

Software Engineering

Lab Manual

**Software Engineering**  
BE(comp)  
VII semester

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**Lab Assignment 1**

<b>Title</b>	<b>Studying Various phases of Water-Fall Model</b>
<b>Objective</b>	To get familiar with basic model used for software engineering.
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	Knowledge of → <b>Characteristics of software.</b> → <b>process,project.</b>
<b>Theory</b>	It is a process model also called as “classic life cycle”, which has 5 phases:- <ul style="list-style-type: none"> <li>● Requirement gathering</li> <li>● Requirement analysis</li> <li>● Design</li> <li>● Coding</li> <li>● Testing and maintenance</li> </ul>

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<b>Sample Output</b>	A document in which all the phases are explained in detail.
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Explain the spiral model and give its advantages over waterfall model?</li> <li>2. Compare waterfall and Spiral model.</li> <li>3. Discuss Prototyping model.</li> </ol>

### Lab Assignment 2

<b>Title</b>	<b>Prepare SRS for Banking or On line book store domain problem.</b>
<b>Objective</b>	To get familiar with preparing a document which is used before starting the project.
<b>References</b>	<p>Software Engineering Roger Pressman McGraw Hill Fifth edition          Software Engineering Ian Somerville Pearson Education Sixth edition          An Integrated Approach To Software Engineering Pankaj Jalote Narosa</p>
<b>Pre-requisite</b>	Knowledge of → <b>Various process models.</b> → <b>keys.</b>
<b>Theory</b>	<p>The Software requirements specification is produced as culmination of the analysis task which contains:-</p> <ol style="list-style-type: none"> <li>1. Introduction                  Goal &amp; Objectives of Software</li> <li>2. Information Description                  Problem Description                  Information Flow                  Hardware Interface</li> <li>3. Functional Description                  Process Narrative for each function</li> <li>4. Design Constraints                  Performance Characteristics                  Behavioral Description                  Validation Criteria</li> </ol> <p>Appendix- I: Description of Executable Prototype</p>
<b>Sample Output</b>	A SRS document which contains detailed information about each of the point specified above.

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<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. What is meant by software requirement definition ? Elaborate on its importance</li> <li>2. Explain various steps involved in Requirement Engineering ?</li> </ol>
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### Lab Assignment 3

<b>Title</b>	<b>Using COCOMO model estimate effort for Banking or On line book store domain problem</b>
<b>Objective</b>	To get familiar with estimation and comparing various estimation techniques.
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	Knowledge of <b>→estimation techniques.</b>
<b>Theory</b>	<p>COCOMO is an open model, which includes</p> <ul style="list-style-type: none"> <li>● The underlying cost estimation equations,</li> <li>● Every assumption made in the model,</li> <li>● Every definition,</li> <li>● The costs included in an estimate are explicitly stated.</li> </ul> <p>The most fundamental calculation in the COCOMO model is the use of the Effort Equation to estimate the number of Person-Months required to develop a project.</p> <p>The COCOMO II model makes its estimates of required effort (measured in Person-Months <math>i_c^{1/2}</math> PM) based primarily on your estimate of the software project's size</p> $\text{Effort} = 2.94 * \text{EAF} * (\text{KSLOC})^E$ <p>Where,</p> <p>EAF Is the Effort Adjustment Factor derived from the Cost Drivers E Is an exponent derived from the five Scale Drivers</p> $\text{Duration} = 3.67 * (\text{Effort})^{SE}$
<b>Sample Output</b>	<p>Effort (E) <math>\text{Effort} = a_b(\text{KLOC})^b = 1.54</math></p> <p>Duration (D) <math>\text{Duration} = c_b(\text{E})^d = 2.94</math></p>
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Describe project metrics.</li> <li>2. Compare FP-based and LOC-based estimation technique.</li> </ol>

### Lab Assignment 4

<b>Title</b>	<b>Calculate effort using FP oriented estimation model.</b>
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<b>Objective</b>	To study software estimation in early stages of software development.
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	<b>Knowledge of</b> <b>→project metrics and software measurement.</b>
<b>Theory</b>	1. Compute the count-total which will be used to define the complexity of a project. (count_total)  2. Find the complexity adjustment values based on responses to the 14 questions ( $\sum Fi$ )  3. $FP = \text{count\_total} [0.65 + 0.01 * \sum Fi]$
<b>Sample Output</b>	count_total=462 , $\sum Fi=53.17$ $FP = \text{count\_total} [0.65 + 0.01 * \sum Fi]$ $FP = 462 * (0.65 + 0.01 * 53.17)$ $FP = 546$
<b>Post Lab Assignment</b>	1. Explain Metrics for small organizations? 2. Explain Metrics for software quality?

