

**SAVITRIBAI PHULE PUNE UNIVERSITY**

**A PRELIMINARY PROJECT REPORT ON**

**BE PROJECT TITLE**

SUBMITTED TOWARDS THE  
PARTIAL FULFILLMENT OF THE REQUIREMENTS OF

**BACHELOR OF ENGINEERING (Computer Engineering)**

**BY**

Animesh Karnewar

Exam No:

Chinmay Sawant

Exam No:

Student Name

Exam No:

Student Name

Exam No:

**Under The Guidance of**

Prof. Guide Name

College Logo Here

**DEPARTMENT OF COMPUTER ENGINEERING**

**College Name**

**College Address**

College Logo Here

**College Name**  
**DEPARTMENT OF COMPUTER ENGINEERING**

**CERTIFICATE**

This is to certify that the Project Entitled

**BE PROJECT TITLE**

Submitted by

Student Name	Exam No:
Student Name	Exam No:
Student Name	Exam No:
Student Name	Exam No:

is a bonafide work carried out by Students under the supervision of Prof. Guide Name and it is submitted towards the partial fulfillment of the requirement of Bachelor of Engineering (Computer Engineering) Project.

Prof. Guide Name  
Internal Guide  
Dept. of Computer Engg.

Prof. HOD Name  
H.O.D  
Dept. of Computer Engg.

## **Abstract**

Please Write here One Page Abstract. It should mainly include introduction, motivation, outcome and innovation if any.

## Acknowledgments

Please Write here Acknowledgment.Example given as

*It gives us great pleasure in presenting the preliminary project report on ‘**BE PROJECT TITLE**’.*

*I would like to take this opportunity to thank my internal guide **Prof. Guide Name** for giving me all the help and guidance I needed. I am really grateful to them for their kind support. Their valuable suggestions were very helpful.*

*I am also grateful to **Prof. HOD Name**, Head of Computer Engineering Department, **CollegeName** for his indispensable support, suggestions.*

*In the end our special thanks to **Other Person Name** for providing various resources such as laboratory with all needed software platforms, continuous Internet connection, for Our Project.*

Student Name1  
Student Name2  
Student Name3  
Student Name4  
(B.E. Computer Engg.)

# INDEX

<b>1</b>	<b>Synopsis</b>	<b>1</b>
1.1	Project Title . . . . .	2
1.2	Project Option . . . . .	2
1.3	Internal Guide . . . . .	2
1.4	Sponsorship and External Guide . . . . .	2
1.5	Technical Keywords (As per ACM Keywords) . . . . .	2
1.6	Problem Statement . . . . .	2
1.7	Abstract . . . . .	3
1.8	Goals and Objectives . . . . .	3
1.9	Relevant mathematics associated with the Project . . . . .	3
1.10	Names of Conferences / Journals where papers can be published . .	3
1.11	Review of Conference/Journal Papers supporting Project idea . . . .	4
1.12	Plan of Project Execution . . . . .	4
<b>2</b>	<b>Technical Keywords</b>	<b>5</b>
2.1	Area of Project . . . . .	6
2.2	Technical Keywords . . . . .	6
<b>3</b>	<b>Introduction</b>	<b>7</b>
3.1	Project Idea . . . . .	8
3.2	Motivation of the Project . . . . .	8
3.3	Literature Survey . . . . .	8
<b>4</b>	<b>Problem Definition and scope</b>	<b>9</b>
4.1	Problem Statement . . . . .	10

4.1.1	Goals and objectives . . . . .	10
4.1.2	Statement of scope . . . . .	10
4.2	Software context . . . . .	10
4.3	Major Constraints . . . . .	10
4.4	Methodologies of Problem solving and efficiency issues . . . . .	10
4.5	Scenario in which multi-core, Embedded and Distributed Computing used . . . . .	11
4.6	Outcome . . . . .	11
4.7	Applications . . . . .	11
4.8	Hardware Resources Required . . . . .	11
4.9	Software Resources Required . . . . .	11
<b>5</b>	<b>Project Plan</b>	<b>12</b>
5.1	Project Estimates . . . . .	13
5.1.1	Reconciled Estimates . . . . .	13
5.1.2	Project Resources . . . . .	13
5.2	Risk Management w.r.t. NP Hard analysis . . . . .	13
5.2.1	Risk Identification . . . . .	13
5.2.2	Risk Analysis . . . . .	14
5.2.3	Overview of Risk Mitigation, Monitoring, Management . .	15
5.3	Project Schedule . . . . .	15
5.3.1	Project task set . . . . .	15
5.3.2	Task network . . . . .	16
5.3.3	Timeline Chart . . . . .	16
5.4	Team Organization . . . . .	16
5.4.1	Team structure . . . . .	16
5.4.2	Management reporting and communication . . . . .	16
<b>6</b>	<b>Software requirement specification (SRS is to be prepared using relevant mathematics derived and software engg. Indicators in Annex A and B)</b>	<b>17</b>
6.1	Introduction . . . . .	18
6.1.1	Purpose and Scope of Document . . . . .	18

