

**B. C. A (2nd Semester)
Teaching Schedule**

030010208 – CC4-Object Oriented Programming

Objective: To enhance logical thinking so as to design and develop problem solving techniques.

Course Outcomes: Upon completion of the course, students shall be able to

C01: Perceive the basic Object Oriented Programming and data structures concepts.

C02: Utilize the object initialization and destruction concept using constructors and destructors.

C03: Apply the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading methods and operators.

C04: Apply the concept of inheritance to reduce the length of code.

C05: Apply concept of dynamic polymorphism using virtual functions, overriding functions and abstract class in programs.

C06: Apply I/O operations and file streams concept in programs.

C07: Design, implement and test programs using object oriented concepts.

Unit	Sub Unit	No. of Lecture(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Evaluation Parameters
1.	Introduction to Object Oriented Programming [9 Hours]					
1	1.1	1	Structured Programming Vs. Object Oriented Programming	VRR#1-pg no 9-10	Chalk-Talk, Discussion	Quiz-1 Unit Test 1(Pr)
	1.2	1	Object Oriented Programming Concepts	VRR#1-pg no 1-4	Chalk-Talk, Discussion	
	1.3	1	Advantages and Application of OO Methodology	VRR#1-pg no 25-26 TB#1-pg no 15	Chalk-Talk, Discussion	
	1.4	1	Structuring the data, Data structures: Primitive and Non Primitive Data Structures	PGAV#1-pg no 5-6	Chalk-Talk, Discussion	
	1.5	1	Stack and its operations: Push, Pop, Peep	PGAV#4-pg no 40-42	Chalk-Talk, Demonstration	
	1.6	1	Queues and its operations: Insertion and Deletion operation	PGAV#5-pg no 56-61	Chalk-Talk, Demonstration	
	1.7	1	Circular queues and its operations: Insertion and Deletion operation	PGAV#5-pg no 62-65	Chalk-Talk, Demonstration	
	1.8	1	Classes and Object: Defining Class, Access Specifier, Creating Object	VRR#1-pg no 12-15, VRR#10-pg no 331-334, VRR#10-pg no 314-319	Chalk-Talk, Demonstration	

	1.9	1	Friend Function and Class, Static Data Members and Member Functions	VRR#10-pg no 342-349, VRR#10-pg no 354-358	Chalk-Talk, Demonstration video- http://spoken-tutorial.org/watch/Advanced%2BCpp/Friend%2BFunction/English/ Video- http://spoken-tutorial.org/watch/Advanced%2BCpp/Static%2BMembers/English/	
2.	Object Initialization and Cleanup [6 Hours]					
2	2.1	2	Constructor: Type of Constructor, Constructor Overloading, Constructor with Default Argument	VRR#11-pg no 364 – 368, VRR#11-pg no 373-380	Chalk-Talk, Demonstration	Unit Test 1(Th) Unit Test 1(Pr)
	2.2	1	Destructor	VRR#1-pg no 371 – 373	Chalk-Talk, Demonstration	
	2.3	1	Nameless Object	VRR#11-pg no 380-381	Chalk-Talk, Demonstration	
	2.4	2	Dynamic Memory Allocation, Array of object	https://www.tutorialspoint.com/cpp_dynamic_memory.htm	Chalk-Talk, Demonstration	
3.	Operator Overloading and Type Conversion [9 Hours]					
3	3.1	3	Unary and Binary Operator Overloading: Overloading Using Member Functions, Overloading Using Friend Functions	VRR#13-pg no 434,445 VRR#14-pg no 528 VRR#13-pg no 480	Chalk-Talk, Demonstration	Unit Test 1(Th) Unit Test 2(Pr)
	3.2	3	Overloading Special Operators: Increment and Decrement Operators, Subscript Operator, Memory Management Operators	VRR#13-pg no 434-438 VRR#13-pg no 477-480 VRR#13-pg no 462-464	Chalk-Talk, Demonstration	

