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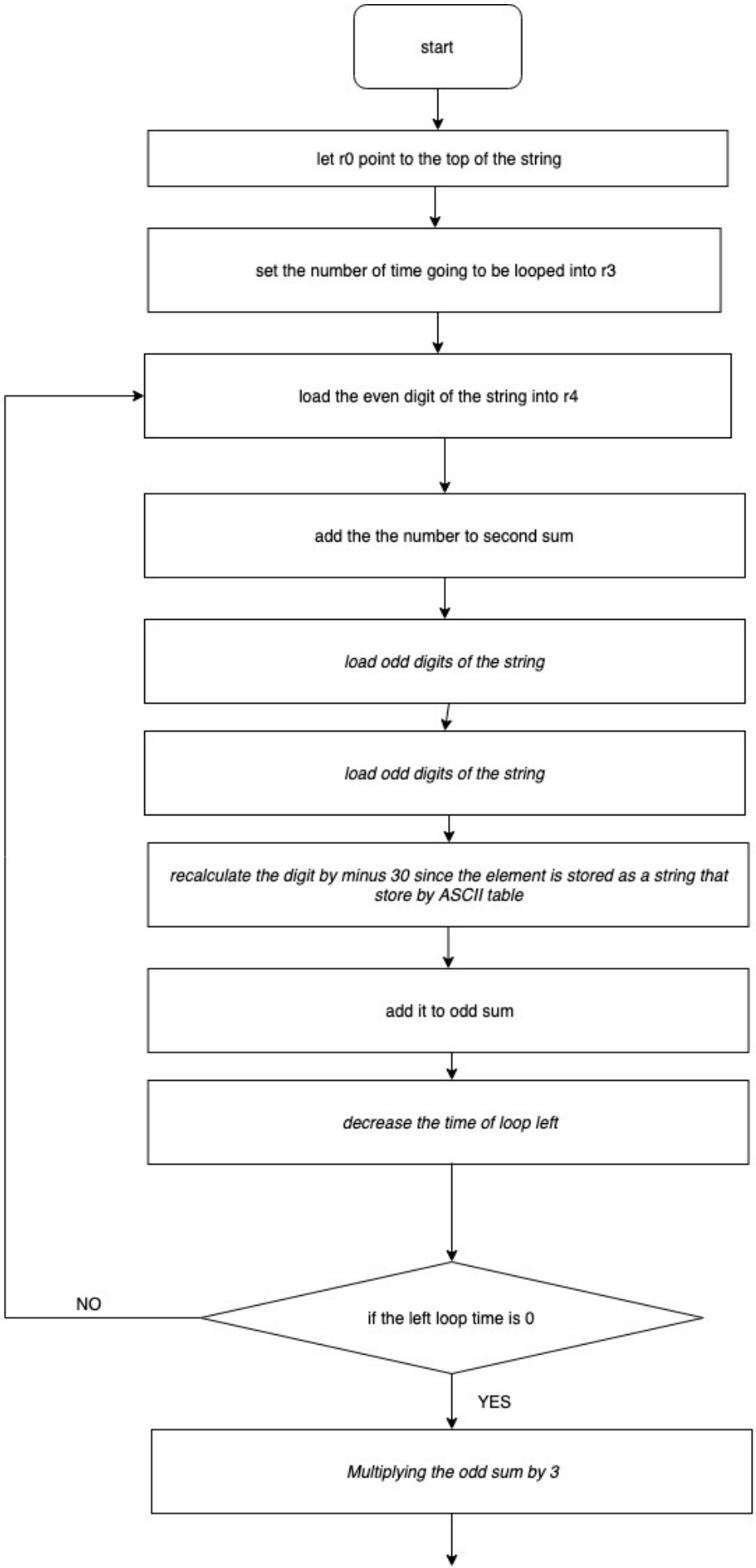
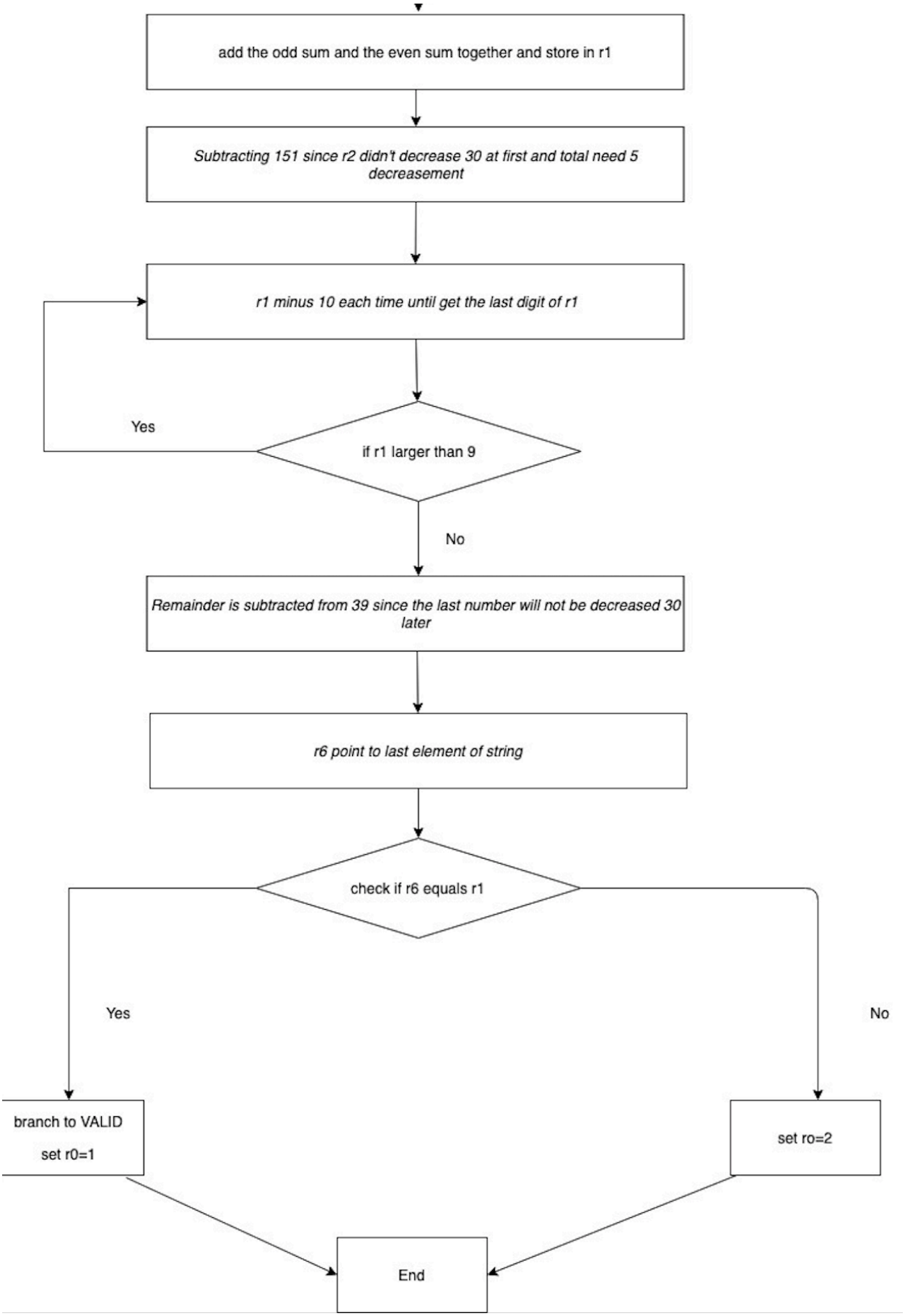
CS2208 assignment3


start
let r0 point to the top of the string
set the number of time going to be looped into r3
load the even digit of the string into r4
add the the number to second sum
load odd digits of the string
load odd digits of the string
recalculate the digit by minus 30 since the element is stored as a string that store by ASCII table
add it to odd sum
decrease the time of loop left
if the left loop time is 0
NO
YES
Multiplying the odd sum by 3


add the odd sum and the even sum together and store in r1
Subtracting 151 since r2 didn't decrease 30 at first and total need 5 decreasement
r1 minus 10 each time until get the last digit of r1
Yes
if r1 larger than 9
No
Remainder is subtracted from 39 since the last number will not be decreased 30 later
r6 point to last element of string
check if r6 equals r1
Yes
No
branch to VALID
set r0=1
set ro=2
End

```
          AREA problem1, CODE,READWRITE
          ENTRY
          ;r0 Point to the top of the string
          ;r3 the time of loop
          ;r1 Odd sum
          ;r5 Store element for first sum
          ;r2 Even sum
