

**PROBLEM:** Given the elements of a stack or a queue, perform the defined operations on them. As elements are inserted into a structure, the first element is considered to be at the bottom and the following elements are inserted vertically above it. The operations are defined below:

**P(X):** Pushes the element to either the stack or queue according to the ACSL Category Book rules.

**P:** Pops an element from the stack or queue according to the ACSL Category Book rules.

**L(X):** Inserts the new element below the smallest element. If there is more than 1 smallest element, the new element is inserted below the first one entered.

**H(X):** Inserts the new element above the biggest element. If there is more than one biggest element, the new element is inserted above the last one entered.

**L:** Deletes the smallest element. If there is more than one smallest element, the first one entered is deleted.

**H:** Deletes the biggest element. If there is more than one biggest element, the last one entered is deleted.

**M(X):** Inserts the new element above the element that is closest to the median of the elements without going over the median. Note the median is the middle score of the sorted (smallest to highest) list but the new element is inserted above the first occurrence of the element closest to the median using the unsorted list.

**INPUT:** There will be 11 lines of input. The first line will be a list of one-digit elements representing the data structure to be used with all the commands. That is, each new command line uses the data given on line #1. The list ends with a 0 that is not part of the list. The elements are in the order entered. That is, the first item is at the bottom of the stack or queue. The next 10 lines will each start with an S or a Q telling to use the structure as a Stack or a Queue. That will be followed by a list giving the commands to be used on the structure. Commands will be executed from left to right. The command list will end with an E. The E is not a command or an element.

**OUTPUT:** For each the 10 lines of input commands print on one line the final results of those commands on the structure with the first (bottom) element in on the left.

**SAMPLE INPUT**

1. 5,3,7,6,1,9,8,7,0
2. S, P, E
3. S, P(4), E
4. Q, P,E
5. Q, P(4), E
6. S, H(3), E
7. Q, L(8), E
8. S, H, L, E
9. Q, M(2), E
10. S, P, H, E
11. Q, P, M(1), E

**SAMPLE UTPUT**

1. 5376198
2. 537619874
3. 3761987
4. 537619874
5. 537619387
6. 537681987
7. 537687
8. 537621987
9. 537618
10. 37161987