	3.3	2	Type Conversion, Basic Type to Class Type	VRR#13-pg no 464-465	Chalk-Talk, Demonstration	
	3.4	1	Class Type to Basic Type	VRR#13-pg no 465-470	Chalk-Talk, Demonstration	
4.	Inheritance [8 Hours]					
4	4.1	2	Accessibility of Base Class Members	VRR#14-pg no 511-512	Chalk-Talk, Demonstration	Open Book Unit Test 2 (Pr)
	4.2	2	Types of Inheritance	VRR#14-pg no 510-511	Chalk-Talk, Demonstration Video- http://spoken-tutorial.org/watch/Advanced%2BCpp/Inheritance/English/	
	4.3	1	Order of Calling of Constructor and Destructor	VRR#14-pg no 525-528	Chalk-Talk, Demonstration	
	4.4	2	Function Overriding	VRR#14-pg no 528-533	Chalk-Talk, Demonstration	
	4.5	1	Object Composition -Delegation	VRR#14-pg no 562-567	Chalk-Talk, Demonstration	
5.	Polymorphism [7 Hours]					
5	5.1	1	Member function overloading and Default Argument	VRR#14-pg no 377-380	Chalk-Talk, Demonstration	Unit Test 2(Th) Section Test(Pr)
	5.2	1	Need and Rules for Virtual Function	VRR#15-pg no 571-573	Chalk-Talk, Demonstration video- http://spoken-tutorial.org/watch/Advanced%2BCpp/Polymorphism/English/	
	5.3	2	Virtual Base Class	VRR#14-pg no 552-558	Chalk-Talk, Demonstration	
	5.4	2	Pure Virtual Function	VRR#15-pg no 584-585	Chalk-Talk, Demonstration	
	5.5	1	Abstract Classes	VRR#15-pg no 585-588	Chalk-Talk, Demonstration	
6.	Streams I/O Operations [9 Hours]					
	6.1	2	Managing Console I/O Operations: Unformatted I/O Operations, Formatted I/O Operations	VRR#17-pg no 635-648	Chalk-Talk, Demonstration	
	6.2	1	Hierarchy of File Stream Classes	VRR#18-pg no 665-667	Chalk-Talk, Demonstration	

6	6.3	1	Opening And Closing a File	VRR#18-pg no 667-672	Chalk-Talk, Demonstration	Internal(Th) Semester End(Pr)
	6.4	2	Reading And Writing a File	http://www.tutorialstutor.com/cplusplus/cpp_files_streams.htm VRR#18-pg no 682-691	Chalk-Talk, Demonstration	
	6.5	2	File Pointer and Their Manipulators for Random Access	VRR#18-pg no 678-682	Chalk-Talk, Demonstration	
	6.6	1	File Error Handling During File Manipulations	VRR#18-pg no 696-698	Chalk-Talk, Demonstration	

Text Book :

1. Venugopal, Rajkumar, Ravishankar - Mastering C++ - Tata McGraw Hill. [VRR]
2. PAI G A V. - Data Structures and Algorithms-Concepts, Techniques and Applications - McGraw Hill. [PGAV]

Reference Book :

1. Forouzan B. Gilberg R. Computer Science - A Structured Approach Using C++ - Cengage Learning.[FG]
2. Kanetkar Y - Let us C++ - BPB Publications.[KY]
3. Trivedi B - Programming with ANSI C++ - Oxford University Press.[TB]
4. Gilberg, R., Forouzan, B. - Data Structures-A Pseudocode Approach with C++ - Thomson.[GF]
5. Joshi, B. - Data Structures and Algorithms using C++ - Tata McGraw Hill.[JB]

Note: # denotes chapter number.

