Lab2: Hexadecimal

Description

You find it annoying to convert numbers to hexadecimal. You decide to write a program to do that.

Requirements

- Write program with LC-3 assembly language
- Start your program at x3000
- Read an unsigned number (10 based) from the console ended with `Enter` , and it will not exceed $2^{16}-1=65535$
- Print the number in 4-digit hexadecimal
- Remember to halt your program in the end

Ideas

We first store the value into the register, then change it into Hex 4 bits by 4 bits,while outputing in the same time.

Code

```
        .ORIG x3000
        AND R1,R1,#0    ;STORE THE VALUE IN DEC

INPUT   TRAP x20
        LD  R3,ASCII
        ADD R0,R0,R3    ;R0<-n
        BRn CONPUT      ;CHECK ENTER
        JSR TIMES10     ;R1<-R1*10
        ADD R1,R1,R0    ;R1<-N
        BRnzp INPUT

CONPUT  AND R4,R4,#0
        ADD R4,R4,#-4
LP      BRz FINAL
        JSR OUTPUT
        ADD R4,R4,#1
        BRnzp LP
FINAL   TRAP X25
```

```
TIMES10 AND R3,R3,#0
        ADD R1,R1,R1    ;R1<-R1*2
        ADD R3,R3,R1    ;R3<-R1*2
        ADD R1,R1,R1    ;R1<-R1*4
        ADD R1,R1,R1    ;R1<-R1*8
        ADD R1,R1,R3    ;R1<-R1*10
        RET

OUTPUT  AND R2,R2,#0
        AND R3,R3,#0
        ADD R3,R3,#-4
LOOP    BRz BACK
        ADD R2,R2,R2
        ADD R1,R1,#0
        BRzp NEXT
        ADD R2,R2,#1
NEXT    ADD R1,R1,R1
        ADD R3,R3,#1
        BRnzp LOOP
BACK    ADD R2,R2,#-9
        BRp CHPUT
        LD  R3,ASCII0
        ADD R0,R2,R3
        TRAP x21
        RET
CHPUT   LD R3,CH
        ADD R0,R2,R3
        TRAP x21
        RET

ASCII   .FILL xFFD0     ;-48,TO CONVERT ASCII
ASCII0  .FILL x0039     ;57
CH      .FILL x0040     ;64
        .END
```

Thoughts

This time we use the assembly language to implement the program, and first time we use the `JSR` and `RET` to code.