Week 3 Assignment

Name :Siddarth S
Date : 10/08/2024

1. **Please find case 1 and mention the result for the mentioned statements using strings.**
2. **Find case 2 and mention the result for the statements using integers.**
3. **Find case 3 and mention how Basic I/O resources are getting closed and the difference that you implemented earlier in the code - copyBytes.java**
4. **Find case 4 and mention the order for 1,2 and 3 using collections**

Case 1:

```
public class StringComparisonExample {
  public static void main(String[] args) {
    // String literals (pooled)
    String str1 = "Hello";
    String str2 = "Hello";

    // New String objects (not pooled)
    String str3 = new String("Hello");
    String str4 = new String("hello");

    // Using ==
    System.out.println("str1 == str2: " + (str1 == str2)); // 1. (same
memory reference) what's the result?
    System.out.println("str1 == str3: " + (str1 == str3)); //2. (different
memory references) what's the result?
```

```
    // Using equals()
    System.out.println("str1.equals(str3): " + str1.equals(str3)); //3. (same content) what’s the result?
    System.out.println("str1.equals(str4): " + str1.equals(str4)); //4. (case-sensitive) what’s the result?

    // Using equalsIgnoreCase()
    System.out.println("str1.equalsIgnoreCase(str4): " + str1.equalsIgnoreCase(str4)); //5. (case-insensitive) what’s the result?
  }
}
```

Result :

1) **str1 == str2:**
   Since str1 and str2 are string literals with the same content, they refer to the same object in the string pool.
   Result: true

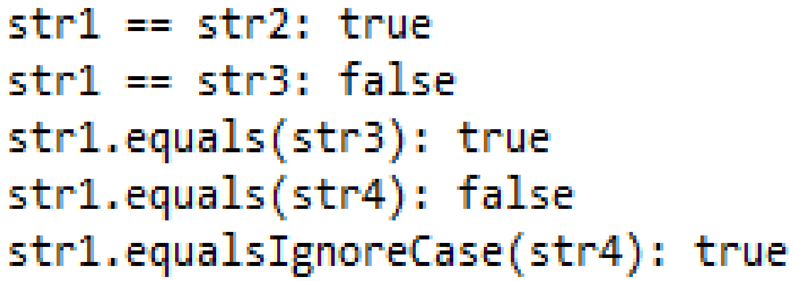
2) **str1 == str3:**
   Here, str3 is created using the new keyword, which creates a new String object in the heap, not in the string pool. Even though str1 and str3 have the same content, they refer to different objects.
   Result: false

3) **str1.equals(str3):**
The equals() method compares the content of the strings, not the memory references. Since str1 and str3 have the same content ("Hello"), this will return true.
Result: true

4) **str1.equals(str4):**
The equals() method is case-sensitive, so comparing "Hello" (str1) and "hello" (str4) will return false because of the difference in case.
Result: false

5) **str1.equalsIgnoreCase(str4):**
The equalsIgnoreCase() method compares strings without considering case, so "Hello" and "hello" will be considered equal.
Result: true

Output



```
str1 == str2: true
str1 == str3: false
str1.equals(str3): true
str1.equals(str4): false
str1.equalsIgnoreCase(str4): true
```

Case 2:

```
 public class IntegerComparisonExample {
   public static void main(String[] args) {

//Mention what's the result in 1, 2, 3,4 and 5
      // Primitive int
      int int1 = 100;
      int int2 = 100;
```

```
    // Integer objects
    Integer intObj1 = 100;
    Integer intObj2 = 100;
    Integer intObj3 = new Integer(100);
    Integer intObj4 = new Integer(200);

    // Using == with primitive int
    System.out.println("int1 == int2: " + (int1 == int2)); // 1. (compares
values)

    // Using == with Integer objects (within -128 to 127 range)
    System.out.println("intObj1 == intObj2: " + (intObj1 == intObj2)); // 2.
(cached objects)

    // Using == with Integer objects (new instance)
    System.out.println("intObj1 == intObj3: " + (intObj1 == intObj3)); // 3.
(different instances)

    // Using equals() with Integer objects
    System.out.println("intObj1.equals(intObj3): " +
intObj1.equals(intObj3)); // 4. (same content)
    System.out.println("intObj1.equals(intObj4): " +
intObj1.equals(intObj4)); // 5. (different content)
  }
}
```

Result:

1) **int1 == int2:**
   Since int1 and int2 are primitive int types, the == operator compares their values directly. Both int1 and int2 have the value 100, so this comparison will return true.
   Result: true

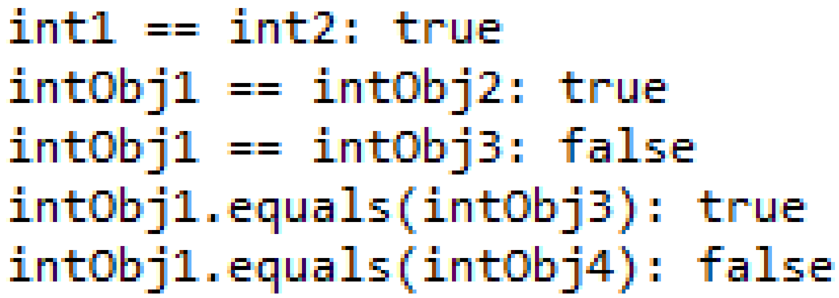
2) **intObj1 == intObj2:**
   Integer objects within the range -128 to 127 are cached by the JVM. Therefore, intObj1 and intObj2, both holding the value 100, point to the same object in memory, so the == operator will return true.
   Result: true

