

## Exam #1 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 detailed.

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

### 1. Variables and Types:

- (a) Primitive types (`int`, `double`, etc.)
- (b) Integer representation (two’s complement)
- (c) Constants and literals
- (d) Arithmetic promotion (e.g., `int * double` becomes `double * double`),
- (e) Assignment conversion (e.g., trying to assign a `double` to an `int` is bad)
- (f) Type casting (e.g., `(double)12`)
- (g) Type suffixes (e.g., `15.6F`)
- (h) Arrays: declaration, allocation, initialization, insertion, deletion

### 2. Statements:

- (a) Assignment (e.g.; `a = 6;`), math operators
- (b) Selection: relational operators, logical operators, `if`, `if-else`, `switch`, short-circuit evaluation
- (c) Iteration: `while`, `for`, `do-while`
- (d) Increment/Decrement Operators (e.g., `i++` and `--j`)
- (e) Compound Assignment Operators (e.g., `k += 2`)
- (f) Output: `System.out.print()`, `.println()`, `.printf()`, including `printf`’s format specifiers `%d`, `%f`, and `%s` (e.g., `%5d`, `%7.2f`, `%-8s`)

### 3. Object-Orientation:

- (a) Terminology: object, class, state, methods (instance and class), variables (instance and class), constructors, references
- (b) UML Diagrams: Class representation (class name, attributes (variables), operations (methods))
- (c) Wrapper classes (e.g., `Integer` and `Character`)
- (d) Autoboxing and unboxing
- (e) Class Definition: writing constructors and class/instance methods, formal and actual parameters, pass-by-value parameters

### 4. Classes and Methods to know how to use:

- (a) `Math`: `pow()`, `sqrt()`
- (b) `Scanner`: `hasNext()`, `nextDouble()`, `nextInt()`
- (c) `String`: `charAt()`, `compareTo()`, `length()`, `substring()`
- (d) `StringBuffer` and `StringBuilder`: `charAt()`, `insert()`, `setCharAt()`
- (e) `Character`: `isDigit()`, `isLowerCase()`, `isUpperCase()`, `toLowerCase()`, `toUpperCase()`
- (f) `Integer`: `parseInt()`

### 5. ... and don’t forget to review what you learned from the sample programs, assignments, and quiz!