

Key to Practical 3

Stack and Subroutines

Step 4

```
LowerCount  movem.l d1/a0,-(a7)
            clr.l   d0
\loop      move.b  (a0)+,d1
            beq    \quit
            cmp.b   #'a',d1
            blo    \loop
            cmp.b   #'z',d1
            bhi    \loop
            addq.l  #1,d0
            bra    \loop
\quit      movem.l  (a7)+,d1/a0
            rts
```

Step 5

```
UpperCount  movem.l d1/a0,-(a7)
            clr.l   d0
\loop      move.b  (a0)+,d1
            beq    \quit
            cmp.b   #'A',d1
            blo    \loop
            cmp.b   #'Z',d1
            bhi    \loop
            addq.l  #1,d0
            bra    \loop
\quit      movem.l  (a7)+,d1/a0
            rts
```

```

DigitCount    movem.l d1/a0,-(a7)

            clr.l   d0

\loop      move.b  (a0)+,d1
            beq    \quit

            cmp.b   #'0',d1
            blo    \loop

            cmp.b   #'9',d1
            bhi    \loop

            addq.l  #1,d0
            bra    \loop

\quit       movem.l  (a7)+,d1/a0
            rts

```

```

AlphaCount ; Count the number of small letters
; and push it onto the stack.
jsr    LowerCount
move.l d0,-(a7)

; Count the number of capital letters and add it
; to the top of stack (without popping off).
; Top of stack = Small letters + Capital letters
jsr    UpperCount
add.l  d0,(a7)

; Count the number of digits.
; The top of stack (Small letters + Capital letters)
; is added to the number of digits (D0).
; The sum is loaded into D0.
; D0 = Small letters + Capital letters + Digits
; The top of stack is popped off (postincrement mode).
jsr    DigitCount
add.l  (a7)+,d0

; Return from subroutine.
rts

```

Step 6

```

Atoui      ; Save registers on the stack.
movem.l d1/a0,-(a7)

          ; Initialize the output variable to 0.
clr.l    d0

          ; Initialize the conversion variable to 0.
clr.l    d1

\loop      ; Copy the current character into D1.
          ; Then A0 points to the next character (postincrement mode).
move.b   (a0)+,d1

          ; If the copied character is null,
          ; branch to \quit (end of string).
beq      \quit

          ; Otherwise, the character is converted into an integer.
subi.b   #'0',d1

          ; Shift the output variable to the left (x10),
          ; and add the integer value.
mulu.w   #10,d0
add.l    d1,d0

          ; Next character.
bra      \loop

\quit      ; Restore registers from the stack and return from subroutine.
movem.l (a7)+,d1/a0
rts

```