Course Objectives and Course Outcomes mapping :

- Understand the basic Object Oriented Programming concepts: C01, C07
- Ability to design, implement and test object oriented programs: C02, C03, C04, C05, C06, C07

Course Units and Course Outcomes Mapping:

Unit No.	Unit Name	Course outcome						
		C01	C02	C03	C04	C05	C06	C07
1.	Introduction to Object Oriented Programming	✓						✓
2.	Object Initialization and Cleanup	✓	✓					✓
3.	Operator Overloading and Type Conversion	✓	✓	✓				✓
4.	Inheritance	✓	✓	✓	✓			✓
5.	Polymorphism	✓	✓	✓	✓	✓		✓
6.	Streams I/O Operations	✓	✓				✓	✓

Programme Outcomes:

P01: Ability to understand the concepts of key areas in computer science.

P02: Ability to design and develop system, component or process as well as test and maintain it so as to

provide promising solutions to industry and society.

P03: Effective communication and presentation skill.

P04: Ability to understand professional and ethical responsibility.

P05: Recognition of the need for life-long learning.

Programme Outcomes and Course Outcomes mapping:

Programme Outcome	Course Outcomes						
	CO1	CO2	CO3	CO4	CO5	CO6	CO7
P01	√	√	√	√	√	√	√
P02	√	√	√	√	√	√	√
P03							
P04							
P05	√	√	√	√	√	√	√

Computing Environment: A student must have the following computing environment in laboratory and or on his/her

Laptop

- ❖ GNU g++ compiler in Ubuntu platform.

Modes of Transaction (Delivery):

Unit No	Topic Detail	Teaching Approach	PO mapped
1	Stack, Queue and Circular Queue	Logic understanding with game.	P01, P02,P03 and P05
2	Constructor and Destructor	Debate between two groups	P01, P02,P03 and P05
3	Type Conversion: Basic Type to Class Type and Class Type to Basic Type	Hands on during laboratory hours	P01,P02 and P05
4 and 5	Inheritance and Polymorphism	Detail explanation by giving real life examples	P01,P02 and P05
6	Streams I/O Operations	Hands on during laboratory hours	P01,P02 and P05

Activities/Practicum:

The following activities shall be carried out by the students.

- ❖ Study about object oriented paradigm.
- ❖ Study of standard header files.
- ❖ Develop at least 3 programs using other than g++ compiler.

The following activities shall be carried out by the teacher:

Learner	Activities to be done	PO mapped
For slow learners	<ul style="list-style-type: none"> • Continuous interaction regarding programming skill improvement in class and laboratory. • Remedial coaching 	P01,P02 and P05
For advanced learners	<ul style="list-style-type: none"> • Provide object oriented topics (not covered in syllabus) to 	P01,P03 and P05

