**SE375 SYSTEM PROGRAMMING SPRING 2023-2024**
**Laboratory Assignment 02**
**March 6, 7 2024**

**Text Manipulation with Threads**

Your task is same as last week and it is to write a Java application that will take a text file and transform the contents of the file and then display it. However, this time, you will use thread classes to perform the Transformations. Instead of methods doing the transformations, you will create thread objects for each transformation. Transformations on the content is as follows:

1. Make all characters in the file upper case or lower case (**`caseThread`**)
2. Encrypt the file by shifting characters by a specified amount(e.g. a→b if the shift amount is 1) (**`shiftThread`**)
3. Color the file red or yellow. (**`colorThread`**)

Note that every thread will operate on the same hash structure. Once every thread completes its assigned task, the main thread will display the results.

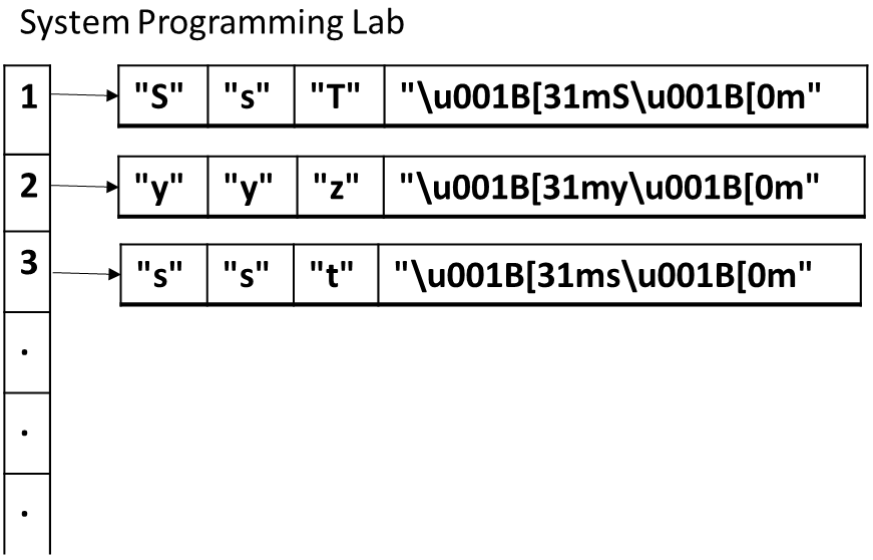
Before these transformations, the program will ask the user to enter input values

1. U for upper case, L for lower case
2. The shift amount. A value from 1 to 3
3. R for red, Y for yellow.

Your program will read the file character by character and construct a Hash structure in which the key will be integer index of the character in the file and the value would be an array of four elements, which holds the original value, upper or lower case value, the shifted value and the color code. These are kept as Strings.

Example:

If the file contains SystemProgrammingLab the hash structure will look like this for the following user input:
**`L,1,R`**




Please read below for the meaning of stings "\u001B[31m" and "\u001B[0m". They are used to color a string.

Here's a sample run for a file that contains the text SystemProgrammingLab

```
Please state your choice...
UPPER case or lower case (U or L):
U
Please state your choice...
How many characters to shift (number between 1-3):
1
Please state your choice...
Color of characters (R or Y):
R
Original
SystemProgrammingLab
After Case Change
SYSTEMPROGRAMMINGLAB
After Shift
TztufnQsphsbnnjohMbc
After Color Change
SYSTEMPROGRAMMINGLAB
```

You will be evaluated by your usage of data structures and application of algorithms.

**How to Color a String**

```
public class lab1 {

    public static final String ANSI_RESET = "\u001B[0m";
    public static final String ANSI_RED = "\u001B[31m";
    public static final String ANSI_YELLOW = "\u001B[33m";

    public static void main(String [] args) {
       String x = "SYSTEM";

       System.out.println(x);

       x = new String(ANSI_RED + "SYSTEM" + ANSI_RESET);

       System.out.println(x);


    }
}
```

**Output:**

SYSTEM
SYSTEM