

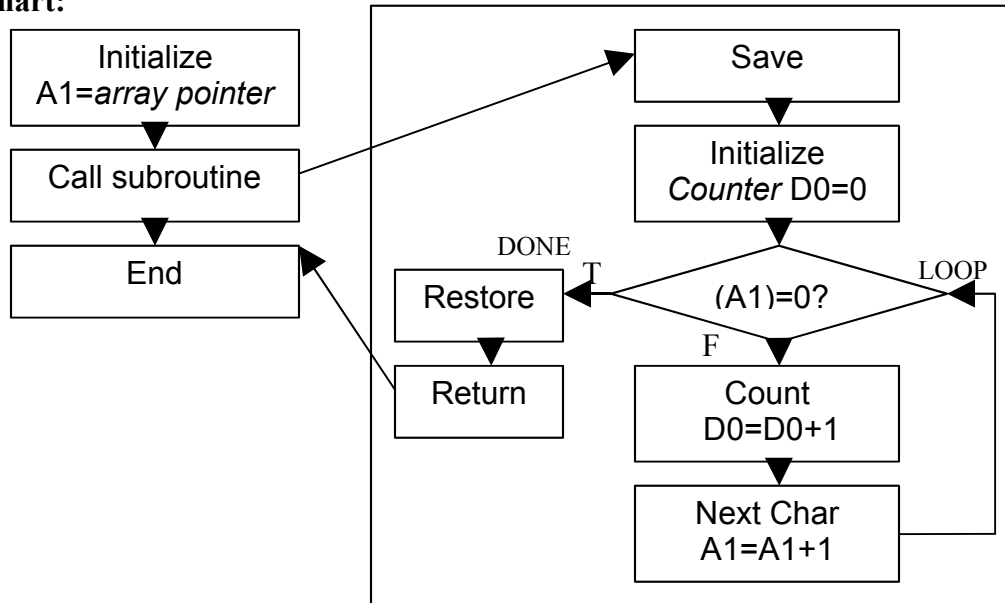
Assembly Programming for Arrays and Strings

1. STRLEN: Measure the length of a NULL-terminated string
2. FINDI: Count the number of 'i's in a NULL-terminated string.
3. FINDP: Count the number of 'p's in a char array (length-prefixed).

STRLEN

Measure the length (number of non-null characters) of a NULL-terminated string.

Flowchart:



Code:

```

ORG      $6000           ; NOTE: this time the data is at the end
LEA.L   DATA, A1       ; initialize array pointer
BSR     LEN              ; branch to subroutine LEN
LEA.L   DATA+12, A1    ; initialize array pointer to just last word
BSR     LEN              ; branch to subroutine LEN
TRAP    #9

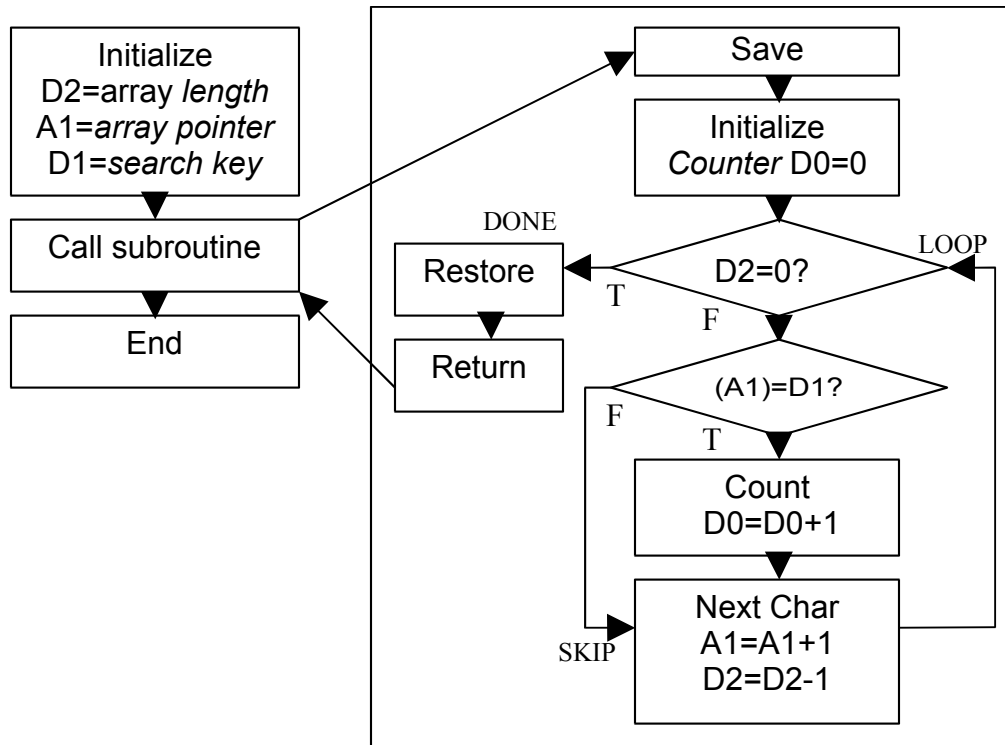
LEN      MOVEM.L  A1, -(A7) ; begin subroutine LEN here: save
        CLR.L   D0         ; initialize count
LOOP    CMPI.B   #0, (A1)+ ; char is NULL? And increment char ptr.
        BEQ    DONE       ; if yes, we are done
        ADDQ.W  #1, D0     ; count another char
        BRA    LOOP       ; loop (char pointer was inc'd on CMP)
DONE    MOVEM.L  (A7)+, A1 ; restore
        RTS              ; return from subroutine

DATA    DC.B    'alabama and tennessee'
        DC.B    0
        END
  
```


FINDP

Count the number of 'p's in a char array (length-prefixed).

Flowchart:



Code :

```

ORG          $6000          ; note that data is at the end
LEA .L      DATA ,A1      ; grab data pointer
MOVE .W     (A1) + ,D2      ; get length and initialize array pointer
MOVE .B     #'p' ,D1       ; initialize search key
BSR        COUNT          ; branch to subroutine
TRAP       #9

COUNT MOVEM .L    A1/D2 , - (A7) ; begin subroutine COUNT here; save
CLR .L     D0        ; initialize count
LOOP  CMPI .W     #0 ,D2      ; is D2 0? (not needed on loop - Z bit set)
      BEQ        DONE        ; if yes (is zero) we're done
      CMP .B     (A1) + ,D1   ; is this char same as search key?
      BNE       SKIP        ; if not, don't count it
      ADDQ .W    #1 ,D0       ; add one to counter
SKIP  SUBQ .W     #1 ,D2      ; subtract one from loop counter
      BRA       LOOP        ; loop again (note Z bit set if D2 is 0)
DONE  MOVEM .L    (A7) + ,A1/D2 ; restore
      RTS        ; return from subroutine

DATA  DC .W      11          ; length of array
      DC .B      'mississippi'
      END
  
```