
# Course Content of java [Total 101 sessions]

| Index | Topics | Duration |
|---|---|---|
| 1 | Introduction to Language | 2 Hours |
| 2 | Introduction to Java Language | 4 Hours |
| | a) Flavors of Java, History of Java, Features of Java, Introduction to JDK, JRE, JVM and JIT Compiler. | |
| 3 | Platform Independency in java | 2 Hours |
| | a) Difference between Compiler and Interpreter | |
| 4 | Token in Java | 2 Hours |
| | a) Keywords, Identifiers, Literals, Punctuators and Operators | |
| 5 | Moving towards First Program of Java | 4 Hours |
| | a) Description of main method | |
| | b) How to download and install Java | |
| | c) First Java program using Notepad, Edit plus and Eclipse IDE | |
| 6 | Types of Literals in java | 6 Hours |
| | a) Integral Literal<br>b) Floating point Literal<br>c) Char Literal<br>d) Boolean Literal<br>e) String Literal<br>f) null literal | |
| 7 | Operators | 2 Hours |
| | a) Arithmetic Operator<br>b) Unary Operators<br>c) Assignment Operator | |

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| | d) Relational Operator<br>e) Logical Operators<br>f) Boolean Operators<br>g) Bitwise Operators<br>h) Ternary Operator<br>i) Member Operator(.)<br>j) new Operator<br>k) instanceof Operator | |
| 9 | Programs on Method Parameter and return type | 4 Hours |
| 10 | Introduction to Object Oriented Programming | 20 Hours |
| | a) OOPs Features and Advantages | |
| | b) Class, Object, Abstraction, Encapsulation, Inheritance and Polymorphism | |
| | c) Default constructor added by compiler | |
| | d) Why compiler adds default constructor to our class | |
| | e) Types of variables (Primitive and Reference) | |
| | f) Instance variable, Static variable, Parameter variable and local variable | |
| | g) How to provide our own user defined values for instance variable | |
| | h) this keyword | |
| | i) Role of instance variable while creating the Object | |
| | j) Working with static variable while creating the Object | |
| | k) When we should declare a variable as an instance or static variable? | |
| | l) Data Hiding | |
| | m) Abstraction | |
| | n) Encapsulation | |
| | o) How to print object properties value (instance variable value) | |

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| | p) Setter and Getter | |
| 10 | Introduction to Constructor | 4 Hours |
| | a) Advantage of Constructor | |
| | b) Types Of Constructor | |
| | c) Default, No Argument and Parameterized Constructor | |
| | d) Passing Object reference to the constructor(Copy Constructor) | |
| | e) Instance Block in java | |
| | f) How many ways we can initialize object properties(instance variable) | |
| 11 | Relationship between the classes | 8 Hours |
| | a) IS-A (Inheritance) Relation and HAS-A(Association) Relation | |
| | b) Introduction to Inheritance (IS-A relation) | |
| | c) Types of Inheritance | |
| | d) this() and super() | |
| | e) Why java does not support multiple inheritance | |
| | f) Access modifiers in Java | |
| | g) HAS-A relation(Association) | |
| | h) Composition and Aggregation | |
| 12 | Wrapper classes in Java | 4 Hours |
| | a) Autoboxing and Unboxing | |
| 13 | Introduction to Polymorphism | 10 Hours |
| | a) Method Overloading, Var-Args, | |
| | b) Ambiguity issues while overloading a method | |
| | c) Method Overriding | |

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| | d) Upcasting and Downcasting | |
| | e) @Override Annotation | |
| | f) Role of Access Modifier while Overriding a method | |
| | g) Co-variant concept in method overriding | |
| | h) Method Hiding | |
| 14 | final keyword in Java | 2 Hours |
| 15 | Object class and its method | 4 Hours |
| | a) getClass(), hashCode(), toString(), equals(Object o) | |
| 16 | Inner classes in java | 4 Hours |
| | a) Nested inner class, Method local inner class, static nested inner class, Anonymous inner class | |
| 17 | Abstract class and abstract methods | 4 Hours |
| 18 | Introduction to interface | 10 Hours |
| | a) Default and static method(**Java 8 features**) | |
| | b) Functional interfaces | |
| | c) Lambda Expression | |
| | d) Predicate<T>, Consumer<T>, Supplier<T>, Function<T,R>, BiPredicate<T,U>, BiFunction<T,U>, BiFunction<T,U,R>, UnaryOperator<T>, BinaryOperator<T> | |
| 19 | Enum in java | 2 Hours |