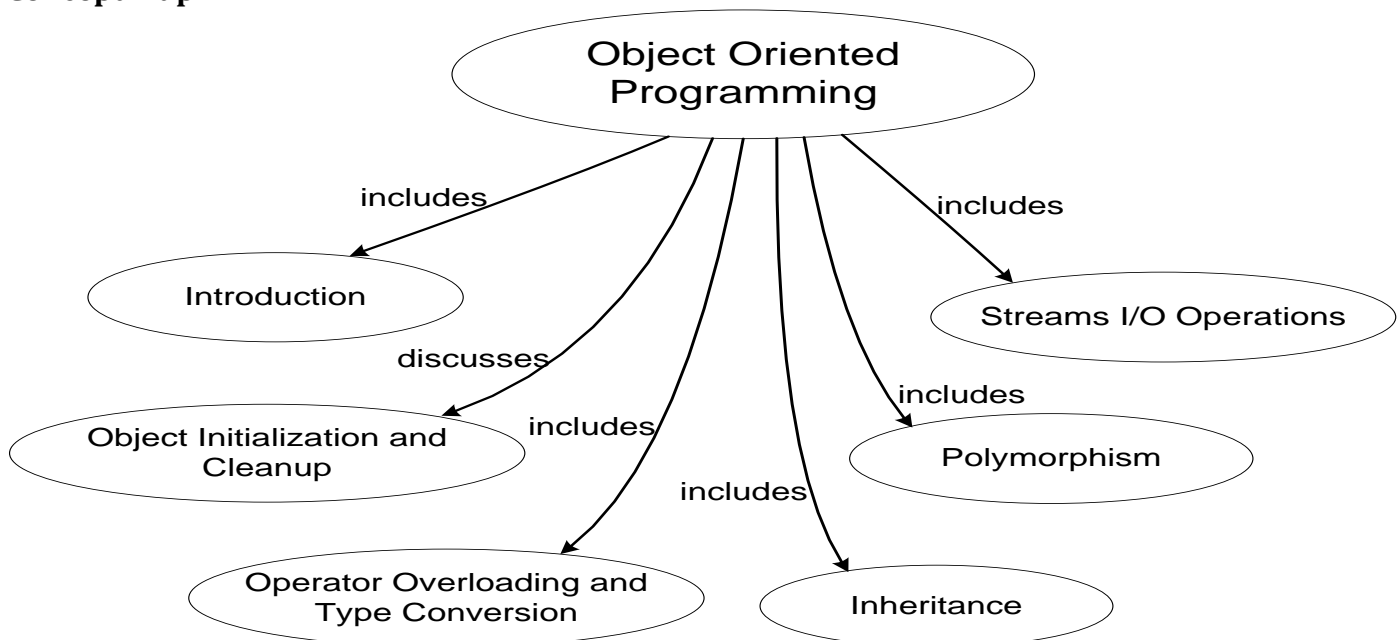
	search and understand. Based on given topics arrange Quiz/Game competition for their learning.	
For all	<ul style="list-style-type: none"> • 10 minutes question-answer writing practice during lecture hour after completion of unit to improve writing skill. • Group discussion regarding problem or error solving. 	PO1,PO2 and PO5

Number of Practical Problems in Journal: 18

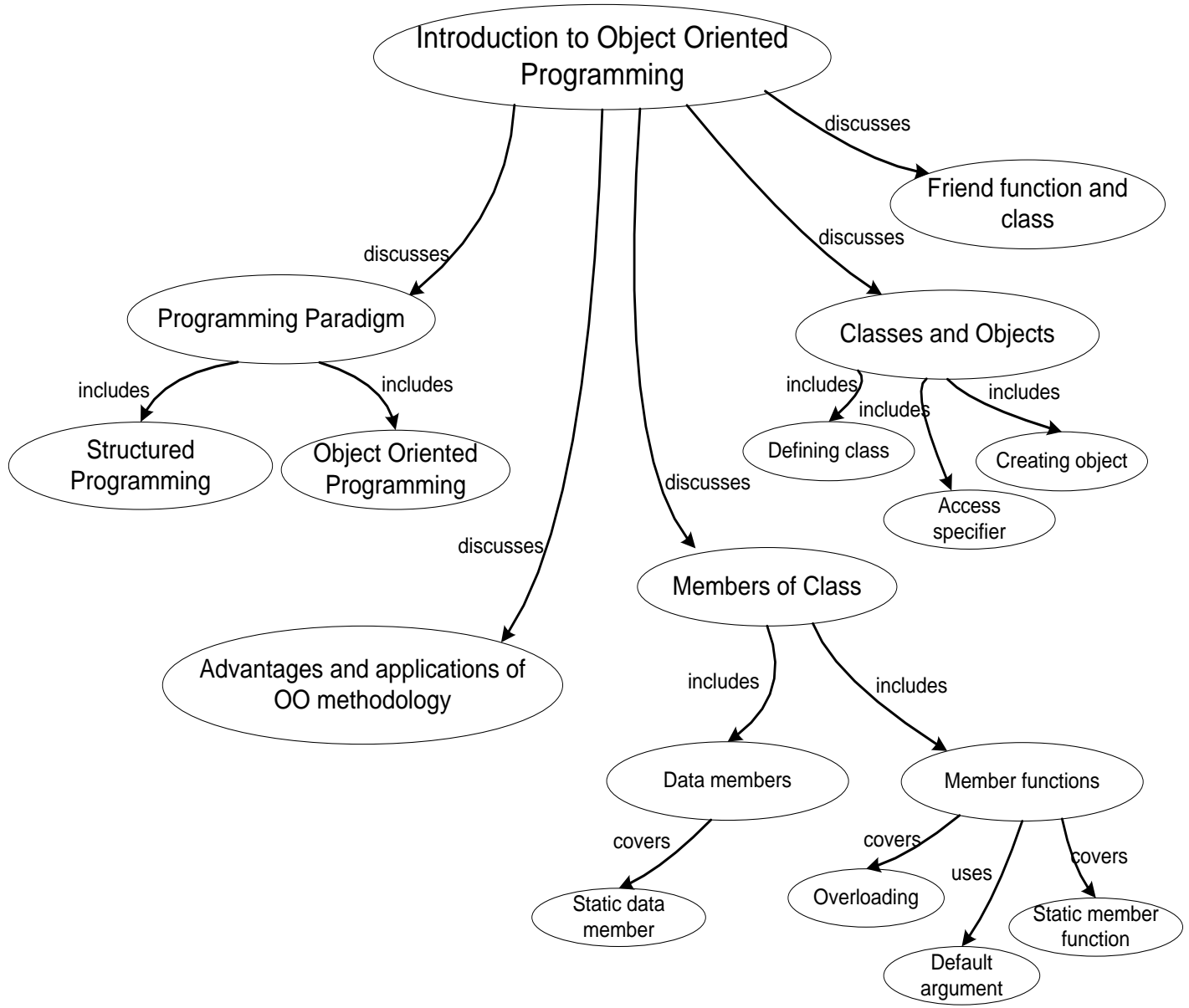
Total sets to be developed for each division: 2

