King Saud University
College of Computer and Information Sciences
Department of Computer Science
CSC453 – Parallel Processing – Tutorial No xx – Spring 2022

Question

Let's consider the following parallel Java code that calculates in a parallel way the number of occurrences of the number 3 in an array.

```java
public class Count3sParallel1 implements Runnable {
    int array[];
    int count, nbThread;
    Thread t;
    LinkedList<Integer> threadIds = new LinkedList<Integer>();

    public void count3s() {
        count =0;
        for (int i=0; i < nbThread; i++) {
            t = new Thread(this);
            threadIds.add(new Integer(i));
            t.start();
        }
    }
    public void run() {
        int depth = (array.length / nbThread);
        int start = threadIds.poll().intValue() * depth;
        int end = start + depth;

        for (int i = start; i < end; i++ ) {
            if (array[i] == 3)
                count ++;
        }
    }
}
```

1. What is the main problem of this parallel code.

2. Which technique could we use to solve this problem. How?

3. How can we enhance the performance of the solution.

4. Enumerate and describe the main factors that may cause a degradation of performance of a parallel program.