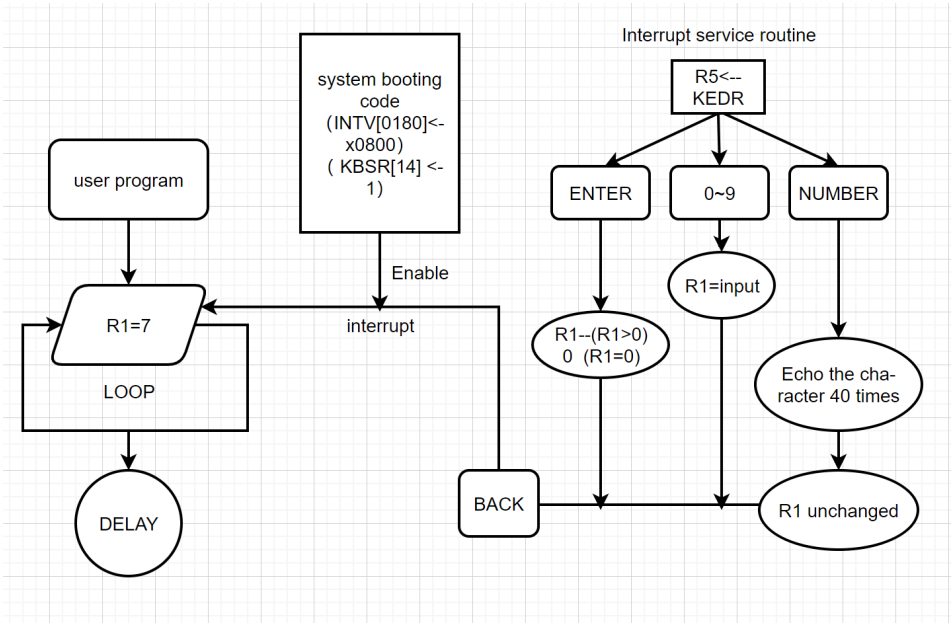
1.Algoritm



2.Essential codes

```
;Interrupt service routine
       .ORIG   x0800
        ST      R3,IN_R3
        LDI     R5,KBDR
        LD      R4,NZERO
        ADD     R3,R5,#-10
        BRz     C_ENTER         ;the input is "Enter"
        ADD     R3,R5,R4
        BRn     C_ECHO          ;the input character is lower than 48(ASCII of
0)
        LD      R4,NNINE
        ADD     R3,R5,R4
        BRp     C_ECHO          ;the input character is larger than 56(ASCII of
9)
        BRnzp   C_NUM           ;the input character is between 48（0） and
57（9）
C_ENTER
        LD      R0,ENTER2
        OUT
        ADD     R1,R1,#0
        BRz     Back
        ADD     R1,R1,#-1
        BRnzp   Back
C_ECHO  ADD     R0,R5,#0    ;output the input character 40 times
        LD      R4,ECHO_times
        LD      R0,ENTER2
        OUT
loop2   ADD     R0,R5,#0
        OUT
        ADD     R4,R4,#-1
        BRp     Loop2
        LD      R0,ENTER2
        OUT
```

```
        BRnzp   Back
C_NUM   LD      R0,ENTER2
        OUT
        LD      R1,NZERO
        ADD     R1,R1,R5
        BRnzp   Back
Back    LD      R2,Out_times2
        LD      R0,ZERO
        ADD     R0,R1,R0
        LD      R3,IN_R3
        RTI
```

When the interrupt service routine is over, the contents of R0 ,R1 exactly equal to the contents required in the loop of the user program .

3.Q&A

When the interruption occurs before output the ENTER,the out_times are set back to 40. As a result,there will be 41 times of output. How will you deal with this bug?

I will use Interrupt_R2 to save R2(the number of output times in the user program) during the interrupt service routine,and load back before RTI, thus guarantee the adequate number of output!