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#include <iostream>

using namespace std;

#define SIZE 5

class Deque {
private:
    int arr[SIZE];

    int front, rear;

public:
    Deque() {
        front = -1;
        rear = -1;
    }

    bool isFull() {
        return (front == 0 && rear == SIZE- 1) || (front == rear + 1);
    }

    bool isEmpty() {
        return front == -1;
    }

    void insertRear(int value) {
        if (isFull()) {
            cout << "Deque is FULL!!! Insertion at rear is not possible!!!" << endl;
            return;
        }

        if (isEmpty()) {
            front = rear = 0;
        } else if (rear == SIZE- 1) {
            rear = 0;
        } else {
            rear++;
        }

        arr[rear] = value;

        cout << "Inserted " << value << " at rear." << endl;
    }

    void insertFront(int value) {

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if (isFull()) {
    cout << "Deque is FULL!!! Insertion at front is not possible!!!" << endl;
    return;
}
if (isEmpty()) {
    front = rear = 0;
} else if (front == 0) {
    front = SIZE- 1;
} else {
    front--;
}
arr[front] = value;
cout << "Inserted " << value << " at front." << endl;
}
void deleteFront() {
    if (isEmpty()) {
        cout << "Deque is EMPTY!!! Deletion from front is not possible!!!" << endl;
        return;
    }
    cout << "Deleted " << arr[front] << " from front." << endl;
    if (front == rear) {
        front = rear =-1;
    } else if (front == SIZE- 1) {
        front = 0;
    } else {
        front++;
    }
}
void deleteRear() {
    if (isEmpty()) {
        cout << "Deque is EMPTY!!! Deletion from rear is not possible!!!" << endl;
        return;
    }
    cout << "Deleted " << arr[rear] << " from rear." << endl;

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if (front == rear) {
front = rear = -1;
} else if (rear == 0) {
rear = SIZE - 1;
} else {
rear--;
}
}

void display() {
if (isEmpty()) {
cout << "Deque is EMPTY!!!" << endl;
return;
}

cout << "Elements in the deque: ";
if (rear >= front) {
for (int i = front; i <= rear; i++)
cout << arr[i] << " ";
} else {
for (int i = front; i < SIZE; i++)
cout << arr[i] << " ";
for (int i = 0; i <= rear; i++)
cout << arr[i] << " ";
}

cout << endl;
}

};

int main() {
Deque dq;

int choice, value;

do {
cout << "\nDouble-Ended Queue Operations Menu:\n";
cout << "1. Insert at Rear\n";
cout << "2. Insert at Front\n";
cout << "3. Delete from Front\n";

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cout << "4. Delete from Rear\n";  
cout << "5. Display Deque\n";  
cout << "6. Exit\n";  
cout << "Select an option: ";  
cin >> choice;  
switch (choice) {  
case 1:  
cout << "Enter value to insert at rear: ";  
cin >> value;  
dq.insertRear(value);  
break;  
case 2:  
cout << "Enter value to insert at front: ";  
cin >> value;  
dq.insertFront(value);  
break;  
case 3:  
dq.deleteFront();  
break;  
case 4:  
dq.deleteRear();  
break;  
case 5:  
dq.display();  
break;  
case 6:  
cout << "Exiting the program." << endl;  
break;  
default:  
cout << "Invalid option! Please try again." << endl;  
}  
} while (choice != 6);  
return 0;  
}
```