6.1.2	Overview of responsibilities of Developer . . . . .	18
6.2	Usage Scenario . . . . .	18
6.2.1	User profiles . . . . .	18
6.2.2	Use-cases . . . . .	18
6.2.3	Use Case View . . . . .	18
6.3	Data Model and Description . . . . .	19
6.3.1	Data Description . . . . .	19
6.3.2	Data objects and Relationships . . . . .	19
6.4	Functional Model and Description . . . . .	19
6.4.1	Data Flow Diagram . . . . .	20
6.4.2	Description of functions . . . . .	20
6.4.3	Activity Diagram: . . . . .	21
6.4.4	Non Functional Requirements: . . . . .	21
6.4.5	State Diagram: . . . . .	21
6.4.6	Design Constraints . . . . .	21
6.4.7	Software Interface Description . . . . .	21
<b>7</b>	<b>Detailed Design Document using Appendix A and B</b>	<b>23</b>
7.1	Introduction . . . . .	24
7.2	Architectural Design . . . . .	24
7.3	Data design (using Appendices A and B) . . . . .	24
7.3.1	Internal software data structure . . . . .	24
7.3.2	Global data structure . . . . .	25
7.3.3	Temporary data structure . . . . .	25
7.3.4	Database description . . . . .	25
7.4	Component Design . . . . .	25
7.4.1	Class Diagram . . . . .	25
<b>8</b>	<b>Summary and Conclusion</b>	<b>27</b>
<b>9</b>	<b>References</b>	<b>29</b>

<b>Annexure A Laboratory assignments on Project Analysis of Algorithmic Design</b>	<b>31</b>
<b>Annexure B Laboratory assignments on Project Quality and Reliability Testing of Project Design</b>	<b>33</b>
<b>Annexure C Project Planner</b>	<b>35</b>
<b>Annexure D Reviewers Comments of Paper Submitted</b>	<b>37</b>
<b>Annexure E Plagiarism Report</b>	<b>39</b>



# List of Figures

6.1	Use case diagram . . . . .	19
6.2	Activity diagram . . . . .	20
6.3	State transition diagram . . . . .	22
7.1	Architecture diagram . . . . .	24
7.2	Class Diagram . . . . .	26

# List of Tables

4.1	Hardware Requirements . . . . .	11
5.1	Risk Table . . . . .	14
5.2	Risk Probability definitions [1] . . . . .	14
5.3	Risk Impact definitions [1] . . . . .	14
6.1	Use Cases . . . . .	18
A.1	IDEA Matrix . . . . .	32

# **CHAPTER 1**

## **SYNOPSIS**

**PROJECT TITLE**

BE Project Title

**PROJECT OPTION**

Please mention type either industry sponsored, entrepreneur or internal project

**INTERNAL GUIDE**

Prof. Internal Guide Name

**SPONSORSHIP AND EXTERNAL GUIDE**

Please write if any sponsorship

**TECHNICAL KEYWORDS (AS PER ACM KEYWORDS)**

Please note ACM Keywords can be found : <http://www.acm.org/about/class/ccs98->  
html

Example is given as

1. C. Computer Systems Organization
  - (a) C.2 COMPUTER-COMMUNICATION NETWORKS
    - i. C.2.4 Distributed Systems
      - A. Client/server
      - B. Distributed applications
      - C. Distributed databases
      - D. Network operating systems
      - E. Distributed file systems
      - F. Security and reliability issues in distributed applications

**PROBLEM STATEMENT**

Define Problem Statement

## **ABSTRACT**

- Abstract (10 to 15 lines)

## **GOALS AND OBJECTIVES**

- Objectives

## **RELEVANT MATHEMATICS ASSOCIATED WITH THE PROJECT**

System Description:

- Input:
- Output:
- Identify data structures, classes, divide and conquer strategies to exploit distributed/parallel/concurrent processing, constraints.
- Functions : Identify Objects, Morphisms, Overloading in functions, Functional relations
- Mathematical formulation if possible
- Success Conditions:
- Failure Conditions:

## **NAMES OF CONFERENCES / JOURNALS WHERE PAPERS CAN BE PUBLISHED**

- IEEE/ACM Conference/Journal 1
- Conferences/workshops in IITs
- Central Universities or SPPU Conferences
- IEEE/ACM Conference/Journal 2

## **REVIEW OF CONFERENCE/JOURNAL PAPERS SUPPORTING PROJECT IDEA**

Atleast 10 papers + White papers or web references

Brief literature survey [ Description containing important description of at least 10 papers

## **PLAN OF PROJECT EXECUTION**

Using planner or alike project management tool.