          ;r4 Store element for even sum
          ;r6 The last digit of the string
          ADR r0, UPC
loop_Count     MOV r3, #5           ;set r3 to 5 means loop 5
time totally
Loop1          LDRB r4,[r0,#1]!     ;load even digits of the
string
            ADD r2,r2,r4       ;add the the number to even sum
            LDRB r5,[r0,#1]!     ;load odd digits of the string
          SUB r5,r5,#0x30      ;recalculate the digit by minus
30 since the element is stored as a string that store by ASCII
table
          ADD  r1,r1,r5        ;add it to odd sum
          SUBS r3,r3,#1        ;decrease the time of loop left
          BNE Loop1
          ADD r1,r1,r1, LSL #1 ;Multiplying the odd sum by 3
          ADD r1,r1,r2         ;add the odd sum and the even sum
together and store in r1
          SUB r1,r1,#151       ;Subtracting 151 from r1 since r2
didn't decrease 30 at first and total need 5 decreasement
Loop2          SUB r1,#10                ;r1 minus 10 each time
          CMP  r1,#9               ;indentity the size of
number after minus 10
          BGT Loop2            ;until the number is not larger
than 9
          RSB r1,r1,#0x39           ;Remainder is subtracted
from 39 since the last number will not be decreased 30 later
          LDRB r6,[r0,#1]!     ;r6 point to last element of
string
          CMP r6,r1            ;check if r6 equals r1
          BEQ  VALID                ;if r6 equals r1, then
branch to VALID
          MOV r0,#2            ;if r6 does not equal r1, then
assign r0 to #2
UPC       DCB "013800150738"   ;the given UPC string
EXIT B    EXIT
VALID          MOV r0,#1            ;if it is valid, assign r0
to #1
          END
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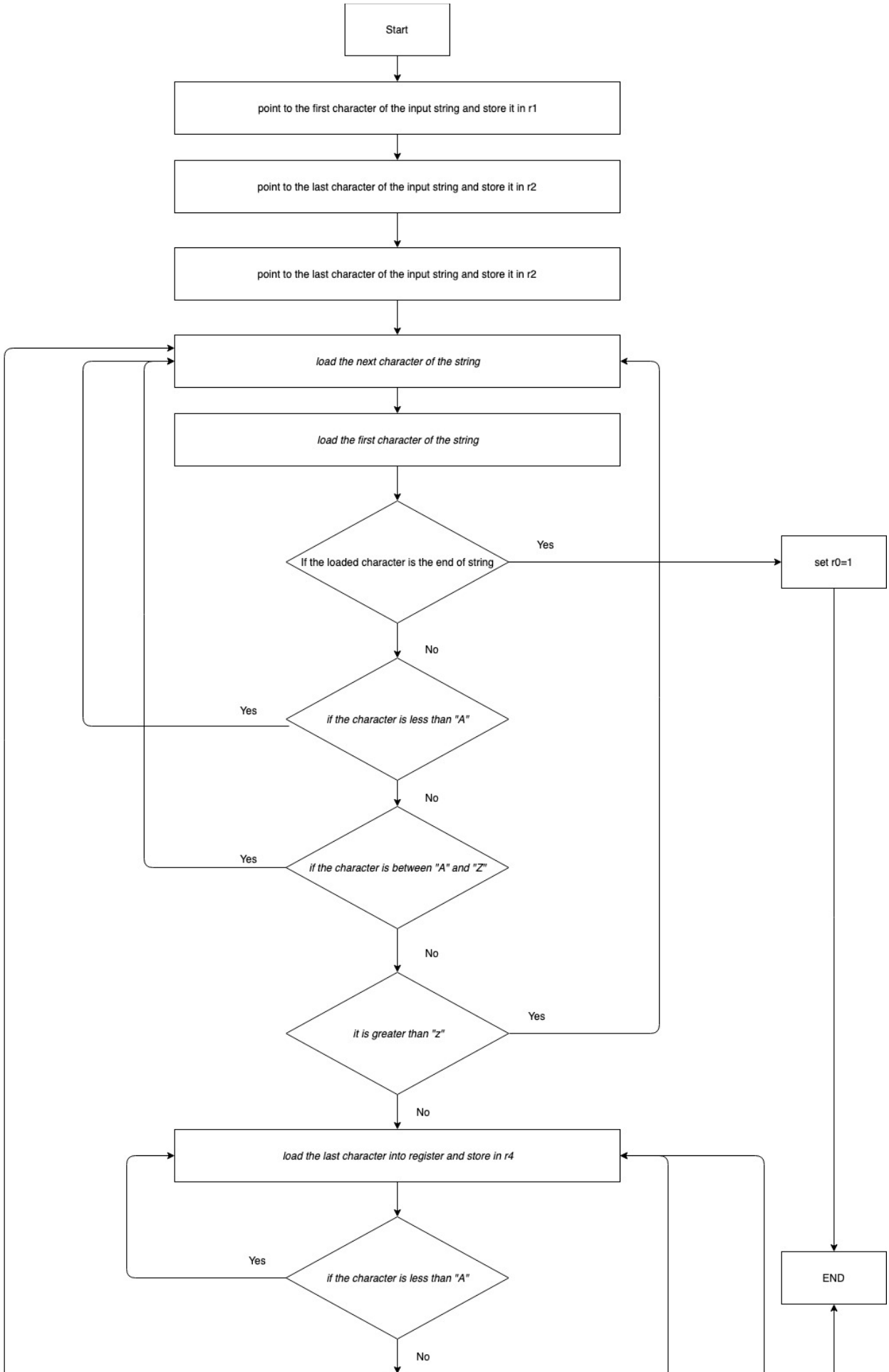
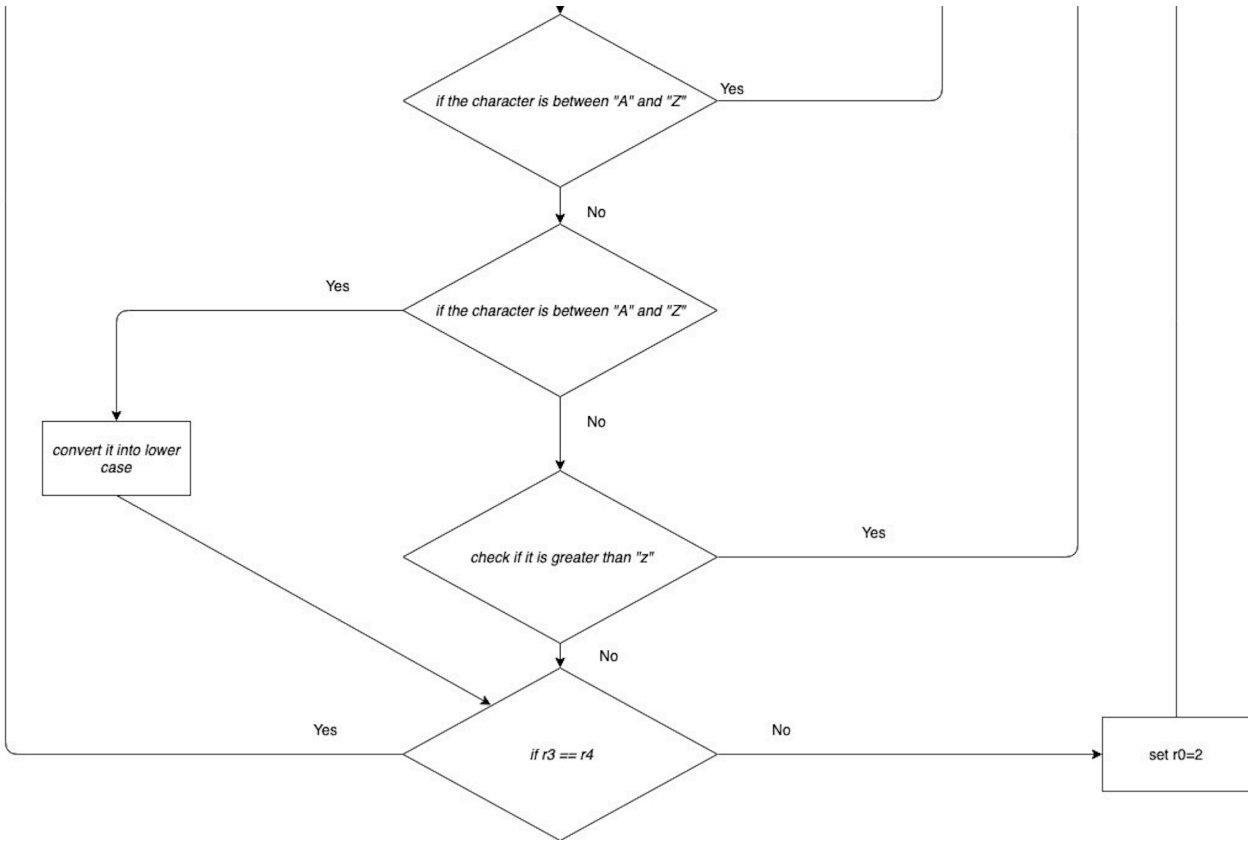

Start
point to the first character of the input string and store it in r1
point to the last character of the input string and store it in r2
point to the last character of the input string and store it in r2
load the next character of the string
load the first character of the string
If the loaded character is the end of string
Yes
set r0=1
No
if the character is less than "A"
Yes
No
if the character is between "A" and "Z"
Yes
No
it is greater than "z"
Yes
No
load the last character into register and store in r4
if the character is less than "A"
Yes
No
END

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     AREA problem2, CODE, READWRITE
