LAB 03: The Linked-List Sort

Your Mission:

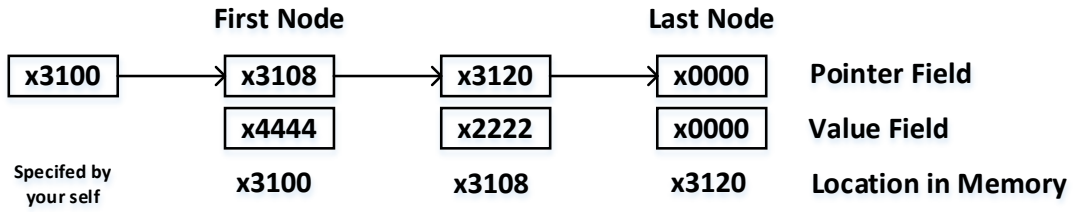
Write a program in LC-3 assembly language that sorts a **linked list** of 2's complement integers in **ascending order**.

Details:

1. This program is going to make use of a common data structure, **the linked list**.
2. The linked list contains a value field and a pointer filed. The value filed stores the **VALUE** of the current node, and the pointer filed stores the **ADDRESS** of the next node.
3. The addresses of pointer field and value field are **continuously**.
4. The address of the first node of the linked list and **WHERE TO STORE IT** should be specified by yourself, and the pointer filed of the last node should be **x0000** to indicate the end of a linked list. Your program should identify the last node and finish the sort process.
5. Your program should start at memory location **x3000** and end with **HALT**.
6. Test your program using linked lists of different length.

Example:

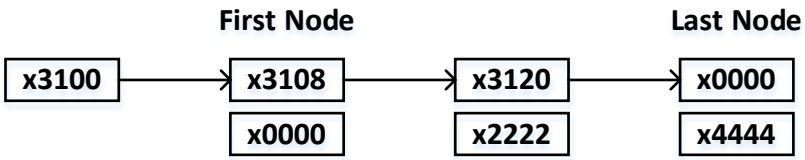
Original linked list:



Please note:

1. **x3100** is the address of the first node.
2. **x3108** is the address of the second node and **x4444** is the value of the first node.
3. **x3108** is stored in address **x3100** and **x4444** is stored in address **x3101**

Sorted linked list:



Notes and Suggestions:

1. You can use any algorithms (bubble sort, select sort and so on) you want to sort the linked list.
2. Load the list into memory before your program begins to run.
3. You can swap two nodes in linked list or just swap the value field. Clarify it in your report.

Additional Requirements:

If you don't comply with these requirements, the lab may be counted as an invalid work.

1. The report shall contain at least 3 parts: How do you work out the algorithm? How do you write the program? And how do you design your own test cases to ensure the program works fine?
2. Save your report in pdf format and name it such as **report.pdf**.
3. Your program must be saved in binary form and renamed to **sort.asm.**
4. Put all above in a directory named after your student number and pack it **(e.g. PB07210340_张海博_LAB03.zip).**