Assignment15

Ans 1.Static keyword in java is used for memory management .It is also used with variables, blocks and methods.

For example :

```
class construct
{
    // static variable
    static int a = 10;
    static int b;

    // static block
    static {
        System.out.println("Static block initialized.");
        b = a * 4;
    }

    public static void main(String[] args)
    {
       System.out.println("From main");
       System.out.println("Value of a : "+a);
       System.out.println("Value of b : "+b);
    }
}
```

Output:

Static block initialized.

From main

Value of a : 10

Value of b : 40

In this example, the static variables (“a” and “b”) and static block , are initialized before the execution of main method.

Ans 2. **Class loading**: It is the process of loading the class files into JVM at run time itself. Therefore, the JVM doesn't need to know about the underlying files or file systems in order to run Java programs.

Execution of Java program:

Java, being a platform-independent programming language, doesn’t work on the one-step compilation. Instead, it involves a two-step execution, first through an OS-independent compiler and second in a virtual machine (JVM) which is custom-built for every operating system.

First, the source ‘.java’ file is passed through the compiler, which then encodes the source code into a machine-independent encoding, known as Bytecode. The content of each class contained in the source file is stored in a separate ‘.class’ file.

The class files generated by the compiler are independent of the machine or the OS, which allows them to be run on any system. To run, the main class file (the class that contains the method main) is passed to the JVM and then goes through other stages before the final machine code is executed, like classLoader.

Ans 3. In Java, a static variable is a class variable (for whole class). So if we have static local variable (a variable with scope limited to function), it violates the purpose of static. Therefore, compiler does not allow static local variable.

Ans 4. The static block is stored in the memory during the time of class loading and before the main method is executed, so the static block is executed before the main method. It runs once when the class is loaded into the memory.

Ans 5. A static method is a method that belongs to a class rather than an instance of a class. This means we can call a static method without creating an object of the class. Therefore, Static methods are also called class methods.

Ans 6. The static blocks can be used for initializing static variables or calling any static method in java. The instance blocks can be used for initializing instance variables or calling any instance method in java. Static blocks executes during the loading of its dot class (. class) file in memory.

Ans 7.

Instance variables	Static (class) variables

Instance variables are declared in a class, but outside a method, constructor or any block.	Class variables also known as static variables are declared with the static keyword in a class, but outside a method, constructor or a block.
Instance variables are created when an object is created with the use of the keyword 'new' and destroyed when the object is destroyed.	Static variables are created when the program starts and destroyed when the program stops.
Instance variables can be accessed directly by calling the variable name inside the class. However, within static methods (when instance variables are given accessibility), they should be called using the fully qualified name, *ObjectReference.VariableName*.	Static variables can be accessed by calling with the class name, *ClassName.VariableName*.
Instance variables hold values that must be referenced by more than one method, constructor or block, or essential parts of an object's state that must be present throughout the class.	There would only be one copy of each class variable per class, regardless of how many objects are created from it.

Ans 8.

Static variables	**Non static variables**
A static variable is a variable that is declared using the static keyword.	A non-static variable is a variable that is not declared using the static keyword.
Allocated in class area and shared among all objects.	Allocated in heap memory and created for each object.
Can be accessed using class name.	Can be accessed using object reference.
Scope is limited to the class.	Scope is limited to the object.
Initialized only once when the class is loaded.	Initialized each time an object is created.

public static int count = 0;	public int age;
Can be inherited by the subclass.	Cannot be inherited by the subclass.
Can be modified using class name.	Can be modified using object reference.
Can be used in both static and non static in java.	Can be used only in non-static methods.
It is created when the class is loaded and destroyed when the class is unloaded.	It is created when the object is created and destroyed when the object is garbage collected.