## **CHAPTER 2**

### **TECHNICAL KEYWORDS**

## **AREA OF PROJECT**

Project Area

## **TECHNICAL KEYWORDS**

Please note ACM Keywords can be found : <http://www.acm.org/about/class/ccs98.html>

Example is given as

1. C. Computer Systems Organization
  - (a) C.2 COMPUTER-COMMUNICATION NETWORKS
    - i. C.2.4 Distributed Systems
      - A. Client/server
      - B. Distributed applications
      - C. Distributed databases
      - D. Network operating systems
      - E. Distributed file systems
      - F. Security and reliability issues in distributed applications



## **CHAPTER 3**

### **INTRODUCTION**

## **PROJECT IDEA**

- Project Idea

## **MOTIVATION OF THE PROJECT**

- Motivation of the Project

## **LITERATURE SURVEY**

- Review of the papers, Description , Mathematical Terms

## **CHAPTER 4**

### **PROBLEM DEFINITION AND SCOPE**

## **PROBLEM STATEMENT**

Description of Problem

### **Goals and objectives**

Goal and Objectives:

- Overall goals and objectives of software, input and output description with necessary syntax, format etc are described

### **Statement of scope**

- A description of the software with Size of input, bounds on input, input validation, input dependency, i/o state diagram, Major inputs, and outputs are described without regard to implementation detail.
- The scope identifies what the product is and is not, what it will and wont do, what it will and wont contain.

## **SOFTWARE CONTEXT**

- The business or product line context or application of the software is to be given

## **MAJOR CONSTRAINTS**

- Any constraints that will impact the manner in which the software is to be specified, designed, implemented or tested are noted here.

## **METHODOLOGIES OF PROBLEM SOLVING AND EFFICIENCY ISSUES**

- The single problem can be solved by different solutions. This considers the performance parameters for each approach. Thus considers the efficiency issues.

## **SCENARIO IN WHICH MULTI-CORE, EMBEDDED AND DISTRIBUTED COMPUTING USED**

Explain the scenario in which multi-core, embedded and distributed computing methodology can be applied.

### **OUTCOME**

- Outcome of the project

### **APPLICATIONS**

- Applications of Project

### **HARDWARE RESOURCES REQUIRED**

Sr. No.	Parameter	Minimum Requirement	Justification
1	CPU Speed	2 GHz	Remark Required
2	RAM	3 GB	Remark Required

Table 4.1: Hardware Requirements

### **SOFTWARE RESOURCES REQUIRED**

Platform :

1. Operating System:
2. IDE:
3. Programming Language

# **CHAPTER 5**

## **PROJECT PLAN**

## **PROJECT ESTIMATES**

Use Waterfall model and associated streams derived from assignments 1,2, 3, 4 and 5( Annex A and B) for estimation.

### **Reconciled Estimates**

Cost Estimate

Time Estimates

### **Project Resources**

Project resources [People, Hardware, Software, Tools and other resources] based on Memory Sharing, IPC, and Concurrency derived using appendices to be referred.

## **RISK MANAGEMENT W.R.T. NP HARD ANALYSIS**

This section discusses Project risks and the approach to managing them.

### **Risk Identification**

For risks identification, review of scope document, requirements specifications and schedule is done. Answers to questionnaire revealed some risks. Each risk is categorized as per the categories mentioned in [1]. Please refer table 5.1 for all the risks. You can refered following risk identification questionnaire.

1. Have top software and customer managers formally committed to support the project?
2. Are end-users enthusiastically committed to the project and the system/product to be built?
3. Are requirements fully understood by the software engineering team and its customers?
4. Have customers been involved fully in the definition of requirements?
5. Do end-users have realistic expectations?

6. Does the software engineering team have the right mix of skills?
7. Are project requirements stable?
8. Is the number of people on the project team adequate to do the job?
9. Do all customer/user constituencies agree on the importance of the project and on the requirements for the system/product to be built?

