<https://docs.oracle.com/javase/specs/jls/se7/html/index.html>

What you should know/master:

* **Introduction**
  + The history of java
  + How java started?

Java was started as a project called "Oak" by James Gosling in June 1991. Gosling's goals were to implement a virtual machine and a language that had a familiar C-like notation but with greater uniformity and simplicity than C/C++. The first public implementation was Java 1.0 in 1995.

* + How to run a java code?

In Command prompt run file ending with .java, there are probably other methods, but this what I know.

* + Run "Hello, World!"code.
  + What is JVM? How java use it?
  + Java Virtual Machine (JVM) is a engine that provides runtime environment to drive the Java Code or applications. It converts Java bytecode into machines language. JVM is a part of Java Runtime Environment (JRE).
  + What is JDK? How java use it?
  + Java Development Kit (JDK) is a software development environment used for developing Java applications and applets. It includes the Java Runtime Environment (JRE), an interpreter/loader (Java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc), and other tools needed in Java development.
  + What is OOP? How java use it?

Object-oriented programming is a method used for designing a program using classes and objects. Object-oriented programming is also called the core of java. Object-oriented programming organizes a program around objects and well-defined interfaces.

* + What is the last java edition? Did you update your computer to the latest java edition?Java SE 16.0. 2, Yes!
  + What is java garbage collector?

Java applications obtain objects in memory as needed. It is the task of garbage collection (GC) in the Java virtual machine (JVM) to automatically determine what memory is no longer being used by a Java application and to recycle this memory for other uses.

* + Do you know all java keywords? **Insha’Allah**
  + Is java compiled or interpreted language? Explain the difference.

Interpreted. the difference between a compiled and interpreted language is that an interpreted language is compiled into an intermediary form and not machine code. Compiled code can run faster, but, unlike interpreted code in Java, it is not platform agnostic.

* + Where does the java program always starts? Main method
  + Types of errors in java? syntax errors, runtime errors, and logic errors.
  + What is the standard output in java? The Print class called through the System.
  + What are the Integrated Development Environments (IDEs) that run java code? Which one do you use? Eclipse, Netbeans, IntelliJ. **I have IntelliJ.**
  + How to run a java code from the command prompt on your OS?

Open a command prompt window and go to the directory where you saved the java program (MyFirstJavaProgram. java). ...

Type 'javac MyFirstJavaProgram. ... to compile.

Now, type ' java MyFirstJavaProgram ' to run your program.

* + What happens to your code after you ask the JVM to compile the code?

Java source code is compiled into bytecode when we use the (javac) compiler. The bytecode gets saved on the disk with the file extension . ... When the program is to be run, the bytecode is converted, using the just-in-time (JIT) compiler. The result is machine code which is then fed to the memory and is executed.

* + What is java API? How to get the benefit from it in your program?

APIs are important software components bundled with the JDK. APIs in Java include classes, interfaces, and user Interfaces. They enable developers to integrate various applications and websites and offer real-time information.

* **Understanding java structure and syntax**
  + What is a class-based programming language?

A programming language in which behavior reuse (or inheritance) is performed via cloning classes instead of using objects as prototypes.

* + What is the structure for a java class?
    - Package statement.
    - Import command.
    - Comments.
    - Declare and define class.
    - Variables.
    - Methods.
    - The constructors.
  + What are the access modifiers in java?

Private, Default, Protected, Public.

* + What is the data field in a java class? How to write it?

A container with associated data. It serves as the descriptive properties of a class. A class is any entity on which data is collected. If for example we are collecting data on a set of students (class), then the student properties (data fields) will be: name, address, age, and subject.

//The Java class will be defined as follows:

Public Class Student {string name; string address; integer age; string subject;}

* + What does constructors do in a java class? How to write them?

A Java class constructor initializes instances (objects) of that class. Typically, the constructor initializes the fields of the object that need initialization. Java constructors can also take parameters, so fields can be initialized in the object at creation time.

/\*\*Defining a Constructor in Java

//Here is a simple Java constructor declaration example. The example shows a very simple Java class with a single constructor.\*/

public class MyClass {

public MyClass() {

}}

* + What does methods do in a java class? How to write them?

A method is a block of code which only runs when it is called.

You can pass data, known as parameters, into a method.

Methods are used to perform certain actions, and they are also known as functions.

* + What is class scope and method scope?

Class level scope (instance variables): any variable declared within a class is accessible by all methods in that class. Depending on its access modifier (ie. public or private), it can sometimes be accessed outside the class.

Method level scope (local variables): any variable declared within a method, arguments included, is NOT accessible outside that method.

* + What is local variable and class instance?