     ENTRY
     ;r0 represent the result of the program, if equal 1, then
the string is palindrome
     ;r3 load the first character of the input string
     ;r4 load the last character of the input string
     ADR r1, STRING ;point to the first character of the input
string and store it in r1
     ADR r2, EoS    ;point to the last character of the input
string and store it in r2
Loop
FW   LDRB r3, [r1], #1       ;load the first character of the
string
        CMP r3,#0x00           ;compare to 0x00 where is the
end of string
     BEQ YES
     CMP r3, #0x41            ; if the character is less than
"A", then skip it beacuse it is not a character
     BLT FW                        ; loop again for next
character
     CMP r3, #0x5A            ; if the character is between "A"
and "Z", then convert it to lower case
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```
     ADDLE r3, #0x20                ; convert it into lower case
     CMP r3, #0x7A             ; it is greater than "z", the skip
this letter and continute next loop
     BGT  FW                        ; go to next loop
BW   LDRB r4, [r2,#-1]!      ; load the last character into
register into r4
     CMP r4, #0x41             ; if the character is less than
"A", then skip it beacuse it is not a character
     BLT BW                       ; loop again for next
character
     CMP r4, #0x5A             ; if the character is between "A"
and "Z", then convert it to lower case
     ADDLE r4, #0x20                ; convert it into lower case
     CMP r4, #0x7A             ; check if it is greater than "z"
     BGT  BW                        ; it is greater than "z", the
skip this letter and continute next loop
     CMP r3,r4                 ; if the ith legal character is
equal the ith legal chacater from back then continute compare
the next character
     BNE NOT
     B Loop
YES     MOV r0,#1                   ; if all of the character
have been check then return true which means assigning value 1
to r0
     B DONE                         ; the program end
NOT  MOV r0,#2                 ; once non-equivalent character
found then return false which means assigning value 2 to r0
DONE    B DONE                      ; since an illegal situation
was found then program end
     DCD 0x0000
STRING  DCB "He lived as a devil, eh?" ;the given UPC string
EoS DCB 0x00                   ;end of string
     END
```