### Risk Analysis

The risks for the Project can be analyzed within the constraints of time and quality

ID	Risk Description	Probability	Impact		
			Schedule	Quality	Overall
1	Description 1	Low	Low	High	High
2	Description 2	Low	Low	High	High

Table 5.1: Risk Table

Probability	Value	Description
High	Probability of occurrence is	> 75%
Medium	Probability of occurrence is	26 – 75%
Low	Probability of occurrence is	< 25%

Table 5.2: Risk Probability definitions [1]

Impact	Value	Description
Very high	> 10%	Schedule impact or Unacceptable quality
High	5 – 10%	Schedule impact or Some parts of the project have low quality
Medium	< 5%	Schedule impact or Barely noticeable degradation in quality Low Impact on schedule or Quality can be incorporated

Table 5.3: Risk Impact definitions [1]



## Overview of Risk Mitigation, Monitoring, Management

Following are the details for each risk.

Risk ID	1
Risk Description	Description 1
Category	Development Environment.
Source	Software requirement Specification document.
Probability	Low
Impact	High
Response	Mitigate
Strategy	Strategy
Risk Status	Occurred

Risk ID	2
Risk Description	Description 2
Category	Requirements
Source	Software Design Specification documentation review.
Probability	Low
Impact	High
Response	Mitigate
Strategy	Better testing will resolve this issue.
Risk Status	Identified

## PROJECT SCHEDULE

### Project task set

Major Tasks in the Project stages are:

- Task 1:
- Task 2:
- Task 3:

Risk ID	3
Risk Description	Description 3
Category	Technology
Source	This was identified during early development and testing.
Probability	Low
Impact	Very High
Response	Accept
Strategy	Example Running Service Registry behind proxy balancer
Risk Status	Identified

- Task 4:
- Task 5:

### **Task network**

Project tasks and their dependencies are noted in this diagrammatic form.

### **Timeline Chart**

A project timeline chart is presented. This may include a time line for the entire project. Above points should be covered in Project Planner as Annex C and you can mention here Please refer Annex C for the planner

### **TEAM ORGANIZATION**

The manner in which staff is organized and the mechanisms for reporting are noted.

#### **Team structure**

The team structure for the project is identified. Roles are defined.

#### **Management reporting and communication**

Mechanisms for progress reporting and inter/intra team communication are identified as per assessment sheet and lab time table.

## **CHAPTER 6**

**SOFTWARE REQUIREMENT  
SPECIFICATION (SRS IS TO BE  
PREPARED USING RELEVANT  
MATHEMATICS DERIVED AND  
SOFTWARE ENGG. INDICATORS IN  
ANNEX A AND B)**

## **INTRODUCTION**

### **Purpose and Scope of Document**

The purpose of SRS and what it covers is to be stated

### **Overview of responsibilities of Developer**

What all activities carried out by developer?

## **USAGE SCENARIO**

This section provides various usage scenarios for the system to be developed.

### **User profiles**

The profiles of all user categories are described here.(Actors and their Description)

### **Use-cases**

All use-cases for the software are presented. Description of all main Use cases using use case template is to be provided.

Sr No.	Use Case	Description	Actors	Assumptions
1	Use Case 1	Description	Actors	Assumption

