#include <iostream>

using namespace std;

class Deque {

int arr[10];

int front, rear, size;

public:

Deque() {

front = -1;

rear = -1;

size = 10;

}

bool isFull() {

return (front == 0 && rear == size - 1) || (front == rear + 1);

}

bool isEmpty() {

return front == -1;

}

void addFront(int value) {

if (isFull()) {

cout << "Deque is full. Cannot add at front." << endl;

return;

}

if (isEmpty()) {

front = rear = 0;

} else if (front == 0) {

front = size - 1;

} else {

front--;

}

arr[front] = value;

cout << value << " added at front." << endl;

}

void addRear(int value) {

if (isFull()) {

cout << "Deque is full. Cannot add at rear." << endl;

return;

}

if (isEmpty()) {

front = rear = 0;

} else if (rear == size - 1) {

rear = 0;

} else {

rear++;

}

arr[rear] = value;

cout << value << " added at rear." << endl;

}

void deleteFront() {

if (isEmpty()) {

cout << "Deque is empty. Cannot delete from front." << endl;

return;

}

cout << arr[front] << " deleted 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. Cannot delete from rear." << endl;

return;

}

cout << arr[rear] << " deleted from rear." << endl;

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 << "Deque elements: ";

if (front <= rear) {

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 deque;

int choice, value;

do {

cout << "\n1. Add Front\n2. Add Rear\n3. Delete Front\n4. Delete Rear\n5. Display\n6. Exit\nEnter your choice: ";

cin >> choice;

switch (choice) {

case 1:

cout << "Enter value to add at front: ";

cin >> value;

deque.addFront(value);

break;

case 2:

cout << "Enter value to add at rear: ";

cin >> value;

deque.addRear(value);

break;

case 3:

deque.deleteFront();

break;

case 4:

deque.deleteRear();

break;

case 5:

deque.display();

break;

case 6:

cout << "Exiting..." << endl;

break;

default:

cout << "Invalid choice. Please try again." << endl;

}

} while (choice != 6);

return 0;

}