NATIONAL UNIVERSITY
OF COMPUTER & EMERGING SCIENCES
LAHORE

45213

17/25

Course: Data Structure — Answer Sheet No.

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Q1) $O(n) = O(100N^2)$

$T(N) = 1 + n(100)(n) + n(100)(n)$

$= 1 + 200n^2$

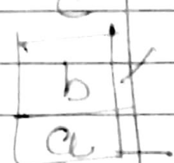
Q2) //First push string A in stack.

stack a;

String a; String b; // alr

for (int i=0; i<

clear stack



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Q2) bool Check (String a, String b) {

```
Stack s; String q;                      // length returns size
for (int i=0; i<a.length(); i++)        // of a.
    s.push(a[i]);                       // push function of
                                        // stack, inserts
for (int i=0, i<a.length(); i++)        // first element on top. //
{  q[i] = s.top();                      // top function of stack
   s.pop();                             // returns top element.
}
if (strcmp(q, b) == true)               // String compare function
    return true;                        // returns true if
else                                    // comparison is true //
    return false;
}
```

National University of Computer and Emerging Sciences, Lahore Campus

Course:	Data Structures	Course Code:	CS-218
Program:	BS (Computer Science)	Semester:	Spring 2020
Duration:	60 Minutes	Total Marks:	25
Paper Date:	28th Feb 2020	Page(s):	3
Section:	All sections	Roll No:	
Exam:	MIDTERM 1		

Instruction/Notes

- Understanding question is a part of your exam. In case of ambiguity write your assumptions and answer accordingly.
- Time management is the key to success

Q1: [5]

Calculate time complexity of the following piece of code by formulating $T(n)$ and computing its O (tight bound)

```
int x=0;
for (int i=0; i< N; ++i){
    for (int j=1; j<= 100; ++j){
        for (int k=j; k<N; ++k){
            x=x+i+j+k;
        }
    }
}
```

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Q2: [5]

Write down code/ pseudocode using stack to determine if an input character string is of the form

$$A \partial B$$

Where, A and B are substrings in the reverse order. For example, if A = *abc*, and B = *cba* , then abc ∂ cba must return **true**. Else, it must return false.

Q / Part No.

(Q3)

```
bool changeHead(int pos){
Node *p = head;   int count = 0;   Node *s;
while( p != nullptr)
{  p = p->next;
   count++;
}
p = head;
for(int i = 0; i < pos-1; i++){
   p = p->next;
}
s = head;                    // 10
Node *q = p;                 // 30
p = p->next; head = p;       // 40
for(int i = pos; i < count-1; i++)
{   // head = p;
   p = p->next;
}
p->next = s;                 // p->next contains null
                             // s is the head
q->next = nullptr;           // q contains last node
                             // before p (pos)
return true;
}
```

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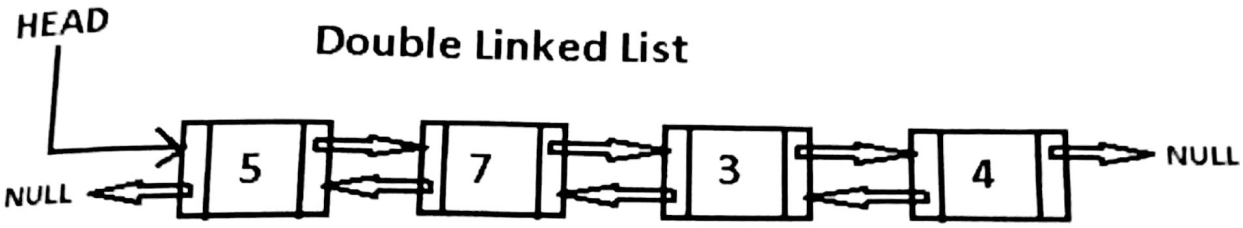
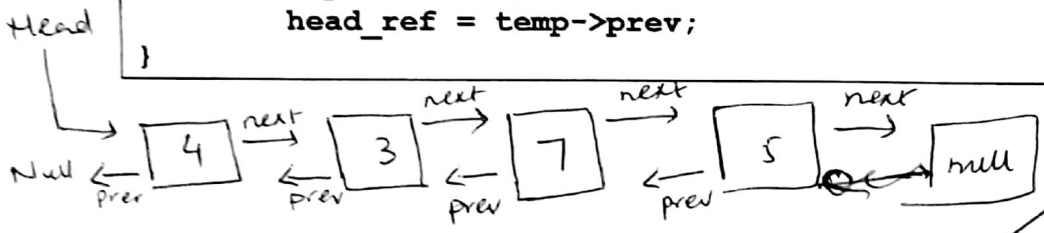
Q.24: [5]

Consider the following function that takes reference to head of a Doubly Linked List as parameter. Assume that a node of doubly linked list has previous pointer as *prev* and next pointer as *next*. Suppose that reference of head of following Doubly Linked List is passed as an argument to the function



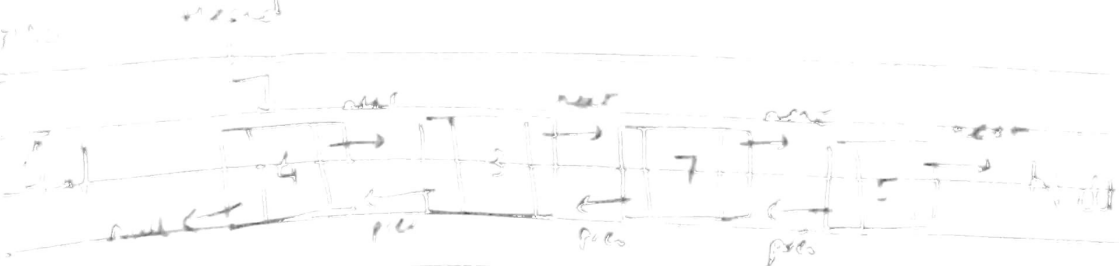
What will be the output of the function? Draw the modified linked list after the function call?

```
void foo(struct node *&head_ref)
{
    struct node *temp = NULL;
    struct node *current = head_ref;

    while (current !=  NULL)
    {
        temp = current->prev;
        current->prev = current->next;
        current->next = temp;
        current = current->prev;
    }

    if(temp != NULL )
        head_ref = temp->prev;
}
```



Output = null, 4, 3, 7, 5, null

head = 4



output of the function is the reverse order of linked list

4 → 3 → 7 → 5

Master already awarded