Table 6.1: Use Cases

### **Use Case View**

Use Case Diagram. Example is given below

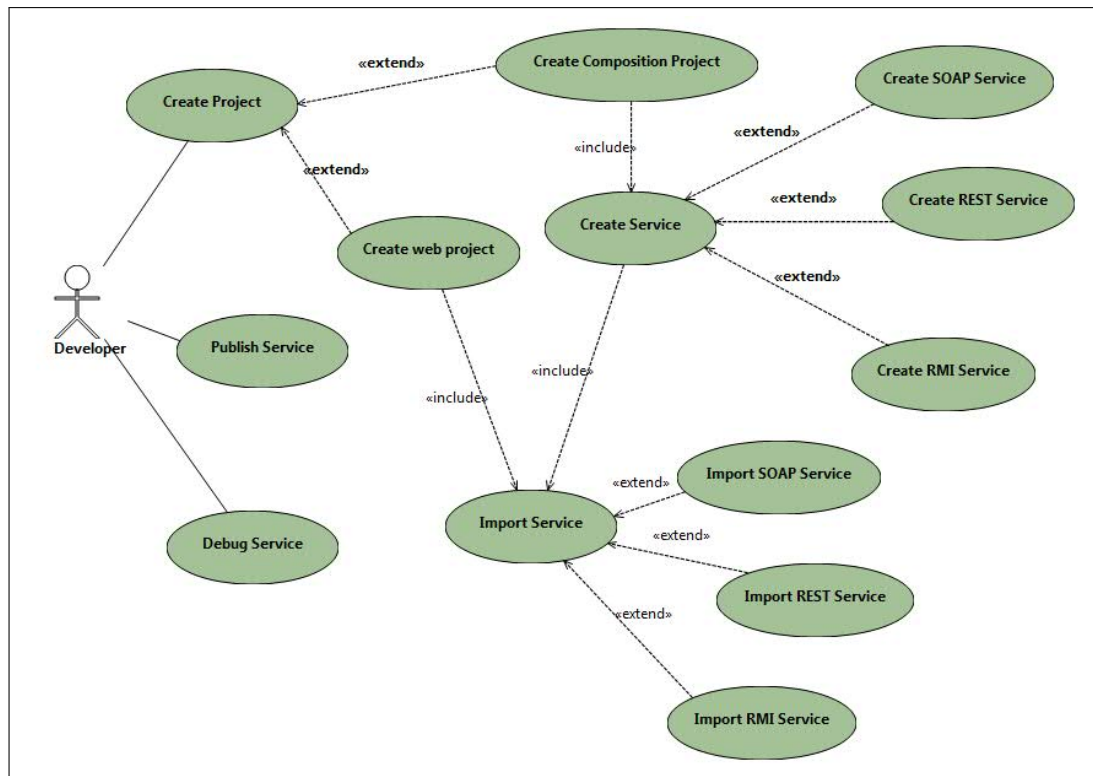


Figure 6.1: Use case diagram

## DATA MODEL AND DESCRIPTION

### Data Description

Data objects that will be managed/manipulated by the software are described in this section. The database entities or files or data structures required to be described. For data objects details can be given as below

### Data objects and Relationships

Data objects and their major attributes and relationships among data objects are described using an ERD- like form.

## FUNCTIONAL MODEL AND DESCRIPTION

A description of each major software function, along with data flow (structured analysis) or class hierarchy (Analysis Class diagram with class description for object oriented system) is presented.

## Data Flow Diagram

Level 0 Data Flow Diagram

Level 1 Data Flow Diagram

## Description of functions

A description of each software function is presented. A processing narrative for function n is presented.(Steps)/ Activity Diagrams. For Example Refer 6.2

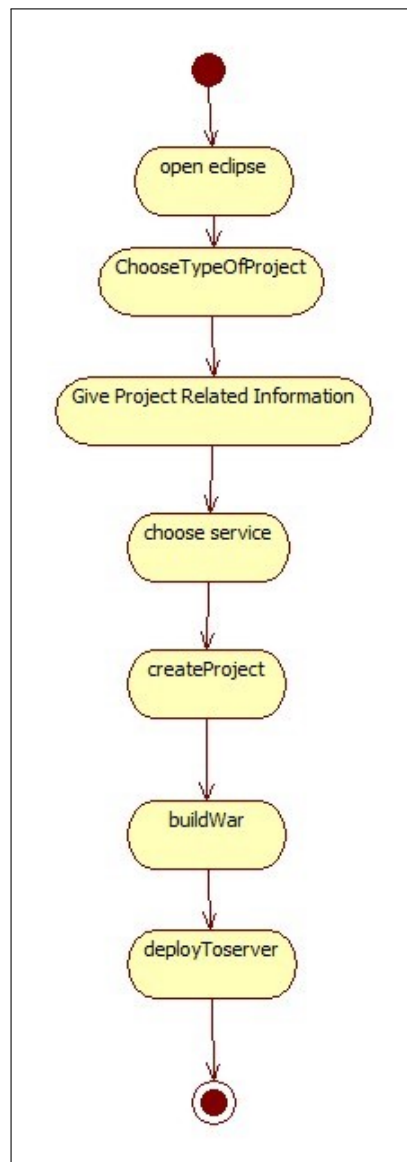


Figure 6.2: Activity diagram

**Activity Diagram:**

- The Activity diagram represents the steps taken.

**Non Functional Requirements:**

- Interface Requirements
- Performance Requirements
- Software quality attributes such as availability [ related to Reliability], modifiability [includes portability, reusability, scalability] , performance, security, testability and usability[includes self adaptability and user adaptability]

**State Diagram:****State Transition Diagram**

Fig.6.3 example shows the state transition diagram of Cloud SDK. The states are represented in ovals and state of system gets changed when certain events occur. The transitions from one state to the other are represented by arrows. The Figure shows important states and events that occur while creating new project.

**Design Constraints**

Any design constraints that will impact the subsystem are noted.

**Software Interface Description**

The software interface(s) to the outside world is(are) described. The requirements for interfaces to other devices/systems/networks/human are stated.

