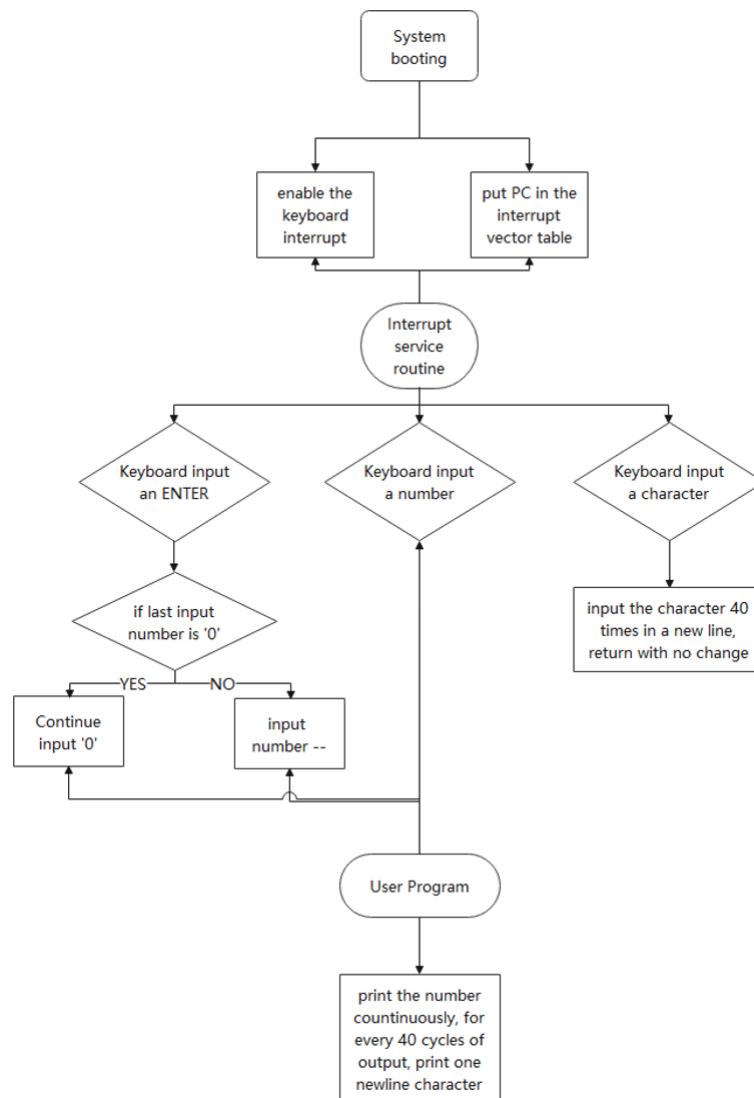# Lab 3 Report

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1. Algorithm

The following chart shows the structure of the algorithm.

2. Essential parts of code

```
1   ;
2   ; system booting code
3   ;
4
5           ; Interrupt Enable
6           LD      R0, KBSR_IE
7           STI     R0, KBSR1 ; KBSR[14] = 1
8
9           ; Init Interrupt Vector Table
10          LD      R0, InterruptA
11          STI     R0, INV  ; mem[x0180] = x0800
12
13
14  KBSR1       .FILL   xFE00
15  KBSR_IE     .FILL   x4000 ; KBSR[14] = 1
16
17  InterruptA  .FILL   x0800
18  INV         .FILL   x0180
```

The part of code above shows the process of enabling the keyboard to interrupt and put PC in correct interrupt vector table.

```
1            ; ------- <Enter> --------
2            ADD    R1, R0, R1      ; IF = 0, THEN INPUT IS AN ENTER
3            BRnp   STEP2
4            ADD    R2, R3, R2
5            BRz    SUCCESS
6            ADD    R4, R4, #-1
7            BR     SUCCESS
8
9
10  STEP2    ; ------- <0 - 9> --------
11           LD     R2, ZERO
12           ADD    R5, R0, #0
13           ADD    R5, R5, R2
14           BRn    STEP3
15
16           LD     R2, NINE
17           ADD    R5, R0, #0
18           ADD    R5, R5, R2
19           BRp    STEP3
20
21           ADD    R4, R0, #0
22           BR     SUCCESS
23
24
25           ; ------- <char > --------
26  STEP3
27           ADD    R5, R0, #0
28           LD     R0, ENTER1
29           OUT
30           ADD    R0, R5, #0
31           ;;PRINT FORTY TIMES
32           LD     R5, LINENUMBER
```

```
33
34    LOOP        OUT
35                ADD     R5, R5, #-1
36                BRnp    LOOP
37
38                LD      R0, ENTER1
39                OUT
40                BR      SUCCESS
41
```

The part of code above shows the process of handling with three different types of input.

3. TA's questions

TA: explain the procedure of interrupt

Answer:

- Initialization
    - Set the system privilege, let PSR[15] = 0
    - If the process in in user mode, then save R6, load R6 with SSP
    - Push PSR & PC
    - Set priority level
    - Jump to the Interrupt Service Routine
- Executing the interrupt service routine
- Ending the interrupt service routine and jump to user program.