Department of Computer Science and Engineering
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Data Structures Quiz, Chapter 4, Nov. 15, 2021

1. Write a C++ function to find the minimum of all elements in a linked list of integers. (50%)

   ```
   class ChainNode {
       int data;
       ChainNode *link;
   };
   class Chain {
       ChainNode *first;   // first node of the list
       int min_value( )
   // Return the minimum value.
   // Return -999 if the chain is empty.
       {
   ```

   Please write the body of min_value ( ).

   ```
       } // end of min_value ( )
   };
   ```

2. Write a C++ function to reverse a singly linked list. For example, suppose that the given list $X=(x_1, x_2, \ldots, x_{n-1}, x_n)$. After the reversing process, the list will become $(x_n, x_{n-1}, \ldots, x_2, x_1)$. (50%)

   ```
   class ChainNode {
     public:
       int data;
       ChainNode *link;
   };
   class Chain {
       ChainNode *first;     // first node of the list
       void reverse( )
           // Reverse the list.
       {
       ChainNode *p, *c;        //   p:previous, c:current
   ```

   Please write the body of reverse ( ).

   ```
       } // end of reverse ( )
   };   // end of class Chain
   ```

參考解答

1.
```
int min_value()
{
   if(first == NULL) return -999;   // empty linked list
   int ans = INT_MAX;         // infinite
   ChainNode *c = first;      // current
   while(c){
       if(c->data < ans){
           ans = c->data;
       }
       c = c->link;
   }
   return ans;
}
```

2.
```
void reverse( )   // Reverse the list.
{
   ChainNode *p, *c;        //   p:previous, c:current
   c = first
   p = 0;     // before current
   while (c) {
       ChainNode *r = p;
        p = c;
        c = c ->link;     // moves to next node
        p->link = r; // reverse the link
   }
   first = p;
} // end of reverse ( )
```