Practical No 7

Aim: Write a program to demonstrate loop unrolling and loop splitting for the given code sequence containing loop.

```
import java.io.*;

public class LoopunrollingProgram {

   String codeStrUnrolling = new String();
   String codeStrFusion = new String();
   String codeStrBeforeFusion = new String();

   public void LoopUnrolling() {
      codeStrUnrolling = "int x; \n "
            + "for (x = 0; x < 100; x++)\n"
            + " {\n"
            + "     delete(x);\n"
            + " }";

      System.out.println("\n\n Code Before Loop Unrolling \n");
      System.out.println("====================================\n");
      System.out.println(codeStrUnrolling);

      codeStrUnrolling = codeStrUnrolling.replace(codeStrUnrolling.substring(codeStrUnrolling.indexOf("x++"),
            codeStrUnrolling.indexOf("x++") + 3), "x += 5");
      String str = "\t delete(x); \r\n\t delete(x + 1); \r\n\t delete(x + 2); \r\n\t delete(x + 3); \r\n\t delete(x + 4); \r\n";
      codeStrUnrolling = codeStrUnrolling.replace(codeStrUnrolling.substring(codeStrUnrolling.indexOf("delete(x);"),
            codeStrUnrolling.indexOf("delete(x);") + "delete(x);".length()), str);
      System.out.println("\n\n Code After Loop Unrolling \n");
      System.out.println("====================================\n");
      System.out.println(codeStrUnrolling);

   }

   public void LoopFusionCode() {

      int forCount = 0;
      boolean forFound = false;
      try (BufferedReader br = new BufferedReader(new FileReader("E:\\beforeloopfusion.txt"))) {
         String currentLine;
         while ((currentLine = br.readLine()) != null) {
            if (currentLine.contains("for")) {
               forCount++;
               forFound = true;
            }
            if (forCount == 1 && forFound) {
               codeStrFusion += currentLine + "\r\n{\r\n";
               forFound = false;
            } else if (forCount == 2 && forFound) {
               forFound = false;
            } else {
               codeStrFusion += currentLine + "\r\n";
            }
            codeStrBeforeFusion += currentLine + "\n";
```

```
        }
        codeStrFusion += "\r\n}";
      } catch (IOException e) {
        e.printStackTrace();
      }
      System.out.println("\n\n Code Before Loop Fusion \n");
      System.out.println("============================\n");
      System.out.println(codeStrBeforeFusion);

      System.out.println("\n\n Code After Loop Fusion \n");
      System.out.println("============================\n");
      System.out.println(codeStrFusion);
    }

    public static void main(String[] args) {
      LoopunrollingProgram loop = new LoopunrollingProgram ();
      loop.LoopUnrolling();
      loop.LoopFusionCode();

    }

}
```

Output:

```
 Code Before Loop Unrolling

====================================

int x;
 for (x = 0; x < 100; x++)
 {
     delete(x);
 }


 Code After Loop Unrolling

====================================

int x;
 for (x = 0; x < 100; x += 5)
 {
         delete(x);
         delete(x + 1);
         delete(x + 2);
         delete(x + 3);
         delete(x + 4);

 }
```

Code Before Loop Fusion

```
================================

int i, a[100], b[100];
for (i = 0; i < 100; i++)
    a[i] = 1;
for (i = 0; i < 100; i++)
    b[i] = 2;
```

Code After Loop Fusion

```
==============================

int i, a[100], b[100];
for (i = 0; i < 100; i++)
{
    a[i] = 1;
    b[i] = 2;

}
BUILD SUCCESSFUL (total time: 0 seconds)
```