Lab 6 Report

--**PB22111599**

Purpose

Show how interrupt-driven I/O can interrupt a program that is running, execute the interrupt service routine, and return to the interrupted program, picking up exactly where it left off(just as nothing had happened).

Principles

1. The main program which starts from x3000 will **keep on printing** my student ID which is **PB22111599** onto the console. The ISR expect an input from the keyboard.
2. When **a key is struck** the KBSR will change its value and then teh program jumps into the ISR part which starts from x1000.
3. The ISR part will **judge if the input character is a decimal number**. If yes, the program will output the factorial of the decimal number and the decimal number will be stored in x3FFF; then the program halts. If no, the ISR part ends and the main program resumes to print.

Procedure

1. Considering that this program only takes 10 numbers into account as "valid", so it is more convenient to implement the factorial calculation by **brute force method**.

```
141            ST   R3, FACT
142            LEA R0, RES5
143            BR   ENDD
144 SKIP5      ADD R0, R0, #-1
145            BRp SKIP6
146            LEA R0, RES6
147            BR   ENDD
148 SKIP6      ADD R0, R0, #-1
149            BRp SKIP7
150            LEA R0, RES7
151            BR   ENDD
152 SKIP7      ADD R0, R0, #-1
153            BRp SKIP8
154            LEA R0, RES8
155            BR   ENDD
156 SKIP8      LEA R0, RES9
157
158 ENDD       PUTS
159            LD   R2, FACT
160            STR R3, R2, #0
161            LD   R0, NEWLINE
162            OUT; \n
163            HALT
164
165            RET
```

Results

example 1

input 0

example 2

input 7

```
--- Halting the LC-3 ---

PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
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PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599 PB22111599
7 is a decimal digit.
7! = 5040.



--- Halting the LC-3 ---
```
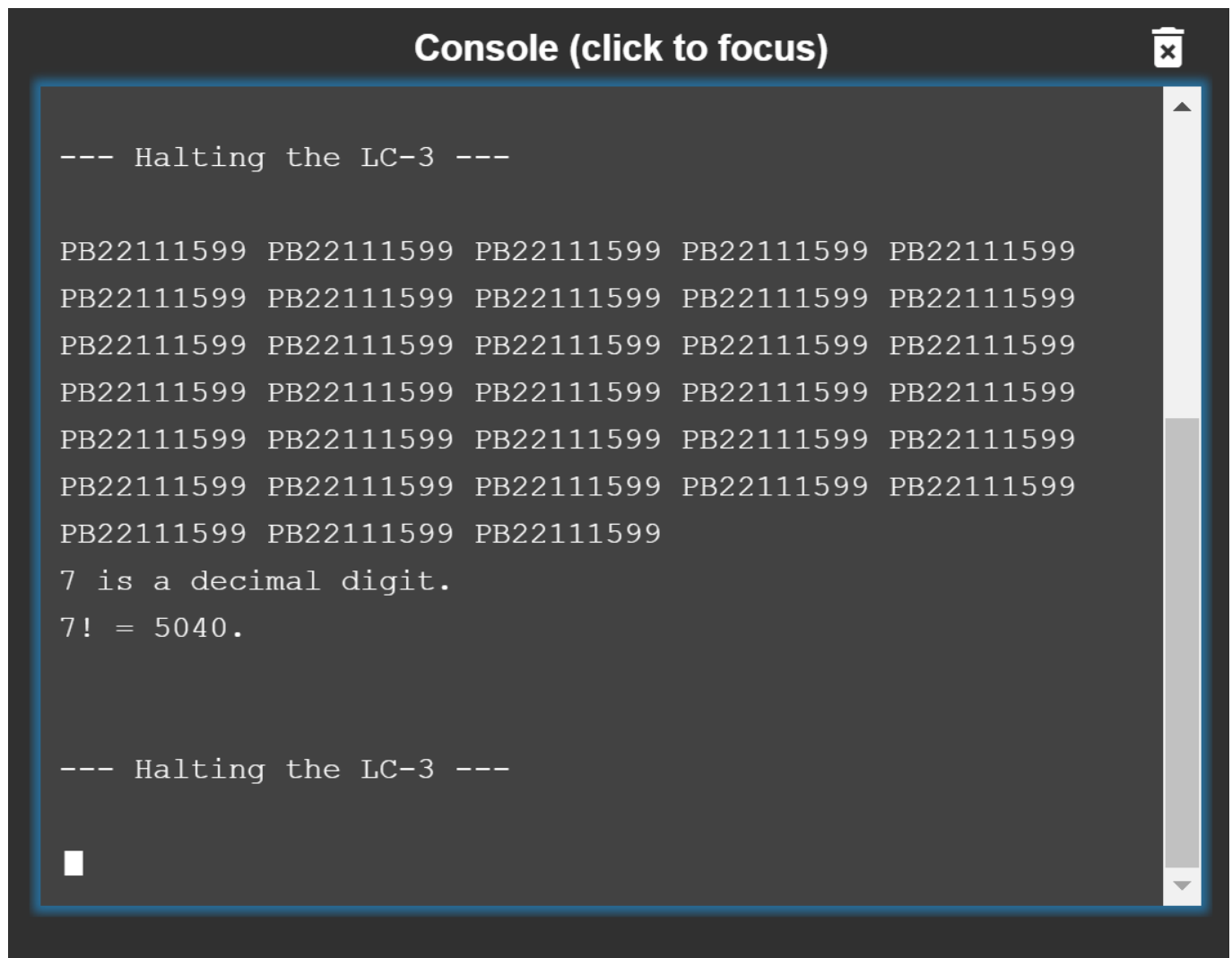
example 3

input h then 8

Console (click to focus)

```
PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
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PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599
h is not a decimal digit.
PB22111599 PB22111599 PB22111599 PB22111599 PB22111599
PB22111599 PB22111599
8 is a decimal digit.
8! is too large for LC-3.


--- Halting the LC-3 ---

```