Lab03 Longest-duplicate-substring

Task

Substring is a consecutive sequence of characters occurrences at least once in a string. Duplicate substring is a kind of substring that consists of the same character. For example, the duplicate substring of "aabbbc" is “aa”, “bbb” and “c”. Given a string S and its length N, can you figure out the length of its longest duplicate substring?

Note that N (**1<=N<=100**) will be stored in **x3100**, and each character of S is stored in successive memory locations starting with address **x3101**. You may assume that S only contains a-z and A-Z.

Your job: store the output, longest duplicate substring in **x3050**.

R0-R7 are set to zeroes at the beginning, and your program should start at **x3000**.

Here are several examples:

Memory address	x3050	...	x3100	x3101	x3102	x3103	x3104	x3105	x3106
example 1	RESULT=3		NUM=6	a	a	b	b	b	c
example 2	RESULT=4		NUM=5	Z	Z	Z	Z	z	
example 3	RESULT=3		NUM=6	a	a	b	a	a	a

For your convenience, your code may be written as:

```
.ORIG x3000
    LDI R0,NUM
    LD R1,DATA          ; R1 is the pointer of the string
...
...
...
...  ;These Codes are hidden!
STI R2,RESULT
HALT

RESULT .FILL x3050
NUM .FILL x3100
DATA .FILL x3101

.END
```

so that you would not need to reset all characters of the string in memory everytime you change the input samples.

Score

Correctness for 50% and the report for other 50%.

Submission

Note that in this experiment, you are required to use **assembly code**.

Here are some notifications:

- Your program should start with **.ORIG x3000**

- Your program should end with **.END**
- Your last instruction should be **TRAP x25 (HALT)**
- Write comments when necessary

Your submission be structured as shown below:

```
PB21******_Name.zip
├── PB21******_Name_report.pdf
└── lab3.asm
```

Reports

Your reports should contain at least the four parts below:

- purpose
- principles
- procedure (e.g. bugs you encountered and how to solve them)
- results of your test