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CS 221

Assignment 2

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attestion: 1-
 #include < iastream >
 using namespace std;
struct Node &
      int data;
      Node "next; 3;
void detect_and_remove_loop (Node* head) {
       Node * slow = head;
       Node * Fast : head;
       bool loopexists = False;
       while (Fast 88 fast - snext) {
         Slow = slow - next;
         Fast = Fast > nent - > nent;
      軍 if (slow=fast) &
         loopenists = true;
3 break;
     if (!loopenists) {
           cout << "No loop detected! " << end!
           return; 3
   Slow = head
   int pos=1
    while ( slow ! = Fast) {
       slow = slow -> next;
      fast = fast - newl-
       POS + + ; 3
   conta "loop starts cut Node # " << pos << end;
  contact value at Node = " < day - data < cend);
```

```
Node loopstart =slow;
  Node* tem=loopstart;
  while (bemp snest 1 = woopsbart) &
        temp = temp -> nent; 3
   couter "loop removed from Node # " expos;
       ce " a Node with value "extemp-stata exend!
     temp -s next = NW;
void printtist (Node * head) {
       Node temp = hand;
       while(temp) }
         contecend; 3
int main () }
    Node head = new Node(); Node + second = new Node (); Node + betiend = new Node ();
    second -sdatat=3;
    third data = 8;
    head - nent = se cond;
    second - next = third;
    third - 9 next = second;
    detect-and_remove_loop (head);
     printlist Chead 1;
     return o;
Question: 2-
 #includ < rostream>
 #include <string>
using numespace std;
                                                       BOL IN TOR
 class Person &
```

Public:

string name string address ,

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son() {3
      erson Letting n, string a, string p) &
         name =n;
         address =a;
                                   alothern and consult in
          Phone = P; 3
 3:
                                      so men, sold or grant as
class Node &
                                   had something with 4 through
   Public :
                                             schooling appearing
     Person data;
     Node = nent;
      Node (Person p) &
         dota = Pi
          next = NULL; 3
 3;
class
      Address Book() {
       Node + head;
 Public:
     Address Book() {
        head = NULL ;
       insert (Person P) {
 Void
                                               THE THE PARTY OF THE
       Node + new Node (P);
       if (!head 11 p.name < head -> data.name) {
                                                  will call by the
           newnode -> nent = head;
                                                      STATE OF THE BEATS
            head = new Node ,.
            return;
                                                    facilities (cia, peach
                                      tereson to come address, process
    Node + temp = head;
    while (temp -> next & & temp -snext -> data.name < p. came) 5
            temp = temp -next: ;
    newNode = next = temp -s next
    temp -> next = new Node
 3
                                                L' come depend from the
void find (string name) s
       Node * temp = head;
       while (temp) &
           if (temp ->data.name == name) {
         cout << "Record found: In";
           return:
      temp=temp - nent.
    Pout 22 " Record not found " +2 name 22 and ( )
```

```
void display () {
    Node temp = head i
    cout era in Address . Book Records ; in ";
     while (temp) &
          coates temp sodata.name ee "1"
              extemp & data address << "1"
              << temp -> data phone < cend,
          temp= temp -> nent;
int main ()
Address Book book ,
 int ni
 coutes "Enter number of records: ".
 cin >>n:
 cin ignore U ;
  For Cint i=0; i<n;i++) s
    string name , address, phone ;
     cout cof Enter values : ";
     gettine (cin, name );
     gettine (cin, address);
     getline (cin, phone)
     person p(name, address, phone),
                                                  Medical service should be
      book insert-(p);
 book. display ();
  string search Name;
                                           hand gross have shower
  cout ee " in Enter name to search: ";
   gettine (cin, sourchname);
  book . Find (search name);
  return o,
                                                   wash there was
                                                        & CHANNER
                                I there exhibe none tenne
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cion: 3 -
 nclude Ciastream?
wing manzespace std;
truct Node s
 Note there is a said to a 
int data:
  Node + nent;
                                                                                                                                   tonga decreed a ten con
      Node (int val): data (val), prev(nulptr), next(nulptr) 53
struct Boublylinked list s
       Note+ head;
        Node + tail:
          Doubly linked List (1: head (null ptr), tail (null ptr) El
        void append (int val) {
                     Node+ new Node = new Node (ral);
                                       it (head == nulletr) s
                                                 head = new Node;
                                                  trail - new Node;
                                             else &
                                                   tail -> next- = new Note
                                                                                                                                            3(A3= $100 (- Y) 31
                                                     new Mode - sprevious - tail;
                                                          tail = new Node :
       Node + Find Node (int val) }
                         Node * current = head;
                                                                                                                                         المه "م ودهد و ما مدسد
                                white (current 1= nulptr) {
                                               if (current - ) data == val) 5
                                                             return current;
                                           current = current -) nent;
                                                                                                                                                                                         I P (a prus)
                               return nullptr;
 void Printlist (1 &
                                                                                                                                                  a west + prey = b;
                   Node * current = head;
                        while (convent != nullptr) {
                                                                                                                                                                                     12319 17-13
                                     cout << current >data ec "<->";
                                            current - s next ;
         coat < < "nullpft" < cendl.
```

```
Void swap nodes (Node + a, Node *b) {
    if (a==nullptr tl b==nullptr 11a==b) {
           cout ce" Invalid nodes for swapping." ezendl;
  3
coat ce " swapping nodes with values " ce a + data ee "and " ce b - data;
    if (a-next == b) E {
      a - next - b - snext
       if (b-snext)
                b -> next -> preu =q;
       b-sper = a -sprer;
          if Ca-sprev1
              a-sprer-snewab;
          b-s next ca;
          a -> prev = b;
       if Chead == a)
               head = Wb;
        if (tail = = b)
            tail = a;
          return;
   else if ( b -> next == q) $
         swap Nobes (b,a);
         return;
  node a _preu = a -sprev;
  Node a_nent = a -> nent;
                                     3. Phillipped Horras I spike
  Hode + b-prer 2 b -> prev;
   Hode b_next = b->next;
   if (a prev)
         a prev -nent = b;
                                                 Theor ands
   if (a-next)
       a _next -> prev = b;
   if (b_prev)
         b- prev - rent =q !
   if (b-nent)
          b-next-sprev=a,
```

```
(a -> previb -> prev);
       wap ( a -s next, b-s next);
       if (head = z a)
            head =b;
       else if (head = = b)
            head = a;
       if (tail = = a)
              fail = b;
       else if (tail = = b)
              taileq;
 int main () {
     Doubly linked list my list;
       my list. append (3);
       mylist append (1);
       mylist appent (8).
       my list append (s);
       my list. append (0);
     courcoriginal list:";
      my lot. printlist ();
      Node * node A = my bit Find Node (8).
      Node * node B = my list . FindNode (3):
       mylish. swap Nodes (nod A , node B).
       Cout ce " list after swapping 8 and 6: ".
       mylistiprintlist ();
      return o:
Question 4: -
#include Liostram>
using name space std;
struct Node {
int data; Node * prev: Node * next:
  Note (int ral): data(val), prev(nulptr), nent(nulptr) 'S)
```

```
struct Poubly Un Red Ust &
     Node + head ;
                     Node + tail;
     Doubly linked list (): head (nulptr), tail (nulptr) []
     void append (int vou) s
           Node * newNode = new Node (val);
             it (head == null ptr) {
                head = newNode ;
                 tail = new Nod;
                 tail - next = new Node;
                 New Node - s prev = tail.
                 z tail = newNode;
   Void prinklist (1 5
        Node * current = h ead;
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