Software Projects

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01 Introduction

Activities Common to Software Projects

- Requirements and specification
- Design
- Modeling
- Programming
- Quality assurance
- Deployment
- Managing software configuration
- Managing the process

02

Descriptions

Requirements and Specification

- It is important to, first, understand the problems, the customer's business environment, and the available technology which can be used to solve the problems
- After that, meet with the customers and users to decide on a course of action that will solve the problems (development or modification)
- Then decide in detail what facilitates the software should provide
- Involved activities: domain analysis, defining the problem, requirement gathering, requirement analysis, requirement specification (pp. 16-17)
- Important principle of requirement is to separate the 'what' from the 'how' – i.e. requirements from design and implementation

Design

- Design is the process of deciding how the requirements should be implemented using the available technology
- Some of the important activities during design: system engineering, determining the software architecture, detailed designs, user interface design, etc.
- For large systems, software engineers work on architectural design in conjunction with high-level requirements to effectively divide the system into subsystems
- For small systems, requirement precede design to avoid re-doing the design if requirements change

Modeling

- Modeling is the process of creating a representation of the domain or the software
- Various modeling approaches can be used during both requirements analysis and design.
- e.g. Use case, structural, and dynamic/ behavioural modeling
- Modeling can be performed visually, using diagrams, or else using semi-formal or formal languages that express the information in a systematically or mathematically.
- e.g. UML with a semi-formal notation & diagrams

Programming

- It involves the translation of higher-level designs into particular programming languages
- The final stage of design since it involves making decisions about the appropriate constructs, variable declarations, etc.
- Programmers: people who do higher-design activities and programming
- Coders: perform only programming with no design
- Research is done on automating programming, e.g. code generators. However there will still be a need for manual programming

Quality Assurance (QA)

- QA encompasses all the processes needed to ensure that the quality objectives discussed in Section 1.5 are met
- Occurs throughout the project
- Involved activities: reviews and inspection, and testing
- Validation and Verification (V & V)
  - Validation: the process of determining whether the requirements will solve the customer's problem
  - Verification: the process of making sure the requirements have been adhered to

Other activities

- Deployment: involves distributing and installing the software and any other components of the system such as databases, special hardware, etc.
- Managing software configurations: involves identifying all the components that compose a software system, including files containing requirements, design, and source code.
- Managing the Process: managers lead the other activities, and undertake the following task:
  - Estimating the cost of the system
  - Planning
  - Periodically Revising the expected estimates and planning