What is final in Java? Final variable, Method and Class Example

# What is final keyword in Java?

Final is a keyword or reserved word in java and can be applied to member variables, methods, class and local variables in Java. Once you make a reference final you are not allowed to change that reference and compiler will verify this and raise compilation error if you try to re-initialized final variables in java.

# What is final variable in Java?

Any variable either member variable or local variable (declared inside method or block) modified by final keyword is called final variable. Final variables are often declare with static keyword in java and treated as constant. Here is an example of final variable in Java

public static final String LOAN = "loan";

LOAN = new String("loan") //invalid compilation error

Final variables are by default read-only.

# What is final method in Java

Final keyword in java can also be applied to methods. A java method with final keyword is called final method and it can not be overridden in sub-class. You should make a method final in java if you think it’s complete and its behavior should remain constant in sub-classes. Final methods are faster than non-final methods because they are not required to be resolved during run-time and they are bonded on compile time. Here is an example of final method in Java:

class PersonalLoan{

public final String getName(){

return "personal loan";

}

}

class CheapPersonalLoan extends PersonalLoan{

@Override

public final String getName(){

return "cheap personal loan"; //compilation error: overridden method is final

}

}

public class TestFinal {

public static void main(String[] args) {

PersonalLoan personalLoan = new CheapPersonalLoan();

System.out.println(personalLoan.getName());

CheapPersonalLoan cheapPersonalLoan = new CheapPersonalLoan();

System.out.println(cheapPersonalLoan.getName());//Final Methods cannot be overridden but they are visible from child class

}

}

# What is final Class in Java

Java class with final modifier is called final class in Java. Final class is complete in nature and can not be sub-classed or inherited. Several classes in Java are final e.g. String, Integer and other wrapper classes. Here is an example of final class in java

final class PersonalLoan{

}

class CheapPersonalLoan extends PersonalLoan{ //compilation error: cannot inherit from final class

}

# Benefits of final keyword in Java

Here are few benefits or advantage of using final keyword in Java:

1. Final keyword improves performance. Not just JVM can cache final variable but also application can cache frequently use final variables.

2. Final variables are safe to share in multi-threading environment without additional synchronization overhead.

3. Final keyword allows JVM to optimized method, variable or class.

# Important points on final in Java

1. Final keyword can be applied to member variable, local variable, method or class in Java.

2. Final member variable must be initialized at the time of declaration or inside constructor, failure to do so will result in compilation error.

3. You cannot reassign value to final variable in Java.

4. Local final variable must be initializing during declaration.

5. Only final variable is accessible inside anonymous class in Java.

6. Final method cannot be overridden in Java.

7. Final class cannot be inheritable in Java.

8. Final is different than finally keyword which is used on Exception handling in Java.

9. Final should not be confused with finalize() method which is declared in object class and called before an object is garbage collected by JVM.

10. All variable declared inside java interface are implicitly final.

11. Final and abstract are two opposite keyword and a final class cannot be abstract in java.

12. Final methods are bonded during compile time also called static binding.

13. Final variables which is not initialized during declaration are called blank final variable and must be initialized on all constructor either explicitly or by calling this(). Failure to do so compiler will complain as "final variable (name) might not be initialized".

14. Making a class, method or variable final in Java helps to improve performance because JVM gets an opportunity to make assumption and optimization.

15. As per Java code convention final variables are treated as constant and written in all Caps e.g.

private final int COUNT=10;

16. Making a collection reference variable final means only reference cannot be changed but you can add, remove or change object inside collection. For example:

private final List loans = new ArrayList();

loans.add(“home loan”); //valid

loans.add("personal loan"); //valid

loans = new Vector(); //not valid

# Example of Final in Java

Java has several system classes in JDK which are final, some example of final classes are String, Integer, Double and other wrapper classes. You can also use final keyword to make your code better whenever it required. See relevant section of java final tutorial for example of final variable, final method and final class in Java.