<b>Lab Assignment 5</b>	
<b>Title</b>	<b>Analyze the Risk related to the project and prepare RMMM plan.</b>
<b>Objective</b>	To study types of risk and preparing RMMM plan.
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	Knowledge of <b>→software Analysis.</b> <b>→Risk analysis.</b>

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<b>Theory</b>	<p>Risk analysis and management are a series steps that help a software team to understand uncertainty.</p> <p>Types of Risks</p> <ol style="list-style-type: none"> <li>1. Technical risks.</li> <li>2. Business risks.</li> <li>3. Project risks.</li> </ol>				
<b>Sample Output</b>	<b>Risk table</b>				
	risk id	Category	Probability	Criticality	RMMM
	1	TE	0.7	2	1
	2	BU	0.4	3	2
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Explain Risk Identification?</li> <li>2. Explain various risk strategies?</li> </ol>				

<b>Lab Assignment 6</b>	
<b>Title</b>	<b>Develop Time-line chart and project table using PERT or CPM project scheduling methods.</b>
<b>Objective</b>	To study project scheduling and tracking
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	Knowledge of → <b>Project and project scheduling.</b> → <b>Task set for the software project.</b> → <b>Adaptation criteria.</b>

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<b>Theory</b>	<p>PERT and CPM are project scheduling methods that can be applied to software development. Both techniques are driven by information already developed in earlier project planning activities:</p> <ol style="list-style-type: none"> <li>1. estimates of effort.</li> <li>2. A decomposition of the product function.</li> <li>3. The selection of the appropriate process model and task set .</li> <li>4. Decomposition of tasks.</li> </ol> <p>When creating a software project schedule, the planner begins with a set of tasks(the work breakdown structure).</p>
<b>Sample Output</b>	Time-line chart and work breakdown structure is prepared.
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Explain degree of Rigor?</li> <li>2. Explain various Adaptation Criteria?</li> </ol>

<b>Lab Assignment 7</b>	
<b>Title</b>	<b>Draw E-R diagram,DFD,CFD and STD for the project.</b>
<b>Objective</b>	To understand actual system using analysis model.
<b>References</b>	<p>Software Engineering Roger Pressman McGraw Hill Fifth edition            Software Engineering Ian Somerville Pearson Education Sixth edition            An Integrated Approach To Software Engineering Pankaj Jalote Narosa</p>
<b>Pre-requisite</b>	<p><b>Knowledge of</b></p> <p><b>→Analysis model-data modeling, functional modeling and behavioral model.</b></p>
<b>Theory</b>	<p>Analysis model is first technical representation of the system. This model consists of data dictionary as its core, then followed by three diagrams E-R diagrams, data flow diagram, and state-transition diagram. All these diagrams are part of functional model.</p>

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<b>Sample Output</b>	E-R diagram, data-flow diagram, state-transition diagram for the project.
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Explain data modeling?</li> <li>2. Compare Hatley and Pirabhai extensions and Ward and Mellor Extensions?</li> </ol>
<b>Lab Assignment 8</b>	
<b>Title</b>	<b>Design of the test cases.</b>
<b>Objective</b>	To understand various testing techniques.
<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	<b>Knowledge of</b> <b>→ Various Testing strategies</b>
<b>Theory</b>	Testing begins “in the small” and progresses “to the large”. The early testing focuses on a single component and applies white- and black-box tests to uncover errors in program logic and function. After individual components are tested they must be integrated. Testing continues as the software is constructed. Finally, a series of high order tests are executed once the full program is operational.
<b>Sample Output</b>	Unit testing Regression testing Integration testing Validation Testing system testing
<b>Post Lab Assignment</b>	<ol style="list-style-type: none"> <li>1. Compare testing and debugging?</li> <li>2. Explain various system testing?</li> </ol>

<b>Lab Assignment 9</b>	
<b>Title</b>	<b>Prepare FTR. version control and change control for software configuration items.</b>
<b>Objective</b>	To understand Software configuration management

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<b>References</b>	Software Engineering Roger Pressman McGraw Hill Fifth edition Software Engineering Ian Somerville Pearson Education Sixth edition An Integrated Approach To Software Engineering Pankaj Jalote Narosa
<b>Pre-requisite</b>	Knowledge of <b>→Software configuration management</b>
<b>Theory</b>	FTR-formal technical review serves as a training ground , enabling junior engineer to observe different approaches to software analysis. Version control-It combines procedures and tools to manage different versions of configuration objects that are created during software process Change control-It is a formal process used to ensure a product services or process is only modifies in line when identified necessary change.
<b>Sample Output</b>	A document which contain software configuration items,details of change control and version control with respect to software configuration management.
<b>Post Lab Assignment</b>	<b>1. Explain software configuration management with baselines SCIs?</b> <b>2. Explain Identification of objects in the software configuration?</b>