The Software Development Process

And Standard Methodologies

Software Development Process

Software Engineering- the process of creating methods, principles and techniques to engineer and build large software systems

Software Development- The process of taking the idea in the clients head to a concrete system.

Software Development Process- The method of breaking down the complex tasks into smaller steps that can be handled individually.

Phases of Software Development Process

1. Requirements Engineering
2. Design
3. Implementation
4. Verify and Validate
5. Maintain Code

Tools of the Trade

IDE- Integrated Development Environment (NetBeans)

VCS- Version Control System(GitHub)

Coverage and Verification Tools

Requirements Engineering

The process of establishing the needs of stakeholders that will be solved by software.

1. **elicitation-** collection of requirements
2. **Analysis-** study and understanding of requirements
3. **Specification-** represented, organized and saved
4. **Validated-** make sure they are complete and not redundant
5. **Management-** Changes of requirements during lifecycle

Design

The design phase consists of design activities

1. **Architectural**
2. **Abstract specification**
3. **Interface design**
4. **Component Design**
5. **Data Structure**
6. **Algorithm Design**

Implementation

Realizing the design of the software.

1. **Reduction of complexity**

2. **Anticipation of diversity**

3. **Structuring for validation (testability)**

4. **Use of (external or internal) standards**

Verifications and Validation

Validation: Did we build the right system?

Verification: Did we build the system right?

Unit Level Testing

Integration Level Testing

System Testing

Maintenance

After the software has been rolled out.

Environment change, feature requests, bug reports

Corrective Maintenance- eliminate problems with code

Perfective Maintenance- make software better, accommodate requests

Adaptive Maintenance- take care of environment changes

Methodologies

Waterfall – Good for stable product definition where requirements are known.

Software concept, requirements analysis, architectural design, detailed design, coding and debugging, system testing.

Spiral- Changes are incremental, less risk

Determine objectives, identify and resolve risks, development and tests, plan the next iteration

Evolutionary Prototyping- allows for immediate feedback

Initial concept, design and implement prototype, refine prototype, complete and release prototype

Rational Unified Process-

Inception, elaboration, construction, transition

Agile-Test Driven Development

Write test phases(fails), make enough code to pass, refactor(modify for readability), start the cycle again

Choose a Model

1. **Requirements (How hard to collect)**
2. **Expected lifetime (How long)**
3. **Risk (level of risk)**
4. **Schedule Constraints (How quickly roll out)**
5. **Interaction (How much with client)**
6. **Expertise of People (Know technologies, know process)**

RESOURCES

Methodology List:

Udacity Free Software Development Process Course Training Course

Wikipedia Definition