Local variables are not visible outside the method. Instance variables are declared in a class, but outside a method. They are also called member or field variables. Class/static variables are declared with the static keyword in a class, but outside a method.

* + what is return type in methods means?

The return keyword means that a method returns the result of that particular line of code, where the type of that result matches the return type specified in the method's signature. In this case, this is the int keyword before the name of the method, i.e. add.

* + How to call methods inside and outside a class? Inside no need to put class name before method(). Outside you need class.method().
  + What is a static method? When do we need it?

Static methods are the methods in Java that can be called without creating an object of class. They are referenced by the class name itself or reference to the Object of that class.. If you have a method that does not use any instance variables or instance methods, you should probably make it static.

* + What is a static data field? When do we need it?

Static is when you want to have a variable that always has the same value for every object of the class, forever and ever.

* **Storing data in a java program** 
  + What is a java object? What does it do?

A Java object is a member (also called an instance) of a Java class. Each object has an identity, a behavior and a state.

The state of an object is stored in fields (variables), while methods (functions) display the object's behavior.

* + How objects are created?

Objects are created at runtime from templates, which are also known as classes.

In Java, an object is created using the keyword "new".

* + What is the link between a variable and an object?

Variables are properties an object knows about itself. All instances of an object have their own copies of instance variables, even if the value is the same from one object to another. One object instance can change values of its instance variables without affecting all other instances.

* + How to remove object from memory?

There is no delete in java, and all objects are created on the heap. The JVM has a garbage collector that relies on reference counts.

Once there are no more references to an object, it becomes available for collection by the garbage collector.

* + What is variable declaration and creation?

To create a variable, you must tell Java its type and name. ... Creating a variable is also called declaring a variable. When you create a primitive variable Java will set aside enough bits in memory for that primitive type and associate that memory location with the name that you used.

* + What is variable data type?

A variable can be thought of as a memory location that can hold values of a specific type. The value in a variable may change during the life of the program—hence the name “variable.” ... A variable that holds integers (whole numbers) has the data type Integer and is called an integer variable.

* + How to pass data between variables? (Primitive values or objects)

There are 2 ways of passing variable or passing a class object into a function:

passing by value. In this case, the value of the argument is copied to the formal parameter of the function. Since a copy of the argument is created in the function, all changes over the copy will not affect the value of the argument;

passing by reference. In this case, a reference to the argument that is used for the call is passed to parameter. Using this reference has access to the argument. Thus, all changes made in the body of the function over the value of the parameter will change the value of the argument that was passed to the function.

* + Is it possible to convert the variable data type? (Primitive to primitive, primitive to reference or reference to primitive) Yes.
  + What are the conversions that cannot happen between data types?
    - <https://docs.oracle.com/javase/specs/jls/se7/html/jls-5.html>

<https://i0.wp.com/techvidvan.com/tutorials/wp-content/uploads/sites/2/2020/03/implicit-type-conversion-in-java.jpg?ssl=1>

answer in link

* + When do you use casting?

When to get access to fields and methods declared on the target type or class. You can not access them with any other type.

* + What is the difference between primitive and reference variables?

Variables in Java are classified into primitive and reference variables. From the programmer's perspective, a primitive variable's information is stored as the value of that variable, whereas a reference variable holds a reference to information related to that variable. reference variables are practically always objects in Java.

* + What is java array? How to create one?

An array is a group of like-typed variables that are referred to by a common name.

First, you must declare a variable of the desired array type. Second, you must allocate the memory that will hold the array, using new, and assign it to the array variable. Thus, in Java all arrays are dynamically allocated.

* + How to manipulate objects in a java array?

Need an array list with treating its methods to manipulate object entries.

* + How to pass Data in the right way? Is there a difference between passing primitive data and referenced data? No difference
  + When can you manipulate object from more than one location in the code? idk
  + How can you make a constant variable in a Java class?

Constants in Java are used when a ‘static‘ value or a permanent value for a variable has to be implemented. Java doesn’t directly support constants. To make any variable a constant, we must use ‘static’ and ‘final’ modifiers in the following manner:

//Syntax to assign a constant value in java:

static final datatype identifier\_name = constant;

The static modifier causes the variable to be available without an instance of it’s defining class being loaded

The final modifier makes the variable unchangeable

* **Program controls**
  + If
  + Switch
  + While
  + For
* **Documentation**
  + Java Doc
  + UML diagram
  + Comments
* **Java community**
  + What are the common pitfalls in java?
    - Not understanding that String is an immutable class: The Java String class is immutable (Unmodifiable). ...
    - Example:
    - Memory Leaks: ...
    - Pre/Post Increment Operator and side-effects: ...
    - Using the relational operator “==” for Objects comparison. ...
    - Using raw types.
  + Where can you get support?

<https://java.com/help>

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