believes can reach the state of done during a Sprint.

**Scrum Events**

A Kick-Off meeting is held – based on the client’s demands – and the Product Owner creates the Product Backlog to fulfil this demand.

**Advantages of SCRUM**

* many meetings enable single members to see the point of view of other team members and start to understand why something is done in a certain way.
* Increased speed
* We get different perspectives
* Improved innovation

**Disadvantages of SCRUM**

* No clear project leadership
* A lot of time is needed for hiring the Development Team as the team is held accountable

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

DevOps is a software development method which focuses on communication, integration, and collaboration among IT professionals to enables rapid deployment of products. DevOps is a culture that promotes collaboration between Development and Operations Team.

**Advantages of DevOps**

* Reduced chance of product failure
* Increase productivity of business and IT teams
* Save costs on maintenance and upgrades, and eliminate unnecessary capital expenditure
* Improve quality, reliability and reusability of all system components
* Clear product vision within the team.

**Disadvantages of DevOps**

* **Transition Challenges (Both Technical and Organizational):** Dealing with legacy systems and re-building your applications to implement microservices architecture or moving them to the cloud is probably what stops most businesses from adopting DevOps.
* **Lack of Talent:** DevOps specialists with hands-on experience are hard to find.

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

* Really small projects in scope
* Simple projects with steady and very well-known requirements.

**What kind of projects can be best done using the RUP way of working?**

* Projects with small/limited changes in the future

**What kind of projects can be best done using the SCRUM way of working?**

* Large and complexity software development projects
* Projects with lots of changes.
* No clear definition project.
* Project that require rapid development.

**What kind of projects can be best done using the devops way of working?**

* Projects that are end-to-end business solution and require fast delivery.
* Projects are scalable

**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?**

The characteristics of documentation in a software project are

* They explain product functionality, unify project-related information, and allow for discussing all significant questions arising between stakeholders and developers.
* Use of different documents at the different stages of the project to explanation what the software project is about, does and problem it addresses.
* Use of diagrams to represent and communicate abstract ideas and to the team

I feel we should use small overview documents to document our software system.

Small overview document are very simple and short. To manage this we need to make the documents to contain just enough information to fulfill its purpose.