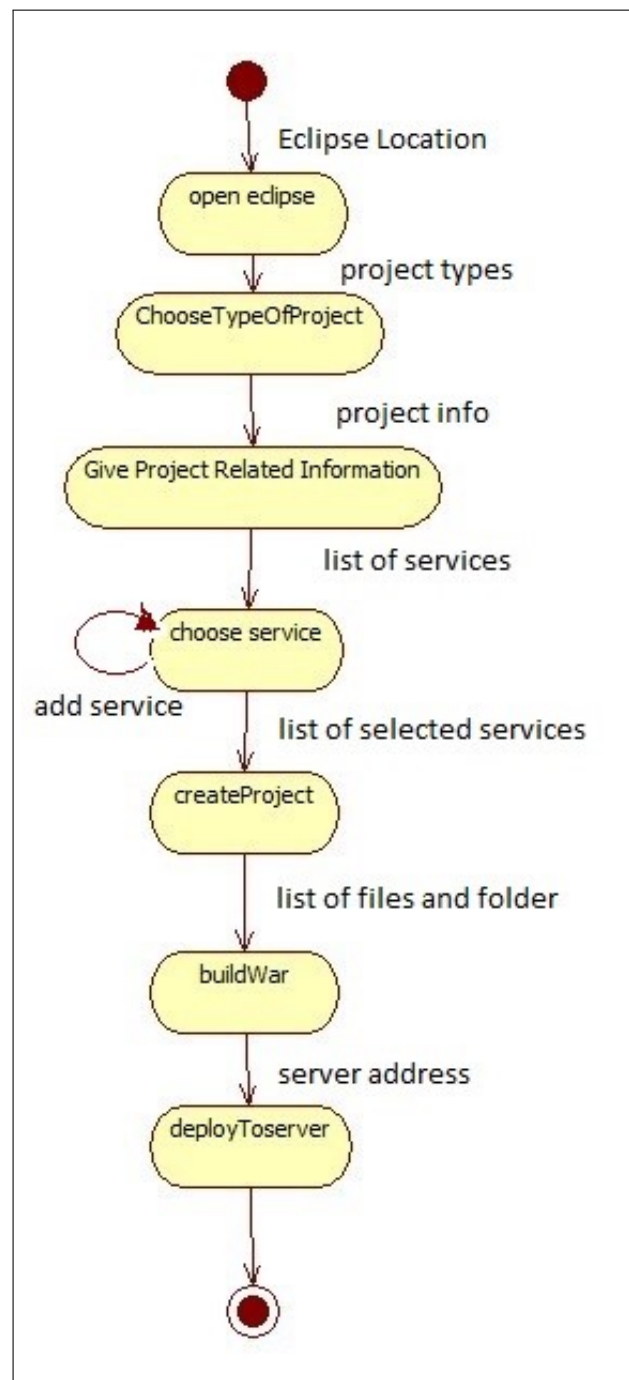


Figure 6.3: State transition diagram



**CHAPTER 7**

**DETAILED DESIGN DOCUMENT USING**

**APPENDIX A AND B**

## INTRODUCTION

This document specifies the design that is used to solve the problem of Product.

## ARCHITECTURAL DESIGN

A description of the program architecture is presented. Subsystem design or Block diagram,Package Diagram,Deployment diagram with description is to be presented.

