Chapter 1: Static Methods and Fields (Q1–Q7)

Q1. Which class is at the top of the Java class hierarchy (has no superclass)?

A) System

B) Object

C) String

D) Class

Answer: B

Q2. Which keyword is used to declare a class-level variable or method in Java (shared by all instances)?

A) final

B) static

C) private

D) synchronized

Answer: B

Q3. Which package is imported by default in every Java program?

A) java.math

B) java.util

C) java.lang

D) java.io

Answer: C

Q4. If a method is declared static, which statement is true?

A) It can only be called after creating an instance of its class.

B) It can be called using the class name without an object.

C) It cannot access other static fields.

D) It cannot have any parameters.

Answer: B

Q5. Which of the following is a common way to generate random numbers in Java?

A) Math.random()

B) Integer.parseInt()

C) System.exit(0)

D) String.valueOf()

Answer: A

Q6. Method overloading means:

A) Having two methods with the same name but different bodies in the same class.

B) Having two methods with the same name and same parameter list.

C) Declaring more than one main method in a class.

D) Having a superclass and subclass method with the same signature.

Answer: A

Q7. A static field belongs to:

A) Each instance of the class separately

B) The entire class rather than an instance

C) The JVM's garbage collector

D) None of the above

Answer: B

Chapter 2: Encapsulation and Abstract Data Types (Q8–Q14)

Q8. Encapsulation primarily aims to:

A) Make all fields public

B) Hide internal data and expose operations safely

C) Avoid using constructors

D) Make code compile faster

Answer: B

Q9. The keyword this in Java is used to:

A) Refer to the current class name

B) Invoke the parent class constructor

C) Refer to the current object's instance

D) Access a static variable

Answer: C

Q10. Which of the following is not a benefit of data hiding?

A) Greater maintainability

B) Direct manipulation of internal fields by all classes

C) Better control over data access

D) Protection against unauthorized access

Answer: B

Q11. A static import (import static) allows you to:

A) Import an entire package

B) Automatically import nested classes

C) Access static members without qualifying the class name

D) Override static methods from another class

Answer: C

Q12. The enum type in Java is used for:

A) Declaring a flexible class that can be extended by any subclass

B) Declaring a group of constants with unique identifiers

C) Declaring numeric arrays

D) Overloading methods

Answer: B

Q13. In Java, a good reason to use an enum rather than public static final constants is:

A) Enums can be used with a switch statement and have type safety

B) public static final is faster at runtime

C) Enums cannot have methods or constructors

D) Both are identical in all respects

Answer: A

Q14. Which keyword effectively restricts a field to be accessed only within the same class?

A) public

B) protected

C) private

D) static

Answer: C

Chapter 3: Inheritance (Q15–Q21)

Q15. If class B extends class A, then B is known as:

A) A superclass of A

B) A static class

C) A subclass of A

D) A final class

Answer: C

Q16. The keyword extends in Java:

A) Is used only in interfaces

B) Implements an interface

C) Indicates inheritance from a class or interface

D) Makes a class final

Answer: C

Q17. Which Java keyword is used to access a superclass constructor or method?

A) super

B) this

C) parent

D) extends

Answer: A

Q18. Which of the following is not inherited by subclasses?

A) Private fields of the superclass

B) Public fields of the superclass

C) Protected methods of the superclass

D) Overridden methods of the superclass

Answer: A

Q19. The protected keyword allows access from:

A) Only the same class

B) The same class and its subclasses, plus classes in the same package

C) Everyone (universal access)

D) Only subclasses outside the package

Answer: B

Q20. If class A is declared final:

A) It can still have subclasses

B) It cannot have subclasses

C) It cannot have private members

D) It cannot contain static methods

Answer: B

Q21. Overriding a superclass method in a subclass requires:

A) Same method name, but different parameters

B) Same method signature and the @Override annotation

C) A final method in the superclass

D) The subclass method must be declared private

Answer: B

Chapter 4: Polymorphism (Q22–Q28)

Q22. Polymorphism lets you:

A) Create more classes than necessary

B) Treat objects of different subclasses through a common superclass reference

C) Use the static keyword more effectively

D) Write code that never needs overriding

Answer: B

Q23. Which statement best describes dynamic binding?

