Please review the following items before you begin your module assignments.

* 1. Read Chapter 5 in Introduction to Java: Programming and Data Structures.
  2. Read the Java Tutorial at <https://www.w3schools.com/java/> to include Keywords.

**Discussion Question:**

Research the Internet for features added to Java 10. Select one, write a summary, and provide an example you may have found or one you have written. Cite your source.

**Assignment Requirements and Grading:**

1. An initial post of approximately 250 words is due by **Thursday, 11:59 p.m., CST**.
2. Submit your post by clicking on the **Assignment Link** above, then **Create Thread**. You must create a thread in order to view your peers' posts. Tip: Create your post in a word document and then copy and paste your work into the thread.
3. A minimum of three (3) responses of 100-200 words each are due by **Sunday, 11:59 p.m., CST**.
4. To view the rubric grading criteria, click on the following link: [Discussion Board Grading Rubric](https://content.bellevue.edu/cst/csd/rubricdbv3.pdf)

**(25 points)**

Write a program that uses nested for loops to output the following with the shown display format:

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**Assignment Requirements and Grading:**

Oracle continues to update Java. Java is a programming language that upgrades to new and advanced versions that ease its use for developers. Java 10 is release on March 20th, 2018, and has a lot of features such as:

* Optional.orElseThrow() method: A new method *orTlseThrow* has been added to the *optional* class and it is the alternative to the *get* method.
* APIs for Creating Unmodifiable Collections: *List.copyOf*, *Set.copyOf*, and *Map.copyOf* methods create new collection instances from existing instances. New methods *toUnmodifiableList*, *toUnmodifiableSet,* and *toUnmodifiableMap* have been added to the *Collectors* class in the Stream package.
* Hashed Passwords for Out-of-the-Box JMX Agent : The clear passwords present in the jmxremote.password file are now being over-written with their SHA3-512 hash by JMX agent.
* Add Additional IDL Stub Type Checks to org.omg.CORBA.ORB::string\_to\_object Method: Application that either explicitly or implicitly call org.omg.CORBA.ORB:string\_to\_object, and wish to ensure the integrity of the IDL stub type involved in the ORB::string\_to\_object call flow, dhould specify additional IDL stub type checking.
* JEP 307 Parallel Full GC for G1: the G1 garbage collector is designed to avoid full collection, but when the concurrent collections can’t reclaim memory fast enough a fall back full GC will occur.
* JEP 319 Root Certificates: provides a default set of root Certification Authority (CA) certificates in the JDK

I would like to talk more about Bytecode Generation for Enhanced for Loop feature.

**Bytecode Generation for Enhanced for Loop**: it is improved to enhanced for loops providing an improvement.

Here is an example: List<String> data = new ArrayList<>(); for (String b : data);

Here is the code generated after the enhancement:

{ /\*synthetic\*/ Iterator i$ = data.iterator(); for (; i$.hasNext(); ) { String b = (String)i$.next(); } b = null; i$ = null; }

Declaring the iterator variable outside of the loop allows a null to be assigned to it as soon as it is no longer used. This makes it accessible to the GC, which can then get rid of the unused memory.

**Work cited**

“Java 10 Release Note”, <https://www.oracle.com/java/technologies/javase/10-relnote-issues.html>, accessed November 14th, 2022

“ JDK- 8175883: bytecode generated for the enhanced for loop may block memory garbage collection”, <https://bugs.java.com/view_bug.do?bug_id=JDK-8175883>, accessed November 14th, 2022

Hello Joseph,

You did great job describing this Java 10 feature. Reading the name Optional.orElseThrow(), I was excited to understand it more. I would like to work on it, but I was not understanding it very well and I left it. I think reading your explanations help me understand it a little bit. In my research, I found that it is a new method that has been added to the *optional* class and it is the alternative to the *get* method. So, instead of using the old get method, Optional.orElseThrow() will be better for handling exception when it occurs. Thank you.

Hello Sam,

I appreciate your explanation on this topic. I see this feature very helpful while reading through your code. Declaring local variable with this type of inference will be interesting because it saves time for a developer and save memory. As you said, it will not always be used but when it is necessary and effective, we can use it. Your explanation and the example are very clear to understand. The second example about the data type that will be returned is also important to consider. If there is confusion, we should better keep our old method of declaring variable. Good job on this topic.

Hello Ryan, thanks for choosing this feature and explaining it in your post. To add to what your already said, I search on <https://docs.oracle.com/javase/10/vm/class-data-sharing.htm#JSJVM-GUID-2942983A-E83C-4DA3-A60C-60411D731D5A> and here is what I found. I think it il also helpful. “To further reduce the startup time and the footprint, Application Class-Data Sharing (ApsCDS) is introduced that extends the CDS to include selected classes from the application class path.

This feature allows application classes to be placed in a shared drive. The common class metadata is shared across different Java processes. AppCDS allows the built-in system class loader, built-in platform class loader, and custom class loaders to load the archived classes. When multiple JVMs share the same archive file, memory is saved and the overall system response time improves.”