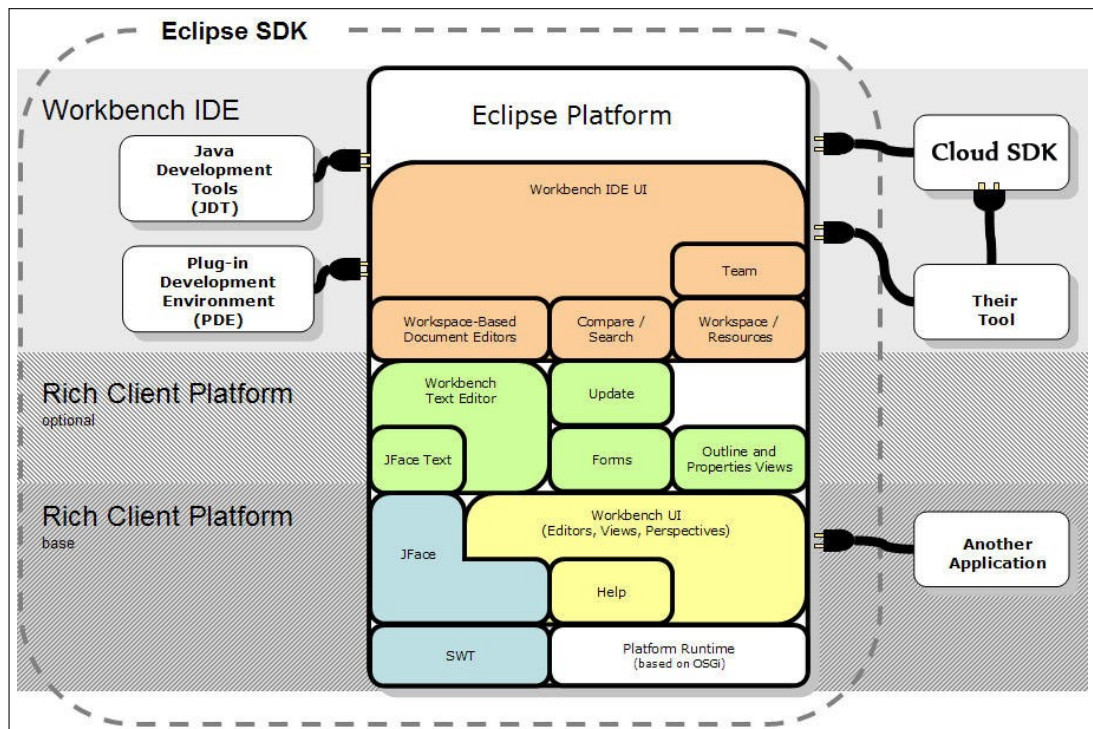


Figure 7.1: Architecture diagram

## DATA DESIGN (USING APPENDICES A AND B)

A description of all data structures including internal, global, and temporary data structures, database design (tables), file formats.

### Internal software data structure

Data structures that are passed among components the software are described.

**Global data structure**

Data structured that are available to major portions of the architecture are described.

**Temporary data structure**

Files created for interim use are described.

**Database description**

Database(s) / Files created/used as part of the application is(are) described.

**COMPOENT DESIGN**

Class diagrams, Interaction Diagrams, Algorithms. Description of each component description required.

