**Data Structure&Algorithm**

**Mid-Exam**

**Submitted to:**

Mam- Yasmeen Jana

Submitted by:

Usama Tariq

FA20-BCS-087



Department of Computer Science.

COMSATS University Islamabad, Vehari Campus.

***Question:1***

*#include <iostream>*

*using namespace std;*

*class Node*

*{*

*public:*

*int data;*

*Node\* next;*

*Node(int data)*

*{*

*this->data=data;*

*this->next=NULL;*

*}*

*};*

*void RemoveDuplicate(Node\* &head)*

*{*

*Node\* temp=head;*

*while(temp!=NULL)*

*{*

*int check=temp->data;*

*Node\* prev=temp;*

*Node\* current=temp->next;*

*while(current!=NULL)*

*{*

*if(check==current->data)*

*{*

*prev->next=current->next;*

*current=prev->next;*

*}*

*else*

*{*

*prev=current;*

*current=current->next;*

*}*

*}*

*temp=temp->next;*

*}*

*}*

*void Display(Node\* &head)*

*{*

*Node\* temp=head;*

*while(temp!=NULL)*

*{*

*cout<<temp->data<<" , ";*

*temp=temp->next;*

*}*

*cout<<endl;*

*}*

*int main()*

*{*

*Node\* head=NULL;*

*Node\* n1=new Node(1);*

*head=n1;*

*Node\* n2=new Node(2);*

*n1->next=n2;*

*Node\* n3=new Node(2);*

*cout<<"Linked list is:1";*

*Display(head);*

*RemoveDuplicate(head);*

*cout<<"Linkedlist Without Duplicate is:";*

*Display(head);*

*}*

***Question : 2***

#include <iostream>

using namespace std;

class Stack {

private:

int\* arr;

int capacity;

int top;

public:

Stack(int size) {

capacity = size;

arr = new int[capacity];

top = -1;

}

~Stack() {

delete[] arr;

}

bool isEmpty() {

return top == -1;

}

bool isFull() {

return top == capacity - 1;

}

void push(int value) {

if (isFull()) {

cout << "Stack overflow. Cannot push " << value << endl;

return;

}

arr[++top] = value;

cout << "Pushed " << value << " into the stack." << endl;

}

void pop() {

if (isEmpty()) {

cout << "Stack underflow." << endl;

return;

}

int value = arr[top--];

cout << "Popped " << value << " from the stack." << endl;

}

void display() {

if (isEmpty()) {

cout << "Stack is empty." << endl;

return;

}

cout << "Stack: ";

for (int i = 0; i <= top; i++) {

cout << arr[i] << " ";

}

cout << endl;

}

};

int main() {

int size;

cout << "Enter the size of the stack: ";

cin >> size;

Stack stack(size);

int choice, value;

while (true) {

cout << "Enter your choice:\n";

cout << "1. Push\n";

cout << "2. Pop\n";

cout << "3. Display\n";

cout << "4. Quit\n";

cin >> choice;

switch (choice) {

case 1:

cout << "Enter a value to push onto the stack: ";

cin >> value;

stack.push(value);

break;

case 2:

stack.pop();

break;

case 3:

stack.display();

break;

case 4:

return 0;

default:

cout << "Invalid choice. Please try again.\n";

}

}

}

