

Trainer: Mohamamd Rajaul Islam

**JAVA SE FUNDAMENTALS**

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## **Course Curriculum:**

### **Java Basics**

- Define the scope of variables
- Define the structure of a Java class
- Create executable Java applications with a main method; run a Java program from the command line; produce console output
- Import other Java packages to make them accessible in your code
- Compare and contrast the features and components of Java such as: platform independence, object orientation, encapsulation, etc.
- Assignments
- Exam(MCQ, Coding)

### **Working With Java Data Types**

- Declare and initialize variables (including casting of primitive data types)
- Differentiate between object reference variables and primitive variables
- Know how to read or write to object fields
- Explain an Object's Lifecycle (creation, "dereference by reassignment" and garbage collection)
- Develop code that uses wrapper classes such as Boolean, Double, and Integer
- Assignments

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### **Using Operators and Decision Constructs**

- Use Java operators; use parentheses to override operator precedence
- Test equality between Strings and other objects using == and equals ()
- Create if and if/else and ternary constructs
- Use a switch statement
- Assignments
- Exam(MCQ, Coding)

### **Creating and Using Arrays**

- Declare, instantiate, initialize and use a one-dimensional array
- Declare, instantiate, initialize and use multi-dimensional arrays
- Using Loop Constructs
- Create and use while loops
- Create and use for loops including the enhanced for loop
- Create and use do/while loops
- Compare loop constructs
- Use break and continue
- Assignments
- Exam(MCQ, Coding)

### **Working with Methods and Encapsulation**

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- Create methods with arguments and return values; including overloaded methods
- Apply the static keyword to methods and fields
- Create and overload constructors; differentiate between default and user defined constructors
- Apply access modifiers
- Apply encapsulation principles to a class
- Determine the effect upon object references and primitive values when they are passed into methods that change the values

### **Working with Inheritance**

- Describe inheritance and its benefits
- Develop code that makes use of polymorphism; develop code that overrides methods; differentiate between the type of a reference and the type of an object
- Determine when casting is necessary
- Use super and this to access objects and constructors
- Use abstract classes and interfaces

### **Handling Exceptions**

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- Differentiate among checked exceptions, unchecked exceptions, and Errors
- Create a try-catch block and determine how exceptions alter normal program flow
- Describe the advantages of Exception handling
- Create and invoke a method that throws an exception
- Recognize common exception classes (such as NullPointerException, ArithmeticException, ArrayIndexOutOfBoundsException, ClassCastException)

### **Working with Selected classes from the Java API**

- Manipulate data using the StringBuilder class and its methods
- Create and manipulate Strings
- Create and manipulate calendar data using classes from java.time.LocalDateTime, java.time.LocalDate, java.time.LocalTime, java.time.format.DateTimeFormatter, java.time.Period
- Declare and use an ArrayList of a given type
- Write a simple Lambda expression that consumes a Lambda Predicate expression

### **Collection Api**

- List
- Set

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- LinkedList
- Map
- ArrayList
- HashSet
- HashMap

**After completing above contents, you have to complete the following projects.**

**Projects:** *All projects are command line application*

- University Class Schedule
- Morse code
- National Election

**GITHUB:** I will teach you how to use GITHUB Basic usages and your projects will be available at GITHUB

**Trainers Guidelines:**

- I shall discuss every topic in detail, if you do not understand anything, you can ask me until you understand. I believe, your success is my success.
- Out of class, you may ask me through different approach like website comment, Skype chat, WhatsApp chat or event live chat if necessary. You are allowed to call me too.
- You must have to pass all exams if you want to get the certificates from me.
- If you cannot maintain time due to your other academic exams, then you will be able to review your course when I run new batch on similar course.