A) Method calls are linked at compile time

B) Overloaded methods are selected at run time

C) Overridden methods are determined at run time based on the actual object type

D) The compiler picks the best method based on variable type

Answer: C

Q24. An example of polymorphic behavior is:

A) A method in a superclass calling super(...)

B) Two methods with the same name but different parameter lists

C) Storing both Student and Instructor objects in a List<Person>

D) Casting a String to an int

Answer: C

Q25. If Person p = new Student(...), calling p.someMethod() uses:

A) The version defined in Person if it's overridden

B) Always the version in Person

C) The version in Student if overridden

D) The version in whichever is declared final

Answer: C

Q26. Which is true about abstract classes in Java?

A) They can't contain concrete (non-abstract) methods.

B) They can be instantiated directly.

C) They can have abstract methods that subclasses must implement.

D) They must only contain final methods.

Answer: C

Q27. An interface in Java:

A) Can have public static methods

B) Can't be used with the implements keyword

C) Must contain at least one abstract method

D) Is extended using extends only

Answer: A

(Modern Java allows static and default methods in interfaces.)

Q28. The primary advantage of polymorphism is:

A) Making classes static

B) Reducing method overloading

C) The ability to handle multiple object types with one interface

D) Forcing single inheritance only

Answer: C

Chapter 5: GUIs (Swing) (Q29–Q35)

Q29. Which of the following is not a Swing component?

A) JFrame

B) JTextArea

C) JButton

D) Scanner

Answer: D

Q30. The Swing container typically used as the main window is:

A) JButton

B) JWindow

C) JFrame

D) JDialog

Answer: C

Q31. Event handling in Swing commonly uses:

A) ActionListener

B) Runnable

C) Serializable

D) System.out.println

Answer: A

Q32. Which layout manager arranges components left to right in a row?

A) BorderLayout

B) FlowLayout

C) GridLayout

D) CardLayout

Answer: B

Q33. To safely update a Swing component from a background thread, you typically use:

A) Thread.sleep()

B) System.exit(0)

C) SwingUtilities.invokeLater()

D) Object.wait()

Answer: C

Q34. JLabel is primarily used for:

A) Displaying images only

B) Displaying text and/or images without user interaction

C) Accepting user text input

D) Handling file I/O tasks

Answer: B

Q35. The advantage of using layout managers in Swing is:

A) You can only place one component on screen

B) Platform-independent component arrangement

C) They never need resizing

D) They disable user input

Answer: B

Chapter 6: Exception Handling (Q36–Q42)

Q36. Which of these is the parent of all exception classes in Java?

A) Object

B) Throwable

C) Exception

D) RuntimeException

Answer: B

Q37. A try block must be followed by:

A) Another try block

B) A finally block only

C) Either a catch block or a finally block (or both)

D) A throws clause

Answer: C

Q38. What does the finally block do?

A) It's executed if and only if an exception is thrown

B) It's always executed, regardless of whether an exception was thrown

C) It's never executed if an exception is thrown

D) It must contain a return statement

Answer: B

Q39. A checked exception in Java:

A) Must be declared in a throws clause or handled by a try/catch

B) Never needs to be caught or declared

C) Is a subclass of RuntimeException

D) Is always thrown automatically by the JVM

Answer: A

Q40. throw vs. throws:

A) throw is used to declare that a method can throw exceptions, throws is used to actually throw it

B) throw is a statement that actually throws an exception object, throws is used in a method declaration

C) Both are interchangeable

D) throws is not a Java keyword

Answer: B

Q41. An example of an unchecked exception is:

A) IOException

B) FileNotFoundException

C) NumberFormatException

D) ClassNotFoundException

Answer: C

Q42. Chained exceptions are primarily used to:

A) Speed up the catch block

B) Link the cause of an exception to a new exception for better debugging

C) Create multiple exceptions from a single error

D) Replace the stack trace

Answer: B

Chapter 7: File Processing (Q43–Q49)

Q43. Which class is commonly used to read text from a file in Java?

