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 b) Floating point Literal c) Char Literal d) Boolean Literal e) String Literal f) null literal	
7	Operators	2 Hours
	a) Arithmetic Operator b) Unary Operators c) Assignment Operator	

	d) Relational Operator e) Logical Operators f) Boolean Operators g) Bitwise Operators h) Ternary Operator i) Member Operator(.) j) new Operator 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)	

	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	

	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

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: 1) WAP to find first and last index of Array 2) WAP to print Array elements in reverse 3) WAP to find sum of all the elements 4) Calculate Student marks in find average 5) Working with Custom Object 6) Storing Book object to access Book property 7) Create Animal abstract class with sub classes show using dynamic Polymorphism. 8) Create Vehicle interface and sub classes to sh dynamic polymorphism. 9) Object array by using Literal. 10)Arrays class Methods. 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),	

	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. 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

	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	

	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	

	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). Finite and Infinite Stream. **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 b) ExecutorService c) ScheduledExecutorService d) Advantages of Using the Executor Framework	