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| 20 | JVM Architecture | 8 Hours |
| | a) Class loader subsystem, Runtime Data areas and Execution Engine | |
| | b) Different types of class loaders | |
| | c) Method Area, Heap Memory, Stack Memory, PC register, Native Method Stack. | |
| | d) Execution Engine and JIT Compiler | |
| 21 | Arrays in java | 12 Hours |
| | a) Array Introduction | |
| | b) Characteristics of an Array | |
| | c) Drawback of an Array | |
| | d) Types of Arrays | |
| | Programs:<br>1) WAP to find first and last index of Array<br>2) WAP to print Array elements in reverse<br>3) WAP to find sum of all the elements<br>4) Calculate Student marks in find average<br>5) Working with Custom Object<br>6) Storing Book object to access Book property<br>7) Create Animal abstract class with sub classes show using dynamic Polymorphism.<br>8) Create Vehicle interface and sub classes to sh dynamic polymorphism.<br>9) Object array by using Literal.<br>10)Arrays class Methods.<br>11)Remaining Logical By using **Stream API** | |
| 22 | String Handling in Java | 10 Hours |
| | a) String Immutability | |
| | b) Working with Various Methods of String class like length(), charAt(), equals(Object obj), | |

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| | equalsIgnoreCase(), toUpperCase(), toLowerCase(), replace(), trim(), indexOf(), lastIndexOf(), split(), toCharArray(), getBytes() e.t.c | |
| | c) == operator and equals(Object obj) method | |
| | d) StringBuffer class and its method | |
| | e) StringBuilder class and its method | |
| | g) Difference between String, StringBuffer and StringBuilder.<br>h) Performance Comparison between StringBuffer and StringBuilder. | |
| 23 | Exception Handling in Java | 14 Hours |
| | a) try-catch block | |
| | b) Nested try catch, try with multi catch block | |
| | c) Dealing with Infinity and NaN | |
| | d) Finally block, try with resources | |
| | e) Exception Propagation | |
| | f) Checked and Unchecked Exception | |
| | g) throw and throws keyword | |
| | h) User-defined checked and unchecked Exception | |
| | i) Rules related to checked Exception | |
| 23 | Introduction to Multithreading | 14 Hours |

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| | a) Process and Thread, Multitasking and multithreading | |
| | b) Creating Thread by using Thread class and Runnable interface | |
| | c) Various methods of Thread class | |
| | d) Implementation of Runnable interface by using **Lambda Expression** | |
| | e) Race condition in multithreading | |
| | f) Synchronization (Method and block level) | |
| | g) Object and class level | |
| | Synchronization | |
| | h) Thread life cycle | |
| | i) Thread Group and Volatile | |
| | j) Inter Thread Communication(ITC) | |
| | k) Deadlock in multithreading | |
| | l) interrupt(), Daemon Thread | |
| 24 | Introduction to Java I/O Streams | 2 Hours |
| | a) Working with Binary Stream and Character Stream | |
| | b) Serialization and De-Serialization | |
| | c) transient keyword role in Serialization | |
| 25 | Collection Framework | 26 Hours |
| | a) Collection Hierarchy | |

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| | b) List,Set and Queue interface | |
| | c) 9 ways to retrieve the object | |
| | from Collection (Including forEach() and Method Reference) | |
| | d) Working with Custom Object(ArrayList<Product>) | |
| | e) Implementation of List interface classes (ArrayList, LinkedList, Vector and Stack) | |
| | f) Hashing technique | |
| | g) Implementation of Set interface classes (HashSet, LinkedHashSet) | |
| | h) SortedSet and NavigableSet interface | |
| | i) Comparable and Comparator interface | |
| | j) TreeSet class and its implementation | |
| | k) Introduction to Map interface | |
| | l) Entry interface | |
| | m)Implementation of Map interface classes (Hashtable, HashMap, ConcurrentHashMap, LinkedHashMap, WeakHashMap, IdentityHashMap) | |
| | n) Properties class | |

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| | o) SortedMap and NavigableMap | |
| | p) TreeMap class and its implementation | |
| | q) Queue interface, PriorityQueue | |
| 26 | Working with Generics | 4 Hours |
| | Mixing generic and non-generic collections | |
| | Polymorphism with Generic | |
| | Type Erasure in Generic | |
| | Wild Card in Generic<?> | |
| 27 | Streams API | 8 hours |
| | Creation of Streams to process the data | |
| | Working with intermediate and Terminal methods (22 Methods).<br>Finite and Infinite Stream.<br><br>**Special Logical Array and String Programs Using STREAM API. [Placement Team]** | |
| 28 | New Features of Java | 4 Hours |
| | Date API, Optional class, Record class, Sealed class in java | |
| 29 | Executor Framework | 4 Hours |
| | a) Executor<br>b) ExecutorService<br>c) ScheduledExecutorService<br>d) Advantages of Using the Executor Framework | |