Unit Number	Number of Questions	Time required to implement and debug the question(in hours)	Minimum required of Journal Certification
Unit 1	4	10	4
Unit 2	3	6	2
Unit 3	3	9	3
Unit 4	3	9	3
Unit 5	2	6	2
Unit 6	3	8	2
Total	18	48	16

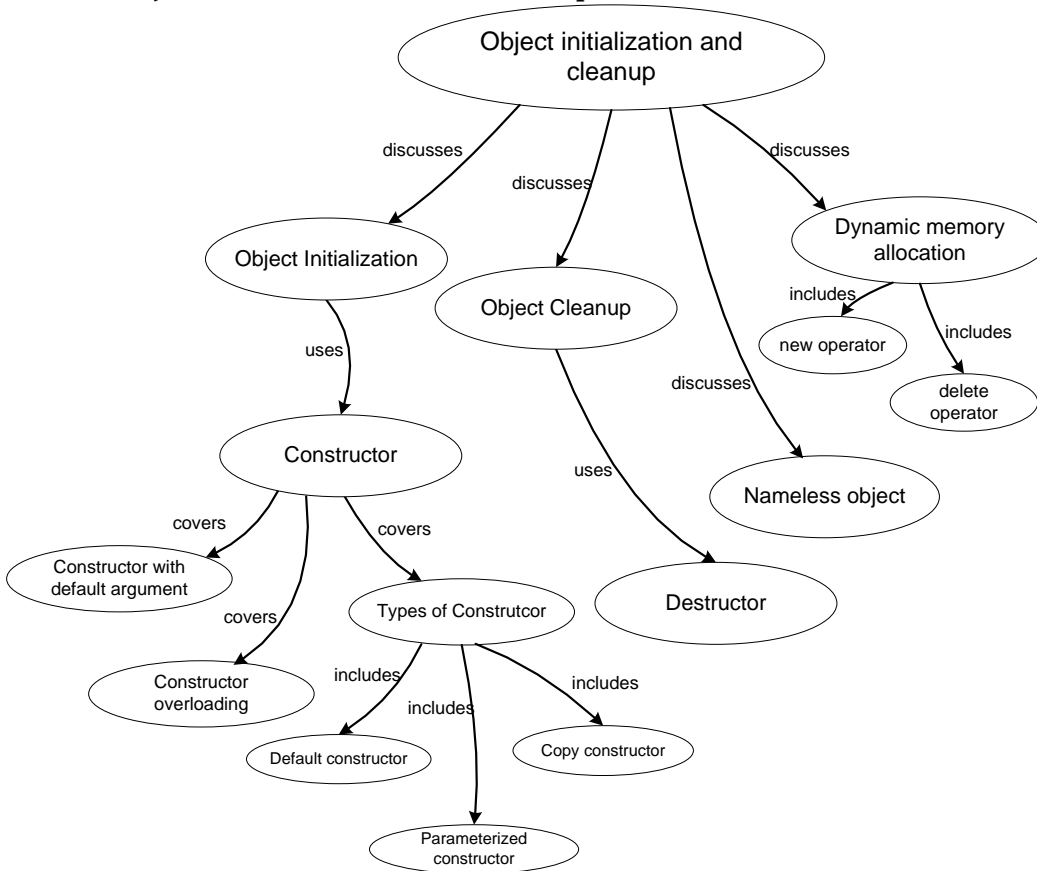
Concept Map:



