ICS Lab2

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Algorithm

I use an array `cnt[25]` to record the frequencies of every letter. As for the two strings, for the letter α in the first string, `cnt[alpha]++`, and for the latter, `cnt[alpha]--`. After reversing the two strings, I will check if `cnt[i] == 0` ,$\forall i \in [0,25]$. If so, print `"YES"`, else print `"NO"`

Create an array and Initialization

Use pseudoinstruction `.BLKW` and `.FILL` would make a specific area in memory for me.

```
 cnt  .BLKW 26
        .FILL 0
```

Pseudocode

```
//reverse two strings
for i in s1:
    if i == '\0':
        break
    else if i == ' ':
        continue
    else if i is uppercase:
        i := lowercaseof(i)
    else:
        cnt[ASCIIof(i)++]
for i in s2:
    if i == '\0':
        break
    else if i == ' ':
        continue
    else if i is uppercase:
        i := lowercaseof(i)
    else:
        cnt[ASCIIof(i)--]
//check
n=0
for n <26:
    if cnt[n]==0:
        n++
        continue
    else:
        OUTPUT("NO")
        HALT
OUTPUT("YES")
HALT
```

Key part of source code

```
;Load part and count part
    ...
    LOAD1:
        LDI R1, addr1; R1 stores str1_addr
        LD R2, addr3; R2 stores cnt's addr
    LOOP1:
        ;if mem[R1]=='\0' break
        LDR R3, R1, #0; R3=mem[R1] as the char now
        ADD R4, R3, #0
        BRz LOAD2
        ;else if mem[R1]==' ' continue
        LD R4, base2
        ADD R5, R3, R4
        BRz END_LOOP1
        ;else if R3 is uppercase
        LD R4, base
        ADD R5, R4, R3
        BRn UPPER1
        BRzp LOWER1
    UPPER1:;R3+=32
        LD R4, base4
        ADD R3, R3, R4
    LOWER1:;cnt[R3-97]++
        LD R4, base
        ADD R3, R3, R4
        ADD R5, R3, R2;R5→cnt[i]
        LDR R6, R5, #0
        ADD R6, R6, #1
        STR R6, R5, #0
    END_LOOP1:
        ADD R1, R1, #1
        BRnzp LOOP1
        ...
```

TA Questions

Q: What if the two strings contains other simbols like `','` `'?'`?

A: Enlarge the array to record more than 26 ASCII values, and add the part of check if the symbol is a letter, if not, skip the uppercase to lowercase transition.