**Software Development Laboratory**

**B.Tech. IV Semester**



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**Faculty of Engineering & Technology**

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**M. S. Ramaiah University of Applied Sciences**

Private University Established in Karnataka State by Act No. 15 of 2013

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| Faculty | Engineering & Technology |
| Programme | B. Tech. in Computer Science and Engineering |
| Year/Semester | 2017/4th Semester |
| Name of the Laboratory | Software Development Laboratory |
| Laboratory Code | CSC213A |

List of Experiments

1. Requirements Analysis - I
2. Requirements Analysis - II
3. Data flow modelling with CASE tools – High level Design
4. Data flow modelling with CASE tools – Low level Design
5. UML Modelling: Use Case and Sequence Diagrams
6. UML Modelling: Class Diagrams
7. UML Modelling: State Chart Diagrams
8. Implementation of Software Design
9. Unit Testing with JUnit
10. Integration testing with JUnit

***Scenario for all labs:***

Various scenarios will be given to students in the lab. Work in groups of 7 and develop the software solution. The Course leader is the customer. Contact the Course leader for any clarifications.

# Index Sheet

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **No.** |  |  |  |  | | **Lab Experiment** | **Viva**  **(6)** | **Results**  **(7)** | **Documentation**  **(7)** | **Total Marks**  **(20)** |
| 1 | Requirements Analysis - I |  |  |  |  |
| 2 | Requirements Analysis - II |  |  |  |  |
| 3 | UML Modelling: Use Case and Sequence Diagrams |  |  |  |  |
| 4 | UML Modelling: Class Diagrams |  |  |  |  |
| 5 | UML Modelling: State Chart Diagrams |  |  |  |  |
| 6 | Data flow modelling with CASE tools – High level Design |  |  |  |  |
| 7 | Data flow modelling with CASE tools – Low level Design |  |  |  |  |
| 8 | Implementation of Software Design |  |  |  |  |
| 9 | Unit Testing with JUnit |  |  |  |  |
| 10 | Lab Internal Test conducted along the lines of SEE and valued for 50 Marks and reduced for 20 Marks | | | |  |
|  | **Total Marks** | | | |  |

**Component 1 (Lab Internal Marks) =**

**Signature of the Staff In-charge**

# Laboratory 1

Title of the Laboratory Exercise: Requirements Analysis - I

1. Introduction and Purpose of Experiment

Students get familiar with the documentation and scenario specified for all the lab exercises while analysing the requirements of the scenario

1. Aim and Objectives

Aim

* To develop formal software requirements in a standard format for a given engineering problem

Objectives

At the end of this lab, the student will be able to

* + Identify software requirements from problem statement
  + Identify type of a software requirement
  + Create an unambiguous list of software requirements based on interaction with a client

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and identify requirements as a group
* Each team will then confirm the requirements and document the requirements in an SRS document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

|  |  |  |
| --- | --- | --- |
| **Component** | **Max Marks** | **Marks Obtained** |
| **Viva** | **6** |  |
| **Results** | **7** |  |
| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 2

Title of the Laboratory Exercise: Requirements Analysis - II

1. Introduction and Purpose of Experiment

Students will formally document the identified requirements in an SRS document for the scenario

1. Aim and Objectives

Aim

* To develop formal SRS document in a standard format for a given engineering problem

Objectives

At the end of this lab, the student will be able to

* + Identify dependencies of a software requirement
  + Create SRS document in a standard format

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and identify requirements as a group
* Each team will then confirm the requirements and document the requirements in an SRS document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
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1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

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| --- | --- | --- |
| **Component** | **Max Marks** | **Marks Obtained** |
| **Viva** | **6** |  |
| **Results** | **7** |  |
| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 3

Title of the Laboratory Exercise: Data flow modelling with CASE tools – High Level Design

1. Introduction and Purpose of Experiment

Students will apply data flow modelling to develop the high level design for given scenario

1. Aim and Objectives

Aim

* To develop software architecture for a given requirements specification using Structured analysis and Design Technique

Objectives

At the end of this lab, the student will be able to

* + Identify context of the software
  + Identify Inputs, Outputs and Data Stores for a given software
  + Identify modules in a software and their dependencies
  + Create design document for a given SRS

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and identify requirements as a group
* Each team will then confirm the requirements and document the requirements in an high level design document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

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| **Results** | **7** |  |
| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 4

Title of the Laboratory Exercise: Data flow modelling with CASE tools – Low Level Design