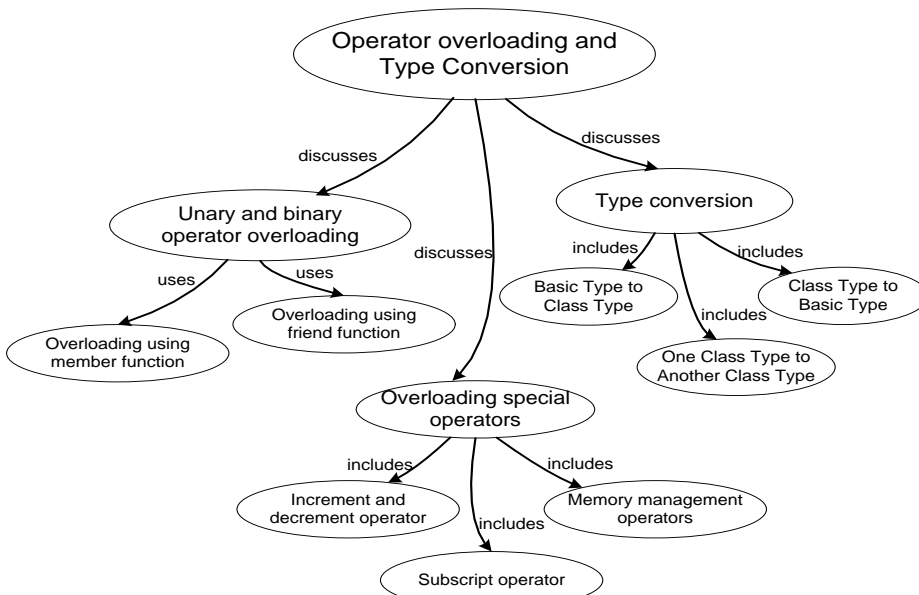
Unit-1: Introduction to Object Oriented Programming



