Course Content Core Java [214 Hours OR 107 days]

Index	Topics	Duration
1	Introduction to Language	2 Hours
2	Introduction to Java	6 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	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	
	d) Command Line Argument	
5	Token in Java	2 Hours
	a) Keywords, Identifiers, Literals, Punctuators and Operators	
6	Types of Literals in java	8 Hours
	a) Integral Literal b) Floating point Literal c) Char Literal d) Boolean Literal e) String Literal f) null literal	
7	Operators	8 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	
8	Data types and Type casting in java	2 Hours
9	Programs on Method Parameter and return type	4 Hours
10	Introduction to Object Oriented Programming	16 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	6 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	2 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 and Sealed keywords in Java	2 Hours
15	Object class and its method	4 Hours
	a) getClass(), hashCode(), toString(), equals(Object o), clone()	
	b) wait(), notify(), notifyAll() finalize()	
16	Inner classes in java	2 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	
	c) Predicate<T>, Consumer<T>, Supplier<T>, Function<T,R>, BiPredicate<T,U>, BiConsumer<T,U>	
	d) Marker interface e) Difference between Abstract class and Interface	

19	Enum in java	2 Hours
	a) Writing enum inside the class, Outside of the class and inside the method. b) Writing Constructor inside an enum. c) Passing enum in switch expression	
20	JVM Architecture	10 Hours
	a) Class loader subsystem, Runtime Data areas and Execution Engine	
	b) Different types of class loaders	
	c) static block in Java	
	d) ClassNotFoundException and NoClassDefFoundError	
	e) Drawback of new keyword	
	f) Method Area, Heap Memory, Stack Memory, PC register, Native Method Stack.	
	g) Garbage Collector	
	h) Heap and Stack diagram Programs	
	i) Execution Engine and JIT Compiler	
21	Arrays in java	10 Hours
	a) 1-D Array, 2-D Array	
	b) Multi-Dimensional Array	
	c) Interview Standard Coding	
	d) Arrays class methods	
22	String Handling in Java	8 Hours
	a) String Immutability	
	b) Various Methods of String class [20 Methods of String class]	

	c) == operator and equals(Object obj) method	
	d) StringBuffer class and its method	
	e) StringBuilder class and its method	
	f) Performance Comparison of StringBuffer and StringBuilder	
	g) StringJoiner class	
23	Exception Handling in Java	12 Hours
	a) Introduction to Exception	
	b) Exception Hierarchy	
	c) Different Criteria of Exception	
	d) try-catch block	
	e) Working with Generic and Specific Exception	
	f) Nested try catch, try with multi catch block (1.7)	
	g) Dealing with Infinity and NaN	
	h) Finally block	
	i) Try with Resources (1.7)	
	j) Exception Propagation	
	k) Checked and Unchecked Exception	
	l) throw and throws keyword	
	m) User-defined checked and unchecked Exception	
	n) Various Test cases with Checked and Unchecked Exception	
	o) Remaining methods of Object class clone() and finalize()	

23	Introduction to Multithreading	14 Hours
	a) Introduction to Process, Thread, Multitaskingand multithreading	
	b) Creating Thread by using Thread class and Runnable interface	
	c) Various methods of Thread class like start(), run(), isAlive(), sleep(long ms), join(), setName() getName(), currentThread(), setPriority(), getPriority()	
	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 Thread Pool	
	j) Inter Thread Communication(ITC)	
	k) Deadlock in multithreading	
	l) interrupt() method of Thread class	
	m) Daemon Thread in Java	
24	Introduction to Java I/O Streams	8 Hours
	a) Introduction to Stream	
	b) Working with Binary Stream and Character Stream	
	c) Reading/Writing data to the File	

	d) Working with various Streams like FileInputStream, FileOutputStream SequenceInputStream, BufferedOutputStream, BufferedInputStream, BufferedOutputStream, DataOutputStream, DataInputStream	
	e) Working with Reader and Writer like FileReader, FileWriter, PrintWriter and so on	
	f) Serialization and De-Serialization	
	g) transient keyword role inSerialization	
25	Collection Framework	26 Hours
	a) Introduction to Collection Framework	
	b) Collection using Legacy classes	
	c) Collection Hierarchy	
	d) Introduction to List, Set and Queue Interface	
	e) Methods of Collections interface	
	f) 7 ways to retrieve Collection objects including forEach() method (1.8), forEachRemaining() and Method Reference	
	g) List interface introduction and Hierarchy	
	h) List interface Methods	
	i) Introduction to List implemented classes ArrayList, LinkedList, Vector and Stack	
	j) ArrayList class with its methods	
	k) LinkedList class with its methods	
	l) Vector class and its Methods	
	m) Stack class and its methods	
	n) Introduction to Set interface and	

	hashing technique	
	o) Hierarchy of Set interface	
	p) Introduction to Set interface and its Methods	
	q) HashSet class with its methods	
	r) LinkedHashSet class with Methods	
	s) Introduction to SortedSet interface	
	t) Comparable and Comparator interface	
	u) TreeSet class with methods	
	v) Methods of SortedSet interface	
	w) Methods of NavigableSet interface	
26	Introduction to Map interface	6 Hours
	a) Map interface Hierarchy	
	b) Map interface Methods	
	c) HashMap class with Methods	
	d) LinkedHashMap class with methods	
	e) Hashtable class with methods	
	f) Properties class with methods	
	g) IdentityHashMap class	
	h) WeakHashMap class	
	i) Introduction to SortedMap interface	
	j) TreeMap class with methods	
	k) Methods of SortedMap	
	l) Methods of NavigableMap	
	m) Introduction to Queue interface	
	n) PriorityQueue class	
27	Working with Generics	4 Hours
	Mixing generic and non-generic collections	
	Polymorphism with Generic	
	Type Erasure in Generic	

	Wild Card in Generic<?>	
28	Concurrent Collections in Java	4 Hours
	a) Limitation of Traditional Collection	
	b) Synchronizing the Traditional Collection	
	c) ConcurrentModification in java	
	d) CopyOnWriteArrayList class	
	e) CopyOnWriteArraySet class	
	f) ConcurrentHashMap class	
29	Streams API	10 hours
	a) Creation of Streams to process the data	
	b) Opertaion on Stream (Intermediate and Terminal)	
	Intermediate Operation Methods: filter(Predicate<T> predicate), map(Function<T, R> mapper) , flatMap(Function<T, Stream<R>> mapper) distinct(), sorted(), sorted(Comparator<T> comparator), peek(Consumer<T> action), limit(long maxSize), skip(long n), takeWhile(Predicate<T> predicate), dropWhile(Predicate<T> predicate)	
	Terminal Operation Methods: forEach(Consumer<T> action), toArray(), collect(Collector<T, A, R> collector), reduce(identity, BinaryOperator<T> accumulator), min(Comparator<T> comparator), max(Comparator<T> comparator), count(), anyMatch(Predicate<T> predicate), allMatch(Predicate<T> predicate), noneMatch(Predicate<T> predicate), findFirst() and	

	findAny()	
30	New Features of Java	5 Hours
	New Date and Time API, Optional class, Record class.	