Lab2 Report

1. algorithm explanation

First , we need to read the digits in decimal and store them in memory .
In this part , we need use r1 to store the -10 to check whether the character we just read is ENTER or not , if it is ENTER , we just reject the ENTER and end the reading prat .
We use r3 to point at the address we want to store the digits .
We use r4 to store -48 to transfer ascii to binary.
We use r5 to count how many the digits are.
Second , we need to transfer the separate digits into a binary number together. We can use r5 in part 1 to get the weight of the highest digit , while we have stored #1 #10 #100 #1000 and #10000 . Then we just multiple it with the highest digit , save the result in r4 , then the second digit , etc. We realize mul by combining adding with iteration ,for example, if we want to mul 6 with 10000, we just need to add 10000 to itself for 6 times. Finally, we transfer all the digits into a binary number in r4.
Third , we need to transfer the binary number into a hex number. We realize this by sub the binary number by x1000 x0100 x0010 x0001 in sequence. And test whether the four digits we want to sub is zero or not .For example ,if the highest four digits is 1111. Then we need to sub the binary number with x1000 for 15 times until the highest four digits are all 0s, and we use r0 to count the number of subtractions we did. Finally ,we transfer the number in r0 into digits or letters to output it ,ad the first digit of the hex number. Then we can process the next four digits.

2. Essential code

```
HEXWEI  .FILL xF000 ;-x1000
        .FILL xFF00 ;-x0100
        .FILL xFFF0 ;-x0010
        .FILL xFFFF ;-x0001
```

Here is the number we use to do the subtraction and count the numbers.

```
DECWEI  .FILL #1
        .FILL #10
        .FILL #100
        .FILL #1000
        .FILL #10000
```

Here is the weight of every decimal digits , we use this to do the mul to transition from separate digits to a binary number.

```
;move r2 to the right weight pointer
        add r2,r2,#-1
        add r2,r2,r5
```

Here we use r2 to point at different decimal weights which we need to do the mul.

3. TA questions

Q: How do you realize the mul ? Add 6 to itself for 10000 times if you want 6*10000?
A: No. I just add 10000 to itself for 6 times.

Q: How can you transfer the separate digits into a binary number?
A: By take the digit and the weight of it to do multiplication and add the results from every digits together.