A) Scanner

B) Thread

C) StringBuilder

D) ExecutorService

Answer: A

Q44. The File class can be used to:

A) Store only images

B) Execute SQL queries

C) Retrieve file and directory info (like paths, existence)

D) Spawn new threads automatically

Answer: C

Q45. Which stream classes are used for text file reading and writing in Java?

A) FileReader and FileWriter

B) DataInputStream and DataOutputStream

C) FileInputStream and FileOutputStream

D) ObjectInputStream and ObjectOutputStream

Answer: A

Q46. A binary file is typically read/write using:

A) System.out.println

B) FileReader and BufferedReader

C) FileInputStream and FileOutputStream

D) Scanner

Answer: C

Q47. ObjectOutputStream is primarily used to:

A) Serialize Java objects to a stream

B) Write text lines only

C) Execute a system command

D) Close file handles

Answer: A

Q48. JFileChooser is a:

A) Non-GUI class for reading database connections

B) Swing component for file selection dialogs

C) Class for random number generation

D) Utility class for concurrency

Answer: B

Q49. Random-access file processing in Java is often handled by:

A) RandomAccessFile class

B) Scanner

C) StringTokenizer

D) BufferedReader

Answer: A

Q50 (Covers Chapters 1–7 Overall). Which concept from OOP ensures that class data is hidden and accessed through methods?

A) Polymorphism

B) Encapsulation

C) Inheritance

D) Overloading

Answer: B

Hard Level (Questions 51–100)

Chapter 8: Recursion (Q51–Q57)

Q51. A base case in a recursive method is:

A) A case where the method calls itself twice

B) A condition that stops further recursive calls

C) A loop that never ends

D) A default constructor

Answer: B

Q52. Recursion vs. iteration: which statement is true?

A) Recursion always runs faster

B) Iteration always uses less memory

C) Both can solve similar problems; recursion may use more stack space

D) Iteration requires more code than recursion in Java

Answer: C

Q53. A risk of using recursion is:

A) It can never handle loops

B) It might lead to StackOverflowError if the recursion is too deep

C) It always overrides the equals() method

D) It can’t handle searching or sorting

Answer: B

Q54. A recursive step usually:

A) Closes all file streams

B) Divides the problem and calls the method again

C) Overloads the method name

D) Switches from text to binary processing

Answer: B

Q55. Which is not a typical reason to use recursion?

A) To easily implement divide-and-conquer algorithms

B) To handle hierarchical data structures

C) To reduce memory usage in all cases

D) To implement backtracking solutions

Answer: C

Q56. When might tail recursion be optimized by some compilers or languages?

A) When the recursive call is the last statement in the function

B) When a constructor is declared private

C) When using a static block

D) Java automatically optimizes all recursion

Answer: A

(Note: Java does not do tail recursion optimization, but some languages do.)

Q57. Which type of recursion calls itself exactly once each time?

A) Tree recursion

B) Multiple recursion

C) Direct recursion

D) Tail recursion

Answer: D

(Tail recursion also implies it's the last operation; though be aware definitions can vary.)

Chapter 9: Searching and Sorting (Q58–Q64)

Q58. Which search algorithm has a worst-case time complexity O(n)?

A) Binary search

B) Linear search

C) Merge sort

D) Quick sort

Answer: B

Q59. Binary search requires:

A) The data to be unsorted

B) A linked list data structure

C) The data to be in a sorted structure

D) A pivot for each comparison

Answer: C

Q60. The worst-case complexity of insertion sort is:

A) O(1)

B) O(log n)

C) O(n)

D) O(n^2)

Answer: D

Q61. A merge sort algorithm uses which approach?

A) Greedy approach

B) Divide-and-conquer

C) Backtracking

D) Brute force

Answer: B

Q62. Which of the following is not typically used for sorting in Java's Arrays or Collections classes?

A) Merge sort

B) Tim sort

C) Bubble sort

D) Quick sort

Answer: C

(Java's built-in sort is typically a variant of Tim sort or dual-pivot quicksort, not bubble sort.)

