Object Oriented System Analysis and Design

Chapter 1

Outline

Chapter I

System Development:

1. Introduction to Information System development.
2. System development methodologies, / Software life cycle and process model and phase
3. Problem Identification, Selection and Planning Phase:
    1. Problem identification
    2. Problem definition:
    3. Prioritizing problems
    4. Project initiation and planning
    5. Planning tools and techniques
    6. Gantt and PERT
4. The human side of systems

Outline

Chapter II

Object Orientation the new software paradigm

1. The potential benefits of object orientation
2. The potential drawbacks of object orientation
3. Object standards
4. The object orientation process and models

Outline

Chapter III

Understanding the Basics of OO concepts

3.1.OO concepts from structured point of view

3.2.Abstraction, Encapsulation, information hiding

3.3.Inheritance

3.4.Association

3.5.Aggregation

3.6.Collaboration

3.12.Component

3.13.Patterns

3.7.Persistence

3.8.Coupling

3.9.Cohesion

3.10.Polymorphism

3.11.Interfaces

Outline

Chapter IV

Gathering user requirements

1. Putting together requirements gathering team
2. Fundamental requirements gathering techniques
    1. Essential Use Case Modeling
    2. Essential User Interface Prototyping
    3. Domain modeling
    4. Developing a supplementary Specification
    5. Identifying Change Cases
3. Requirement validation Techniques
    1. Testing Early and Often
    2. Use Case Scenario Testing

Outline

Chapter V

Determining What to Build: OO Analysis

1. System Use Case Modeling
2. Sequence Diagrams:
3. Conceptual Modeling:
4. Activity diagramming
5. User interface
6. Applying Analysis patterns Effectively
7. User Documentation
8. Organizing your models with packages

Outline

Chapter VI

How to Build Your System: OO Design

1. Layering your models: Class Type Architecture
2. Class Modeling
3. Applying Design Patterns Effectively
4. State chart modeling
5. Collaboration Modeling
6. Component Modeling
7. Deployment Modeling
8. Rational Persistence Modeling
9. User Interface Design

Outline

Chapter VII

Object Oriented Testing and Maintenance

1. An overview of testing
   - 7.1.1. Testing concepts
   - 7.1.2. Testing activities
   - 7.1.3. Managing testing
   - 7.1.4. Impact of object-oriented testing
   - 7.1.5. Types of Testing
2. Types & procedures of system maintenance;
3. Post installation follow-up

Assessment

Chapter VII

Assessment Forms	%
Assignment 1- Project work (Proposal)	10
Assignment 2- Project work (analysis and design part)	10
Quiz	5
Midterm exam	25
Final examination	50

System Development

Introduction

- Systems development is the art and science of creating man-made systems to satisfy predetermined customer needs
- It is the process of defining, designing, implementing , and testing(evaluation), a new software application or program.
- It consists of six important stages:
  - System survey,
  - Needs analysis,
  - Design,
  - Implementation, including the database creation
  - Testing,
  - Change and maintenance.

System Development

SDLC

- SDLC is a systematic process for building software that ensures the quality and correctness of the software built.
- It consists of a detailed plan which explains how to plan, build, and maintain specific software.
- Every phase of the SDLC life Cycle has its own process and deliverables that feed into the next phase.
- Prime reasons why SDLC is important for developing a software system is:
  - Offers a basis for planning, scheduling, and guessing
  - Provides a framework for a standard set of activities and deliverables
  - It is a mechanism for project tracking and control
  - Increased and enhance development speed

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 1: Requirement collection and analysis
- Phase 2: Feasibility study
- Phase 3: Design
- Phase 4: Coding or implementation
- Phase 5: Testing
- Phase 6: Installation/Deployment
- Phase 7: Maintenance and upgrade

