

Exam #2 Topic List

Purpose: Students often appreciate receiving a list of topics that will be covered on upcoming exams. My usual answer to the question “Which topics should we study for the exam?” is “All of ’em!” While that’s true, it’s also not explicit.

Please note that this is not meant to be an exhaustive list of exam topics; rather, it’s meant to hit the highlights and ensure that you don’t overlook a critical topic.

1. Arrays
 - (a) Declaration, allocation and usage of 2-D arrays
 - (b) Handling command-line arguments
2. Exceptions
 - (a) Exception class hierarchy (esp. checked vs. unchecked exceptions)
 - (b) Managing exceptions (propagation, `try{}` and `catch{}`)
 - (c) Throwing exceptions
3. Files
 - (a) Text vs. binary files
 - (b) `System.in`, `System.out`, `System.err`
 - (c) File status (existing, readable, etc.)
 - (d) Text file I/O: `Scanner`, `PrintWriter`, and `BufferedReader`
 - (e) Binary file I/O: `FileInputStream`, `FileOutputStream`, `DataInputStream`, `DataOutputStream`
 - (f) Object I/O: `ObjectInputStream`, `ObjectOutputStream`, `Serializable`
4. Class Reuse
 - (a) Class composition and adaptation (“has a”), UML representation
 - (b) Inheritance (“is a”); Overriding vs. Overloading
 - (c) Abstract classes
 - (d) Generics (parameterized types, e.g. “`List<E>`”)
 - (e) Interfaces: Separation of interface from implementation, Java’s interfaces, creating our own
5. Lists
 - (a) Abstract Data Types (ADTs) and their relationship to Java classes
 - (b) List operations: create, destroy, size, capacity, `isEmpty`, `isFull`, `insert`, `append`, `prepend`, `delete`
 - (c) Java’s `List` interface
 - (d) Array representation for lists (implementing list operations)

6. Stacks (“LIFO”) and Queues (“FIFO”)

- (a) Stack operations: push, pop, peek
- (b) Infix → Postfix stack-based conversion algorithm
- (c) Queue operations: enqueue, dequeue
- (d) Stack and queue array representations (inc. circular arrays for queues)

7. Java classes and methods to know how to use (beyond those from Exam 1):

- (a) Exception: `getClass().getName()`, `getMessage()`, `printStackTrace()`
- (b) File: `exists()`, `canRead()`, `canWrite()`, `isDirectory()`
- (c) Scanner: `nextLine()`, `hasNext()`
- (d) PrintWriter: `println()`
- (e) BufferedReader: `readLine()`, `read()`
- (f) DataInputStream: `read___()` (that is, `readInt()`, `readDouble()`, etc.)
- (g) DataOutputStream: `write___()` (that is, `writeInt()`, `writeDouble()`, etc.)
- (h) ObjectInputStream: `readObject()`
- (i) ObjectOutputStream: `writeObject()`
- (j) List: `add(E)`, `add(int,E)`, `remove(int)`, `remove(Object)`