Q63. Binary search on an array with n elements has a worst-case complexity of:

A) O(n^2)

B) O(log n)

C) O(n)

D) O(1)

Answer: B

Q64. Loop invariants are used to:

A) Prove the correctness of loops and algorithms

B) Make loops run infinitely

C) Guarantee dynamic binding

D) Replace recursion with iteration

Answer: A

Chapter 10: Linked Data Structures (Q65–Q71)

Q65. A linked list node typically contains:

A) Data and references to the previous/next nodes

B) No data, only methods

C) Static methods for arithmetic

D) A random index for O(1) lookup

Answer: A

Q66. Which operation is typically faster on a linked list than on an array?

A) Random access by index

B) Iteration from start to finish

C) Inserting an element at the head

D) Sorting the entire collection

Answer: C

Q67. A stack data structure follows which principle?

A) FIFO (First In, First Out)

B) LIFO (Last In, First Out)

C) Sorting-based insertion

D) Priority-based retrieval

Answer: B

Q68. A queue data structure typically enqueues items at the:

A) Front of the queue

B) Middle of the queue

C) Tail (rear) of the queue

D) Stack portion of the queue

Answer: C

Q69. Which is true about a singly linked list?

A) Each node typically has only one reference to the next node

B) It can be traversed forwards and backwards efficiently

C) It requires a separate sentinel node for each element

D) It has built-in random indexing

Answer: A

Q70. auto-boxing in Java occurs when:

A) Converting an int to an Integer automatically

B) Removing duplicates from an array

C) Using switch on enum values

D) Casting a superclass to a subclass

Answer: A

Q71. A binary tree node usually has references to:

A) Only one child

B) Exactly two children

C) Zero or up to two children (left and right)

D) A random index pointer

Answer: C

Chapter 11: Generic Classes and Methods (Q72–Q78)

Q72. Generics in Java help with:

A) Improving reflection

B) Providing type safety at compile time

C) Overriding static methods

D) Eliminating the need for inheritance

Answer: B

Q73. A generic class in Java might look like:

A) public class Box<T> { ... }

B) public class Box<???> { ... }

C) public class Box<generics> { ... }

D) public class Box(type) { ... }

Answer: A

Q74. When you see <? extends Number> in a method signature, it means:

A) The method can only accept arrays

B) The collection holds objects of type Number or any subclass of Number

C) No primitive types allowed

D) It's an illegal Java syntax

Answer: B

Q75. List<?> is called a:

A) Raw type

B) Bounded wildcard

C) Unbounded wildcard

D) Type erasure

Answer: C

Q76. Which is true about generics and arrays in Java?

A) You can create arrays of parameterized types easily (e.g., new ArrayList<String>[10])

B) Java forbids arrays of parameterized types

C) Arrays of parameterized types are allowed but produce no warnings

D) They're allowed but with a warning about unchecked operations

Answer: D

(Creating arrays of parameterized types leads to compile-time warnings / potential issues.)

Q77. A raw type in generics:

A) Is the use of a generic class without specifying a type parameter

B) Forces the code to be strictly typed

C) Is required by the Java Virtual Machine to run generics

D) Is no longer supported in Java

Answer: A

Q78. Overloading generic methods means:

A) You cannot have two generic methods in the same class

B) You can have the same method name with different parameter types (generic or not)

C) Must use synchronized on all methods

D) Is not permitted in modern Java

Answer: B

Chapter 12: Collections Framework (Q79–Q85)

Q79. Which of these is not part of the Java Collections Framework?