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 1: Requirement collection and analysis
  - Requirements elicitation (also known as Requirements Gathering or Capture) is the process of generating a list of requirements (functional, system, technical, etc.) from the various stakeholders (customers, users, vendors, IT staff, etc.) that will be used as the basis for the formal Requirements Definition.
  - Or :-
    - the process of determining user expectations for a new or modified product.
    - is a set of operations that helps define users' expectations of the application you are building or modifying.
    - analysis involves defining, analyzing, validating, and aligning stakeholders' expectations for new projects while considering all
    - It is conducted by the senior team members with inputs from all the stakeholders and domain experts in the industry.
    - is a process that determines as well as documents and manages the needs and requirements of the stakeholders to meet the objectives
    - It gives a clearer picture of the scope of the entire project and the anticipated issues, opportunities, and directives which triggered the project.

System Development

SDLC Phases

- The entire SDLC process divided into the following SDLC steps:

- Phase 2: Feasibility study
  - A feasibility study is an assessment of the practicality of a project or system. A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing business.
  - A feasibility study is an evaluation and analysis of a project or system that somebody has proposed.
  - is to define and document software needs or SRS(software requirement specification)

System Development

SDLC Phases

- The entire SDLC process divided into the following SDLC steps:

- Phase 2: Feasibility study
  - Common types of feasibilities checks:
    - Economic: Can we complete the project within the budget or not?
    - Operation feasibility: Can we create operations which is expected by the client?
    - Technical: Need to check whether the current computer system can support the software
    - Schedule: Decide that the project can be completed within the given schedule or not.

System Development

SDLC Phases

- The entire SDLC process divided into the following SDLC steps:

- Phase 3: Design
  - The system and software design documents are prepared as per the requirement specification document.
  - There are two kinds of design documents
  - High-Level Design (HLD)
    - It may contain
      - Brief description and name of each module
      - An outline about the functionality of every module
      - Interface relationship and dependencies between modules
      - Database tables identified along with their key elements
      - Complete architecture diagrams along with technology details

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 3: Design
  - The system and software design documents are prepared as per the requirement specification document.
  - There are two kinds of design documents
  - Low-Level Design (LLD)
    - It may contain
      - Functional logic of the modules
      - Database tables, which include type and size
      - Complete detail of the interface
      - Addresses all types of dependency issues
      - Listing of error messages
      - Complete input and outputs for every module

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 4: Coding
  - Developers start build the entire system by writing code using chosen programming language tools like compiler, interpreters, debugger to generate and implement the code.

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 5: Testing
  - The testing team test the functionality of the entire system.
  - This is done to verify that the entire application works according to the customer requirement.
  - testing team may find some bugs/defects which they communicate to developers.
  - The development team fixes the bug and send back to re-test.
  - This process continues until the software is bug-free, stable, and working according to the business needs of that system.

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 6: Installation/Deployment
  - Is a process of installing software, setting configurations or creating customizations
  - Based on the feedback given by the project manager, the final software is released and checked for deployment issues if any.

System Development

SDLC Phases

- The entire SDLC process divided into the following steps:

- Phase 7: Maintenance
  - Once the system is deployed, and customers start using the developed system, following 3 activities occur
    - Bug fixing – bugs are reported because of some scenarios which are not tested at all
    - Upgrade – Upgrading the application to the newer versions of the Software
    - Enhancement – Adding some new features into the existing software

System Development

Popular SDLC Models-Reading Assignment

A. Waterfall model
B. Iterative Model
C. V-Model
D. Agile Model
E. Big bang model

System Development

Problem Identification

- Is the development of clear, straightforward problem statements that can be linked directly with the specific goals and objectives
- Developing a detailed problem statement that includes the problem's consequence
- A clearly specified list of problems is the most suitable basis for identifying potential solutions.
- Consists of clearly identifying the root cause of a problem.

System Development

Assignment

- Problem Identification, Selection and Planning Phase:
  - Problem identification
  - problem definition
  - prioritizing problems
  - project initiation and planning
  - planning tools and techniques
  - Gantt& PERT