Java Interview questions notes

History of Java

Java is an object-oriented programming language released by Microsystems in 1995.

Write Once, Run Anywhere(WORA), cross platforms unlike c++.

Borrowed syntax from c++, but provide automatic memory management and eliminate multiple inheritance.

The java virtual machine

WORA is possible because of JVM, in java, code is compiled into a virtual machine language called bytecode. The JVM acts as an intermediary between bytecode and the physical machine.

Every platform that supports Java has its own implementation of the JVM. Java applications are portable because every JVM adheres to a standard interface. The distribution package of   the JVM and standard libraries is called the Java Runtime Environment (JRE). The distribution package of the JRE and development tools, such as the compiler and debugger, is called the JDK.

Procedural Programming vs Object-Oriented Programming

Procedural programming is writing code that executes a series of linear procedures to produce a result. Object-oriented programming is writing code that uses objects to encapsulate attribute and behavior. Procedural code is easier to use in small projects or in multithreaded environments due to its stateless nature, but object-oriented code is far more flexible and easier to maintain.

What is the WORA principle? Why is it beneficial?

Write once and run anywhere, due to the java virtual machine, java code could run on different platforms, it could reduce programmer’s workload, which means they do not need to implement the same application on different platforms, it is time-consuming.

How could java applications run on multiple platforms?

Due to the java virtual machine, every platform has its own implementation of JVM, java code is compiled in an intermediary language called bytecode. JVM translate bytecode into machine language and then run the code.

What is the difference between the JRE and the JDK?

JRE is a package of JVM and java standard libraries.

JDK is a package of JRE and development tools such as debugger, compiler.

What is the difference between procedural programming and object-oriented programming?

Procedural programming is writing linear procedures to produce a result. It is suitable in small projects or in multithreaded environments due to its stateless nature.

Object-oriented programming is writing objects that encapsulate attributes and behaviors. It is flexible to use and easier to maintain.

Object-Oriented Concepts

What is the purpose of abstraction in software development?

Abstraction is the act of perceiving an entity from a narrow perspective. The goal of abstraction is to reduce the complexity in software systems.

What is encapsulation? How does java support it?

Encapsulation is a technique that encourages abstraction by hiding information. Java encourage encapsulation through the use of interfaces and by providing access modifiers that could limit the visibility of classes, fields and methods.

What is polymorphism? How does java support it?

Polymorphism is a technique that encourages abstraction by allowing an entity to assume multiple forms. In Java, an object can take on the form of any parent in its hierarchy or any interface in its hierarchy.

Class&Object

What is the difference between a class and an object?

Class is the blueprint of object, object is an instance of class.

Class define object’s fields and methods, object use new keyword to initialize class.

When initialize an object, class loader will load the class file and all of its superclasses first, after the one-time initialization of the class, the object will invoke a special method called a constructor method. Superclass first, then subclasses.

What happens when an object is instantiated for the first time?

Java virtual machine will load its class and all its superclasses into the memory. After the initialization of the class, the object will invoke a special method called constructor to initialize itself. The constructor method will recursively invoke all of the constructors of its superclasses.

What is the difference between a primitive type and an object?

A primitive type is a fixed-size data type that is predefined and reserved as a keyword.

Primitive types are not objects, but every primitive type has a corresponding wrapper object.

What is the difference between autoboxing and unboxing?

Autoboxing means primitive types convert to its wrapper objects

Unboxing mean wrapper objects convert to its primitive types.

Array

What is an array?

Array is an object that hold a fixed number of values of a single type.

Array could cast to its superclass type. String[] 🡪 Object[]

Strings

How is a String different from a regular object?

Strings are unique objects that are used to represent text.

Can be initialized without new keyword.

Can be concatenated via the overload + operator.

Cache it in a process called interning.

What is the difference between a StringBuilder and a StringBuffer?

StringBuffer is thread-safe, but StringBuilder is not.

If your program is single thread, use StringBuilder is more efficient; if it is a multiple threads, use StringBuffer ensure its thread safe.

Why are enums superior to String or Integer constants?

Represent a set of single-instance constants.

Could contain methods, implement interfaces and provide type safety.

Enums could not be subclassed or extend any class besides the implicitly extended Enum class.

What is difference between package-by-layer and package-by-feature?

Package-by-feature is preferable.

What is the difference between a method declaration and a method signature?

Method declaration contains a list of modifiers, a return type, a method name, a list of parameter types and their corresponding names and a list of throwable exceptions.

Method signature contains method name, the types and order of its parameters, not parameters’ names included.

What is recursive method?

A method call itself, a alternative to loop.

What is the final keyword used for?

Final keyword indicates whether a reference can be changed after being assigned.

Final class could not be extended. All its methods are final methods.

Final methods could not be overriding.

Final fields could not be changed, they are constants.

What is the static keyword used for?

Static keyword indicates a property belongs to a class or an object instance.

Why can’t a static method access a nonstatic field?

Since static method usually call by the class name, nonstatic fields belongs to objects. When calling the method, there is no object, so these nonstatic fields are not initialized.

What are access modifiers used for? What are the different types?

Indicate the visibility of classes, fields and methods.

Public: visible to all classes

Protected: visible to subclasses and classes in the same package

Default: visible to the same package

Private: visible to the inner class

What are annotations used for?

Annotations are applied to fields, methods, classes and packages used to embed metadata alongside code.