3) **intObj1 == intObj3:**
   Here, intObj3 is created using the new keyword, which creates a new Integer object in the heap, different from the one referenced by intObj1. Therefore, intObj1 and intObj3 refer to different objects, so the == comparison will return false.
   Result: false

4) **intObj1.equals(intObj3):**
   The equals() method compares the values inside the Integer objects. Since intObj1 and intObj3 both contain the value 100, this comparison will return true.
   Result: true

5) **intObj1.equals(intObj4):**
The equals() method compares the values inside the Integer objects. intObj1 contains 100, while intObj4 contains 200, so this comparison will return false.
Result: false

Output



```
int1 == int2: true
intObj1 == intObj2: true
intObj1 == intObj3: false
intObj1.equals(intObj3): true
intObj1.equals(intObj4): false
```

Case 3:

Solution:

In the `TryWithResourcesExample` code, basic I/O resources like `BufferedReader` and `FileReader` are getting closed automatically by using the **try-with-resources** statement. This feature was introduced in Java 7, and it simplifies resource management by ensuring that any resources opened within the `try` block are closed automatically when the block is exited, either normally or because of an exception.

Key Points:

1. **Automatic Resource Closure:** The `try-with-resources` block makes sure that `BufferedReader` and `FileReader` are automatically closed without needing to explicitly call `close()` in a `finally` block.
2. **Simplified Code:** This approach eliminates the need for a `finally` block to close the resources, resulting in cleaner and more readable code.

Difference from the Traditional Approach (`copyBytes.java`):

- In the traditional approach (before Java 7), I had to use a `finally` block to manually close the resources. This was necessary to avoid resource leaks, but it made the code more verbose and error-prone.
- Now, with the `try-with-resources` statement, the code is more concise, and there's no risk of forgetting to close the resources since it's handled automatically.

So, the `try-with-resources` feature not only reduces boilerplate code but also ensures better resource management.

Case 4:

```
 import java.util.HashSet;
import java.util.LinkedHashSet;
import java.util.Set;
import java.util.TreeSet;

public class SetExample {
```

```java
    public static void main(String[] args) {
        // Set 1. What's the order of elements?
        Set<String> hashSet = new HashSet<>();
        hashSet.add("Banana");
        hashSet.add("Apple");
        hashSet.add("Orange");
        hashSet.add("Grapes");

        System.out.println("HashSet: " + hashSet);

        // LinkedHashSet 2. What's the order of elements  ?
        Set<String> linkedHashSet = new LinkedHashSet<>();
        linkedHashSet.add("Banana");
        linkedHashSet.add("Apple");
        linkedHashSet.add("Orange");
        linkedHashSet.add("Grapes");

        System.out.println("LinkedHashSet: " + linkedHashSet);

        // TreeSet 1. What's the order of elements  ?
        Set<String> treeSet = new TreeSet<>();
        treeSet.add("Banana");
        treeSet.add("Apple");
        treeSet.add("Orange");
        treeSet.add("Grapes");

        System.out.println("TreeSet: " + treeSet);
    }
}
```

Result:

In the `SetExample` code, the order of elements changes depending on which `Set` implementation is used:

1. HashSet:

- **Order of Elements:** The elements in a `HashSet` are unordered, so there's no guaranteed order when I iterate over them.
- **Example Output:** The order could be `[Banana, Apple, Orange, Grapes]`, but it might vary. The key point is that the order is unpredictable.

2. LinkedHashSet:

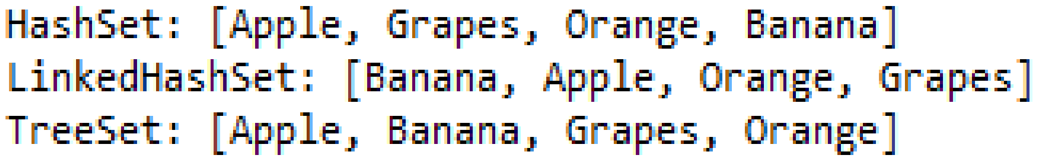
- **Order of Elements:** The elements in a `LinkedHashSet` maintain the order in which they were added.
- **Example Output:** The order will be exactly as I inserted them: `[Banana, Apple, Orange, Grapes]`.

3. TreeSet:

- **Order of Elements:** The elements in a `TreeSet` are sorted according to their natural order, which for strings is alphabetical.
- **Example Output:** The order will be `[Apple, Banana, Grapes, Orange]`, sorted alphabetically.

So, `HashSet` doesn't guarantee any order, `LinkedHashSet` keeps the insertion order, and `TreeSet` sorts the elements alphabetically.

Output:



```
HashSet: [Apple, Grapes, Orange, Banana]
LinkedHashSet: [Banana, Apple, Orange, Grapes]
TreeSet: [Apple, Banana, Grapes, Orange]
```