|  |  |  |
| --- | --- | --- |
|  | UNIVERSITY OF MALAKAND |  |
| DEPARTMENT OF SOFTWARE ENGINEERING |
| SOFTWARE CONSTRUCTION & DEVELOPMENT LAB EXPERIMENT # 1 |

Lab Title: Introduction to UML

Student Name: Roll Number:

**LAB ASSESSMENT:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attributes | Excellent  (5) | Good  (4) | Average  (3) | Satisfactory  (2) | Unsatisfactory  (1) |
| Ability to Conduct Experiments |  |  |  |  |  |
| Ability to Assimilate the results |  |  |  |  |  |
| Effective use of lab equipment and follow lab’s safety rule |  |  |  |  |  |

Total Marks: Obtained Marks:

**LAB REPORT ASSESSMENT:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attributes | Excellent  (5) | Good  (4) | Average  (3) | Satisfactory  (2) | Unsatisfactory  (1) |
| Data Presentation |  |  |  |  |  |
| Experimental Results |  |  |  |  |  |
| Conclusion |  |  |  |  |  |

Total Marks: Obtained Marks:

Date: Instructor Signature:

**1.1. Theory:**

UML stands for **U**nified **M**odeling **L**anguage. It’s a rich language to model software solutions, aapplication structures, system behavior and business processes. There are **14 UML diagram types** to help you model these behaviors.

UML is not a programming language, it is rather a visual language. We use UML diagrams to portray the behavior and structure of a system. UML helps software engineers, businessmen and system architects with modelling, design and analysis. The Object Management Group (OMG) adopted Unified Modelling Language as a standard in 1997. It’s been managed by OMG ever since. International Organization for Standardization (ISO) published UML as an approved standard in 2005. UML has been revised over the years and is reviewed periodically.

**1.2.** **Object Oriented Concepts Used in UML –**

1. **Class –** A class defines the blue print i.e., structure and functions of an object.
2. **Objects –** Objects help us to decompose large systems and help us to modularize our system. Modularity helps to divide our system into understandable components so that we can build our system piece by piece. An object is the fundamental unit (building block) of a system which is used to depict an entity.
3. **Inheritance –** Inheritance is a mechanism by which child classes inherit the properties of their parent classes.
4. **Abstraction –** Mechanism by which implementation details are hidden from user.
5. **Encapsulation –** Binding data together and protecting it from the outer world is referred to as encapsulation.
6. **Polymorphism –** Mechanism by which functions or entities are able to exist in different forms.

Additions in UML 2.0 –

* Software development methodologies like agile have been incorporated and scope of original UML specification has been broadened.
* Originally UML specified 9 diagrams. UML 2.x has increased the number of diagrams from 9 to 13. The four diagrams that were added are: timing diagram, communication diagram, interaction overview diagram and composite structure diagram. UML 2.x renamed state chart diagrams to state machine diagrams.
* UML 2.x added the ability to decompose software system into components and sub-components.

**1.3.** **List of UML Diagram Types**

**Structure Diagrams**

* Class Diagram
* Component Diagram
* Deployment Diagram
* Object Diagram
* Package Diagram
* Profile Diagram
* Composite Structure Diagram

**Behavioural Diagrams**

* Use Case Diagram
* Activity Diagram
* State Machine Diagram
* Sequence Diagram
* Communication Diagram
* Interaction Overview Diagram
* Timing Diagram

**Useful link:**

The following web blog provide a comprehensive discussion and examples on all the aforementioned UML diagram. It is recommended to students for understanding and self learning.

<https://creately.com/blog/diagrams/uml-diagram-types-examples/#ClassDiagram>

**Lab Task:**

Compare and contrast structural and behavioural diagrams and comment on the usage of both in your own words.