# Software Development Life Cycle (SDLC) Phases

## Introduction

The Software Development Life Cycle (SDLC) is a structured approach to software development, outlining a series of steps and phases that guide the development process from initial concept to final deployment and maintenance. Each phase in the SDLC is crucial for ensuring that the software meets the required specifications, is of high quality, and is delivered on time and within budget. The key phases in the SDLC are as follows:

# Software Development Life Cycle (SDLC) Phases

## Planning

Objective: Define the project goals, scope, and constraints.

Activities: Requirement gathering, feasibility analysis, project scheduling, resource allocation, risk management, and stakeholder communication planning.

Outcome: Project plan, feasibility report, and initial project requirements.

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## Requirements Analysis

Objective: Understand and document the exact requirements of the software.

Activities: Elicitation, analysis, specification, validation, and documentation of functional and non-functional requirements.

Outcome: Requirement Specification Document (RSD), which serves as a guide for the subsequent phases.

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## Design

Objective: Create the architecture and detailed design of the software.

Activities: System design, architectural design, detailed design, design reviews, and prototyping.

Outcome: Design documents, including system architecture, data models, interface designs, and detailed specifications.

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## Implementation (Coding)

Objective: Transform the design documents into executable code.

Activities: Writing code, unit testing, code review, and integration.

Outcome: Source code, executable programs, and unit test results.

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## Testing

Objective: Verify that the software meets the specified requirements and is free of defects.

Activities: Test planning, test case development, system testing, integration testing, performance testing, and defect tracking.

Outcome: Test reports, defect logs, and a validated software product.

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## Deployment

Objective: Release the software to the production environment for use.

Activities: Deployment planning, installation, configuration, user training, and transition to the production environment.

Outcome: Deployed software, deployment plan, and user manuals.

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## Maintenance

Objective: Ensure the software continues to function correctly and efficiently over time.

Activities: Monitoring, bug fixing, updates, enhancements, and performance optimization.

Outcome: Updated software, maintenance reports, and improved system performance.

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## Evaluation

Objective: Assess the success of the project and identify lessons learned.

Activities: Post-implementation review, user feedback collection, performance evaluation, and documentation of lessons learned.

Outcome: Evaluation report, user satisfaction survey results, and recommendations for future projects.

## Software Development Life Cycle (SDLC) Phases

### Key Concepts in Each Phase

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Planning:

- Feasibility Study

- Project Charter

- Risk Assessment

Requirements Analysis:

- Use Case Diagrams

- User Stories

- Requirement Traceability Matrix (RTM)

Design:

- UML Diagrams

- Prototypes

- Design Patterns

Implementation:

- Source Code Management

- Integrated Development Environment (IDE)

- Continuous Integration (CI)

Testing:

- Test Automation

- Regression Testing

- User Acceptance Testing (UAT)

Deployment:

- Deployment Automation

- Rollback Plan

- Production Monitoring

Maintenance:

- Bug Tracking Systems
- Patch Management
- SLA Management

Evaluation:

- Post-Mortem Analysis
- Key Performance Indicators (KPIs)
- Feedback Loops