1. Introduction and Purpose of Experiment

Students will apply data flow modelling to develop the low level design for given scenario

1. Aim and Objectives

Aim

* To develop low level software design for a given requirements specification using Structured analysis and Design Technique

Objectives

At the end of this lab, the student will be able to

* + Identify functions in modules
  + Identify Inputs, Outputs and Data dependencies for functions
  + Create low level design document for a given SRS

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and identify requirements as a group
* Each team will then confirm the requirements and document the requirements in an low level design document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

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| --- | --- | --- |
| **Component** | **Max Marks** | **Marks Obtained** |
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| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 5

Title of the Laboratory Exercise Use Case and Sequence Diagrams

1. Introduction and Purpose of Experiment

Students will apply object oriented analysis and design for the given scenario for analysis of requirements and possible interactions

1. Aim and Objectives

Aim

* To study the given requirements and develop use case diagrams and Sequence diagrams

Objectives

At the end of this lab, the student will be able to

* + Explain the purpose of the sequence diagram
  + Identify the logical sequence of activities undergoing in a system, and represent them pictorially
  + Design and model a given use case using UML-sequence diagrams

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and discuss the requirements as a group
* Each team will then create and confirm the design and document the design in an software architecture specifications document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

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| **Component** | **Max Marks** | **Marks Obtained** |
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| **Results** | **7** |  |
| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 6

Title of the Laboratory Exercise: Class Diagrams

1. Introduction and Purpose of Experiment

Students will apply object oriented analysis and design for the given scenario for object decomposition

1. Aim and Objectives

Aim

* To construct a UML class diagram for a given system and identify the class members and determine their relationships

Objectives

At the end of this lab, the student will be able to

* + Identify the main members of the family
  + Identify how they are related to each other
  + Find the characteristics of each family member
  + Determine relations among family members
  + Decide the inheritance of personal traits and characters

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the problem statement and discuss the requirements as a group
* Each team will then create and confirm the design and document the design in an software design specifications document
* Each individual will then write their lab manual, documenting their observations

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1. Limitations of Experiments

2. Limitations of Results

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# Laboratory 7

Title of the Laboratory Exercise: State chart diagrams

1. Introduction and Purpose of Experiment

Students will apply object oriented analysis and design for the given scenario for low level design of classes

1. Aim and Objectives

Aim

* To develop low level software design for a given class diagram using state chart diagrams

Objectives

At the end of this lab, the student will be able to

* + Identify states of each object
  + Identify triggers and messages for each object
  + Understand the behavior of a class, given its state chart diagram

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the class diagram and identify objects, interactions and states of objects
* Each team will then design state transitions and simulate the same. They will then document the design in an low level design specification document
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
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5. Comments

1. Limitations of Experiments

2. Limitations of Results

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4. Recommendations

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# Laboratory 8

Title of the Laboratory Exercise: Implementation and Coding Standards

1. Introduction and Purpose of Experiment

Students will use JavaDoc and similar standards to ensure good documentation and maintainability of code

1. Aim and Objectives

Aim

* To implement a given design with appropriate coding standards

Objectives

At the end of this lab, the student will be able to

* + Apply industry standard coding standards
  + Use automatic documentation tools
  + Create maintainable code

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the class diagram and identify objects, interactions and states of objects
* Each team will then split workload and develop classes individually.
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

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| **Component** | **Max Marks** | **Marks Obtained** |
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| **Documentation** | **7** |  |
| **Total** | ****20**** |  |

# Laboratory 9

Title of the Laboratory Exercise: Unit Testing with JUnit

1. Introduction and Purpose of Experiment

Students will apply JUnit framework to implement test cases and test the developed software

1. Aim and Objectives

Aim

* To develop and apply test cases in a Java project using JUnit

Objectives

At the end of this lab, the student will be able to

* + Analyse failure conditions
  + Create Unit test cases
  + Develop test suites in Java using JUnit framework

1. Experimental Procedure

* Work in teams of 7 students
* Each team should read the developed code and identify failure cases and correct cases of execution
* Each team will then split workload and develop and implement test cases individually
* Each individual will then write their lab manual, documenting their observations

1. Calculations/Computations/Algorithms
2. Presentation of Results
3. Analysis and Discussions
4. Conclusions
5. Comments

1. Limitations of Experiments

2. Limitations of Results

3. Learning happened

4. Recommendations

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| **Total** | ****20**** |  |