**Class Diagram**

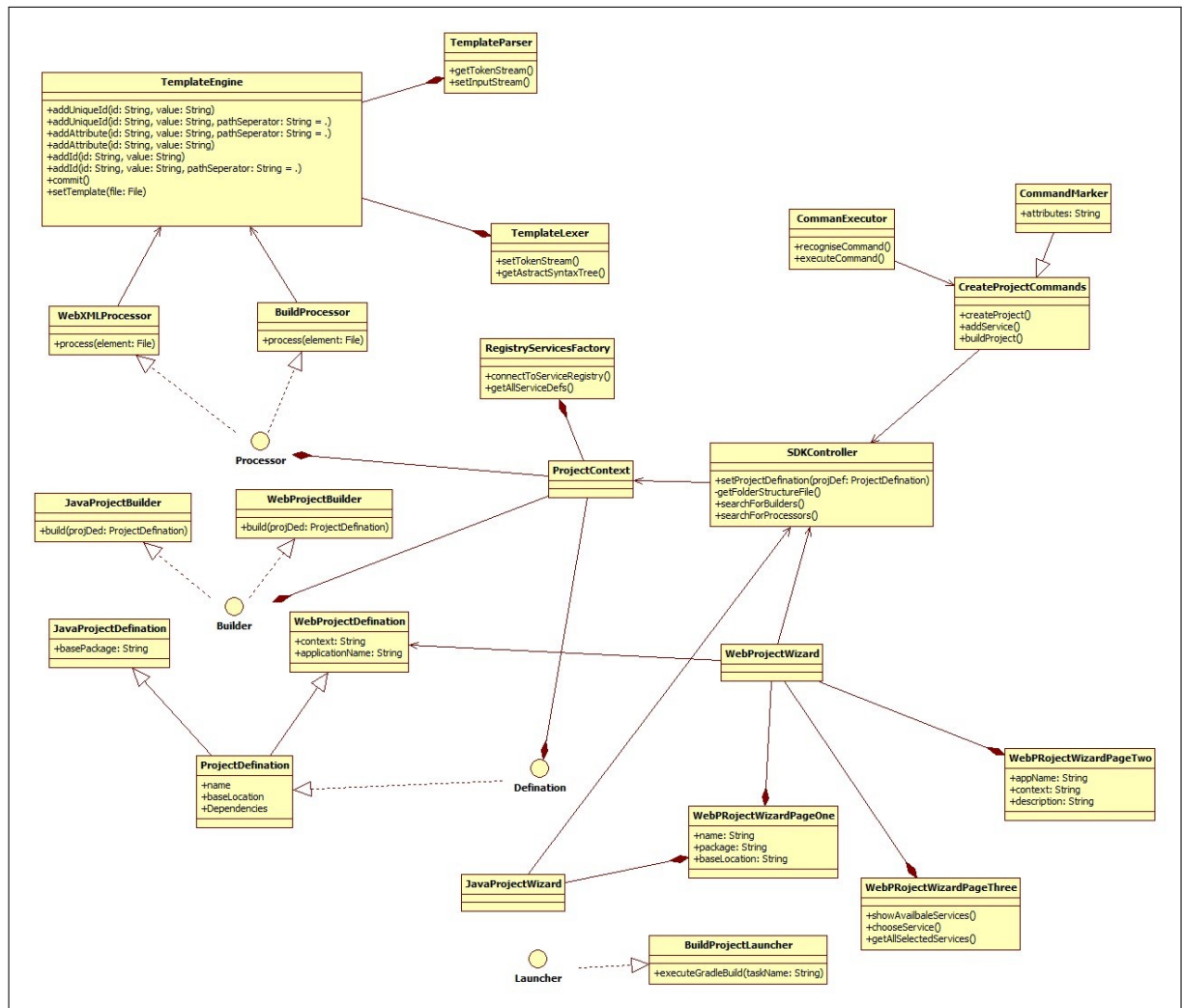


Figure 7.2: Class Diagram

## **CHAPTER 8**

### **SUMMARY AND CONCLUSION**

Write one page summary and conclusion

## **CHAPTER 9**

## **REFERENCES**

- [1] R. S. Pressman, *Software Engineering (3rd Ed.): A Practitioner's Approach*. New York, NY, USA: McGraw-Hill, Inc., 1992.
- [2] P. Kulkarni, *Knowledge Innovation Strategy*. Pune: Bloomsbury Publication, 2015.
- [3] P. Sinha, *Electronic Health Record*. IEEE Press Wiley.
- [4] McKinsey, "Big data: The next frontier for innovation, competition, and productivity," tech. rep.
- [5] "Digital competition:<http://www.mckinsey.com/insights>."
- [6] "Government website to support entrepreneurs:<http://msme.gov.in/mob/home.aspx>."



**ANNEXURE A**

**LABORATORY ASSIGNMENTS ON**

**PROJECT ANALYSIS OF ALGORITHMIC**

**DESIGN**

- To develop the problem under consideration and justify feasibility using concepts of knowledge canvas and IDEA Matrix.

Refer [2] for IDEA Matrix and Knowledge canvas model. Case studies are given in this book. IDEA Matrix is represented in the following form. Knowledge canvas represents about identification of opportunity for product. Feasibility is represented w.r.t. business perspective.

I	D	E	A
Increase	Drive	Educate	Accelerate
Improve	Deliver	Evaluate	Associate
Ignore	Decrease	Eliminate	Avoid

Table A.1: IDEA Matrix

- Project problem statement feasibility assessment using NP-Hard, NP-Complete or satisfy ability issues using modern algebra and/or relevant mathematical models.
- input  $x$ , output  $y$ ,  $y=f(x)$

**ANNEXURE B**

**LABORATORY ASSIGNMENTS ON**

**PROJECT QUALITY AND RELIABILITY**

**TESTING OF PROJECT DESIGN**

It should include assignments such as

- Use of divide and conquer strategies to exploit distributed/parallel/concurrent processing of the above to identify object, morphisms, overloading in functions (if any), and functional relations and any other dependencies (as per requirements). It can include Venn diagram, state diagram, function relations, i/o relations; use this to derive objects, morphism, overloading
- Use of above to draw functional dependency graphs and relevant Software modeling methods, techniques including UML diagrams or other necessities using appropriate tools.
- Testing of project problem statement using generated test data (using mathematical models, GUI, Function testing principles, if any) selection and appropriate use of testing tools, testing of UML diagram's reliability. Write also test cases [Black box testing] for each identified functions. You can use Mathematica or equivalent open source tool for generating test data.
- Additional assignments by the guide. If project type as Entrepreneur, Refer [3],[4],[5], [6]

**ANNEXURE C**

**PROJECT PLANNER**

Using planner or alike project management tool.

**ANNEXURE D**

**REVIEWERS COMMENTS OF PAPER**

**SUBMITTED**

(At-least one technical paper must be submitted in Term-I on the project design in the conferences/workshops in IITs, Central Universities or UoP Conferences or equivalent International Conferences Sponsored by IEEE/ACM)

1. Paper Title:
2. Name of the Conference/Journal where paper submitted :
3. Paper accepted/rejected :
4. Review comments by reviewer :
5. Corrective actions if any :



**ANNEXURE E**

**PLAGIARISM REPORT**

Plagiarism report