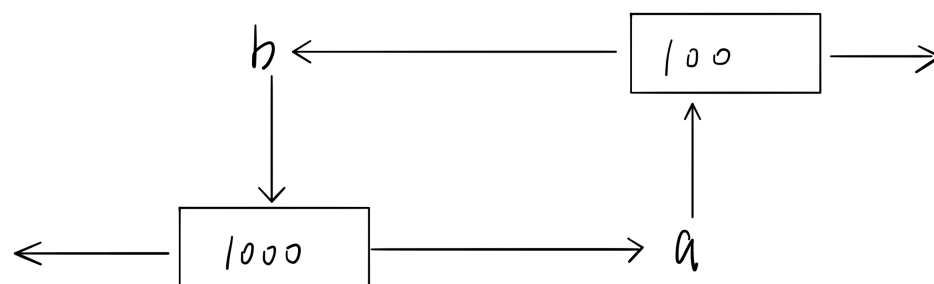a. This program realizes the double linked list through the structure and the smart pointer, print the double linked list and the reference times.

b. The double node includes a value and two pointers, next and prev. The double node is trying to implement the double linked list. The linked list only have on pointer which point to the next node, but double linked list have two pointer which point to the next node and previous node, it is easy to travel to the previous node in double linked list.

c. This construct a type which allow multiple owner to the data and the data can change. The diagram is blew.

d. Rc can be downgraded to a Weak pointer, that will have a borrowed reference to the heap. When an Rc drops the value inside, it will not check whether there are Weak pointers to it. This means that a Weak pointer will not always have a valid reference. Rc will lead to a reference cycle, and weak reference are not an ownership relationship, so it wouldn't lead to reference cycle.

e. The code let node A prev pointer point to node B