1. No

2. No

3. bool set(const KeyType& key, const ValueType& value, bool permanent=false)

get the hashnumber for the key

get the pointer of the node that contains key

if the pointer is a null pointer

if the hashtable is full

return false

add the key and value association into the hash table, set its permanent value as well

get the head pointer of the linked list, which points to the node just added

if the node added is not permanent

set the t\_prev pointer to the node added before this node

record the address of the current node

if the node isn’t the first node to be added

let the t\_next pointer of the node added before points to this node

otherwise the node is the first to be added

otherwise

update the value

if the node is not the last node to be added and its not permanent

get the pointer that is added later

if the current pointer is not the first to be added

set the t\_next pointer of the node added before the current node to the node that is added later

otherwise

set the next node to be the first to be added

set the t\_prev pointer of the later node to the t\_prev pointer of the current node

set the t\_prev pointer of the current node to the latest node added

set the lastest pointer points to the current node

set the t\_next pointer of the current node to nullptr

return true

bool touch(const KeyType& key)

get the hashnumber for the key

get the pointer of the node that contains key

if the pointer is not a nullptr

if the node is not the last node to be added and its not permanent

get the pointer that is added later

if the current pointer is not the first to be added

set the t\_next pointer of the node added before the current node to the node that is added later

otherwise

set the next node to be the first to be added

set the t\_prev pointer of the later node to the t\_prev pointer of the current node

set the t\_prev pointer of the current node to the latest node added

set the lastest pointer points to the current node

set the t\_next pointer of the current node to nullptr

return true

return false

bool discard(KeyType& key, ValueType& value)

if no node has been added yet

return false

get the first node being added

set the next node being added to the first node being added

copy the values of the original first node

if the originally first added node is not the last node in the linked list

set the values in this node to the values of the next node in the linked list

set the pointer to the next node to the next next node

delete the next node

otherwise

delete current node

return true