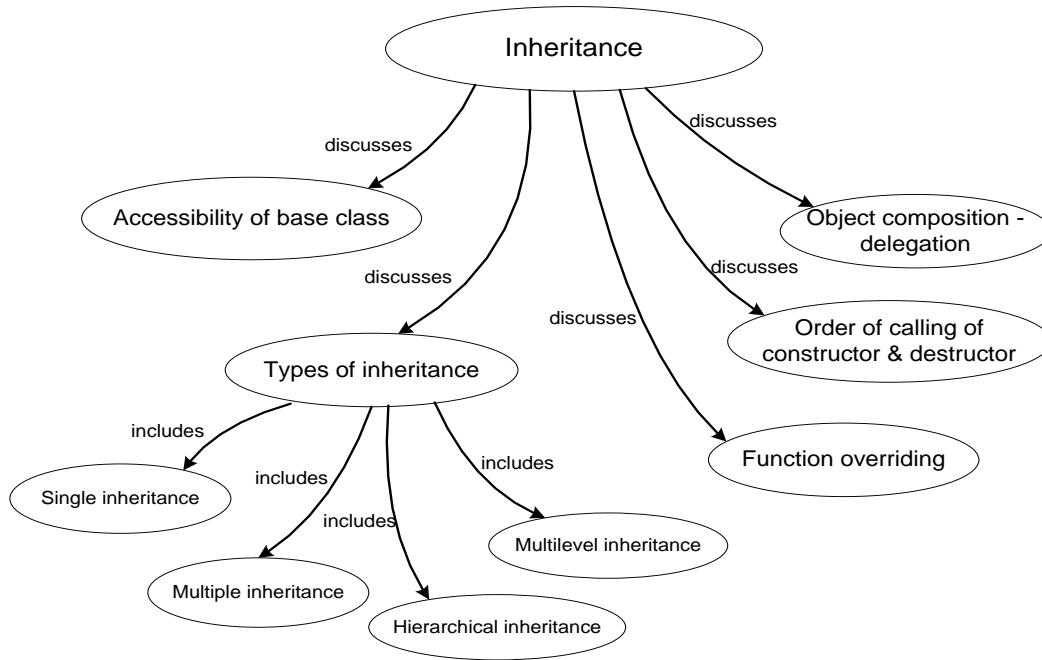
Unit-2: Object Initialization and Cleanup



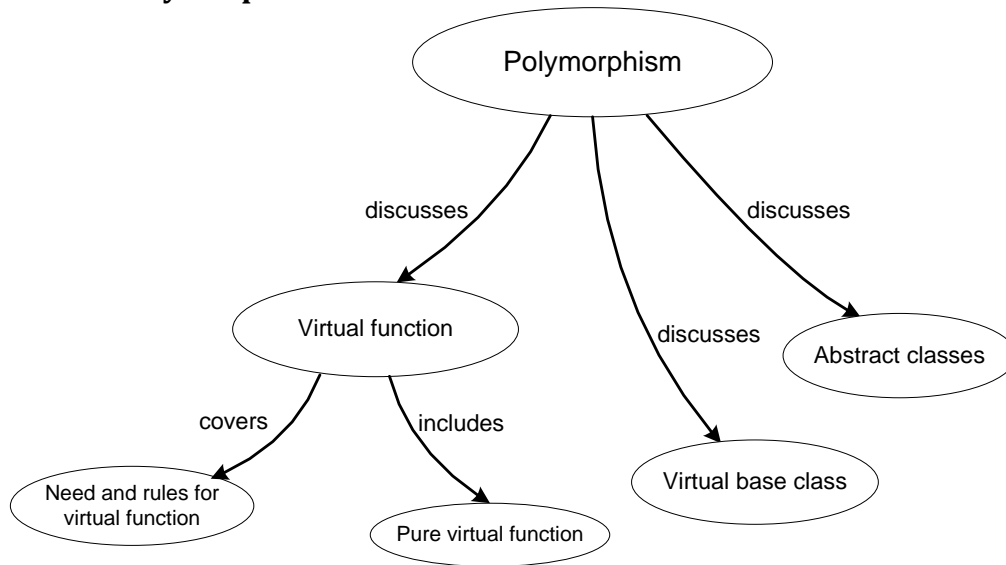
Unit-3: Operator Overloading and Type Conversion



Unit-4: Inheritance



Unit-5: Polymorphism



Unit-6: Streams I/O Operations