A) List

B) Set

C) Map

D) StringBuilder

Answer: D

Q80. Arrays.asList(...) returns:

A) An unmodifiable list

B) A fixed-size list backed by the original array

C) A thread-safe array

D) A copy of the array as a new list

Answer: B

Q81. The HashMap in Java:

A) Maintains insertion order

B) Does not allow null keys

C) Uses hashing to store and retrieve key-value pairs

D) Sorts keys automatically

Answer: C

Q82. The Collections.sort(...) method:

A) Sorts only arrays, not lists

B) Sorts lists in place

C) Returns a new sorted list but leaves the original unchanged

D) Only works for HashSet

Answer: B

Q83. To traverse a List<E> polymorphically, you can use:

A) Iterator<E>

B) Only a while loop

C) The Runnable interface

D) FileReader

Answer: A

Q84. A Properties object in Java:

A) Stores key-value pairs as strings, often used for configuration

B) Is used to handle exceptions

C) Implements the Collection interface

D) Cannot store data at runtime

Answer: A

Q85. The method Collections.synchronizedList(...) returns:

A) An immutable list

B) A thread-safe wrapper around the given list

C) A new LinkedList

D) A copy that cannot be changed

Answer: B

Chapter 13: Multithreading (Q86–Q92)

Q86. The life cycle of a thread in Java includes states like:

A) NEW, RUNNABLE, BLOCKED, WAITING, TERMINATED

B) ALIVE, DEAD, SLEEPING, IDLE

C) FREE, ALLOCATED, EXPIRED

D) None of the above

Answer: A

Q87. Implementing the Runnable interface allows a class to:

A) Override all methods in Thread

B) Be used in a try-with-resources

C) Provide a run() method that can execute in a new thread

D) Avoid using synchronized

Answer: C

Q88. Which is not a recommended way to handle concurrency in a shared resource?

A) Using synchronized blocks

B) Using ReentrantLock

C) Using volatile on all local variables

D) Using thread-safe data structures

Answer: C

Q89. The join() method in Java:

A) Stops a thread permanently

B) Forces the calling thread to wait for another thread to finish

C) Immediately terminates the JVM

D) Changes the thread's priority

Answer: B

Q90. A common pattern for producer-consumer relationships in Java uses:

A) StackOverflowError

B) Scanner and Formatter

C) A shared queue with wait() and notify() or notifyAll()

D) StringTokenizer

Answer: C

Q91. In Swing, updating GUI components from a background thread requires:

A) A direct call to component.repaint() from any thread

B) Using the Event Dispatch Thread via SwingUtilities.invokeLater()

C) Changing the thread priority to high

D) Throwing an InterruptedException

Answer: B

Q92. The Callable<V> interface differs from Runnable because:

A) It cannot be executed by an ExecutorService

B) It returns a result (and can throw checked exceptions)

C) It must be declared static

D) It does not contain a run() method

Answer: B

Chapter 14: Networking (Q93–Q99)

Q93. Which class is used to create a server socket in Java?

A) ServerSocket

B) SocketServer

C) SocketHandler

D) DatagramSocket

Answer: A

Q94. A Socket in Java typically represents:

A) An open network connection between two machines

B) A local file path

C) A collection class for storing user objects

D) A method for reading user input from console

Answer: A

Q95. UDP-based communication in Java typically uses:

A) ServerSocket and Socket

B) DatagramSocket and DatagramPacket

C) FileReader and FileWriter

D) RandomAccessFile

Answer: B

Q96. In a multithreaded server, each client is often handled by:

A) A single static method

B) A shared global variable

C) A separate thread or a thread pool

D) One large main() method

Answer: C

Q97. To open a URL connection in Java, you might use:

A) URL url = new URL("http://..."); then url.openConnection()

B) Thread.sleep(100)

C) Integer.parseInt("123")

D) System.currentTimeMillis()

Answer: A

Q98. A typical client-server model in Java:

A) Requires that the client is always on the same machine

B) Uses ServerSocket on the server side, and Socket on the client side

C) Must use only DatagramSocket

D) Does not need I/O streams

Answer: B

Q99. When building a collaborative network application in Java, it's common to:

A) Share the same Socket across multiple clients without synchronization

B) Have the server handle concurrency via multiple threads

C) Close the server after the first client connects

D) Rely on file-based communication only

Answer: B

Q100 (Chapters 8–14 Overall). In Java, a StackOverflowError often indicates:

A) An empty stack in a data structure

B) Excessively deep recursion or infinite recursion

C) Too many open files

D) A syntax error in your code

Answer: B