Requirements Partial Two

Software Process

- Coping with change
  - *Change is inevitable in al large software projects.
    *Change leads to rework so the cost of change include both rework as well as the costs of implementing new functionality.
  - Reducing the costs of rework
    *Change anticipation, where the software process includes activities that can anticipate possible changes before significant rework is required
    *Change tolerance, where the process is designed so that changes can be accommodated at relatively low cost
  - Software prototyping
    a prototype is an initial version of a system used to demonstrate concepts and try out design options.
    - Benefits mof sprototyping
      - Improved system usability
      - A closer match to users real needs
      - Improved deign quality
      - Improved maintainability
      - Reduced developmenth effort
    - Prototype development
      - may be based on rapid prototyping languages or tools
      - May involve leaving out functionality
        - Prototype should focus on areas of the product that are not well-understood
        - Error checking and recovery may not be included in do prototype
        - Focus on functional rather than non functional requirements such as reliability and security
      - Three-away prototypes
        - Prototypes should be discarded after development as they are not a good basis for a production system
        - It may be impossible to tune the system to meet non functional requirements
        - Prototypes are normally undocumented
        - The prototype structure is usually degraded trough rapid change
        - The prototype probably will not meet normal organisational quality standards
- Process activities
  - Software specification
    - The process of establishing what services are required and the constrains on the system's operation and development
    - Requirements engineering process:
      *Requirements elicitation and analysis
      *Requirements specificcation
      *Requirements validation
  - Software design and implementation
    - *The process of converting the system specification into an executable system
      *Software design
      *Implementation
      *The activities of design and implementation are closely related and may be inter-leaved
  - Testing
    - Testing stages
      *Component testing
      *System testing
      *Customer testing
  - Software evolution
    - Software is inherently and can change

Software process models

- A software process model is an abstract representation of a process. It presents a description of a process from some particular perspective
  - The waterfall model:
    this takes the fundamental process activities of specification, development, validation, and evolution and represents them separate process phases such as requirements specification, software design, implementation, and testing.
    - Phases:
      -Requirements definition
      -System and software design
      -Implementation and Unit testing
      -Integration and system testing
      -Operation and maintenance
    - Problems:
      this model is only appropriate when the requirements are well understood and changes will be fairly limited during the design process
  - Incremental development:
    Specification, development and validation are interleaved. May be plan-driven or agil
    - Incremental development benefits
      -The cost of accommodating changing customer requirements is reduced
      -It is easier to get customer feedback on the development work that has been done
      -More rapid delivery and deployment of useful software to the customer is possible
    - Incremental development problems
      -The process is not visible
      -System structure tends to degrade as new increments are added
  - Integration and configuration:
    The system is assembled from existing configurable components. May be plan-driven or agile.
    Based on software reuse where systems are integrated from existing components or application systems.

Process improvement

- The process improvement cycle
  - Measure
    - You measure one or more attributes of the software process or product
  - Analyse
    - The current process is assessed, and process weaknesses and bottlenecks are identified
  - Change
    - Process changes are proposed to address some of the identified process weaknesses
- Approaches to improvement
  - The process maturity approach,which focuses on improving process and project management and introducing good software
  - The agile approach,which focuses on iterative development and the reduction of overheads in the software process
- Many software companies have turned to software process improvement as a way of enhancing the quality of their software

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