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Linear search:

LinearSearch.cpp

```cpp
int main(){
    // n is the length of array we enter and element is the element we have to search.
    int n, element;
    cout<< "Enter the length of array: "<< endl;
    cin >> n;

    // An array is defined with maximum length of 20.
    int arr[20];
    // taking input of array.
    cout<< "Ener the elements in array: "<<endl;
    for(int i = 0; i<n; i++){
        cin>> arr[i];
    }

    cout<< "Enter the number you want to check" <<endl;
    cin>> element;

    //now for linear searching.
    for(int j = 0; j<n; j++){
        if (arr[j]== element)
        {
            cout<< j;
        }
```

```
cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ LinearSearch.cpp -o LinearSearch && "/Users/vishwaskisaniya/Documents/vscode/"LinearSearch
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode % cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ LinearSearch.cpp -o LinearSearch && "/Users/vishwaskis
aniya/Documents/vscode/"LinearSearch
Enter the length of array:
5
Ener the elements in array:
3 4 5 6 7
Enter the number you want to check
6
3
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode %
```

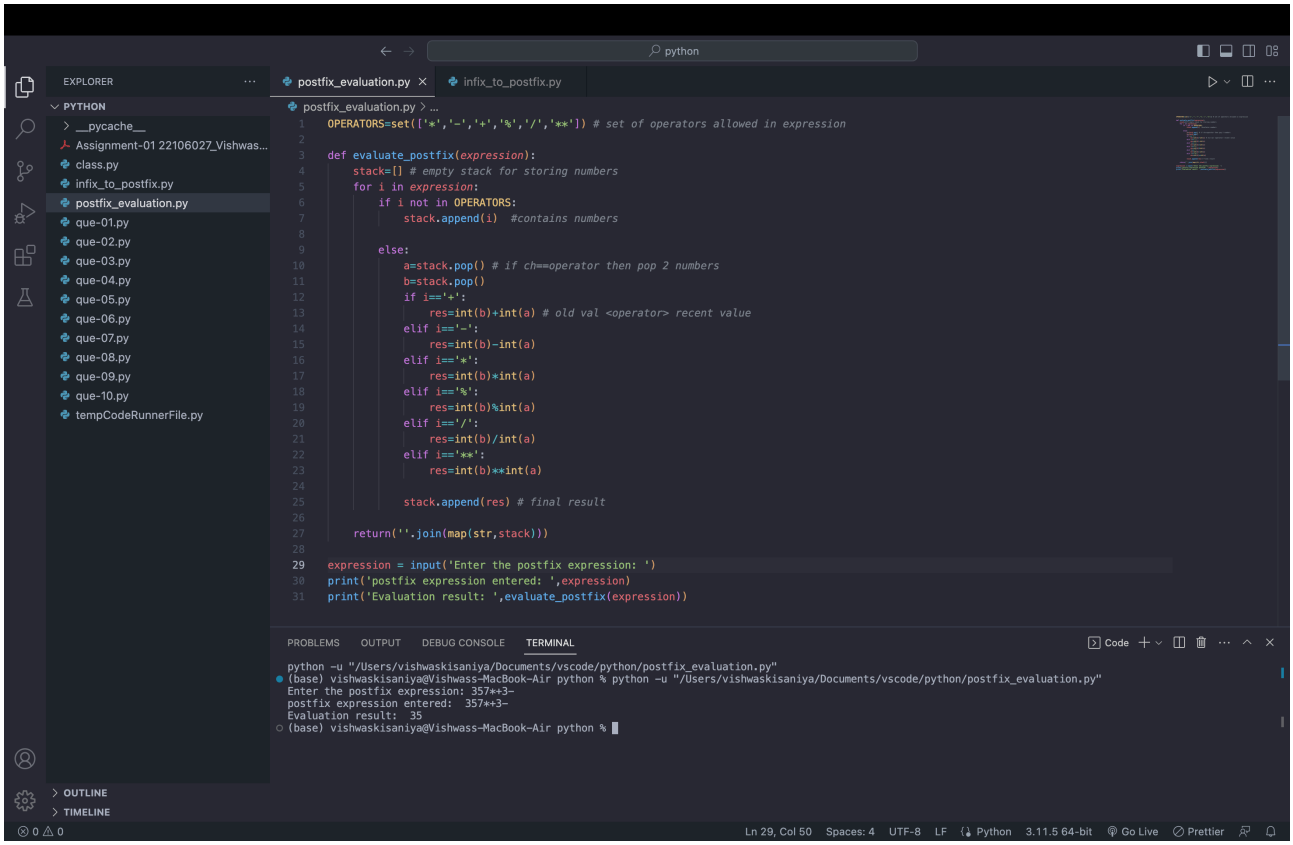
Binary search:

BinarySearch.cpp

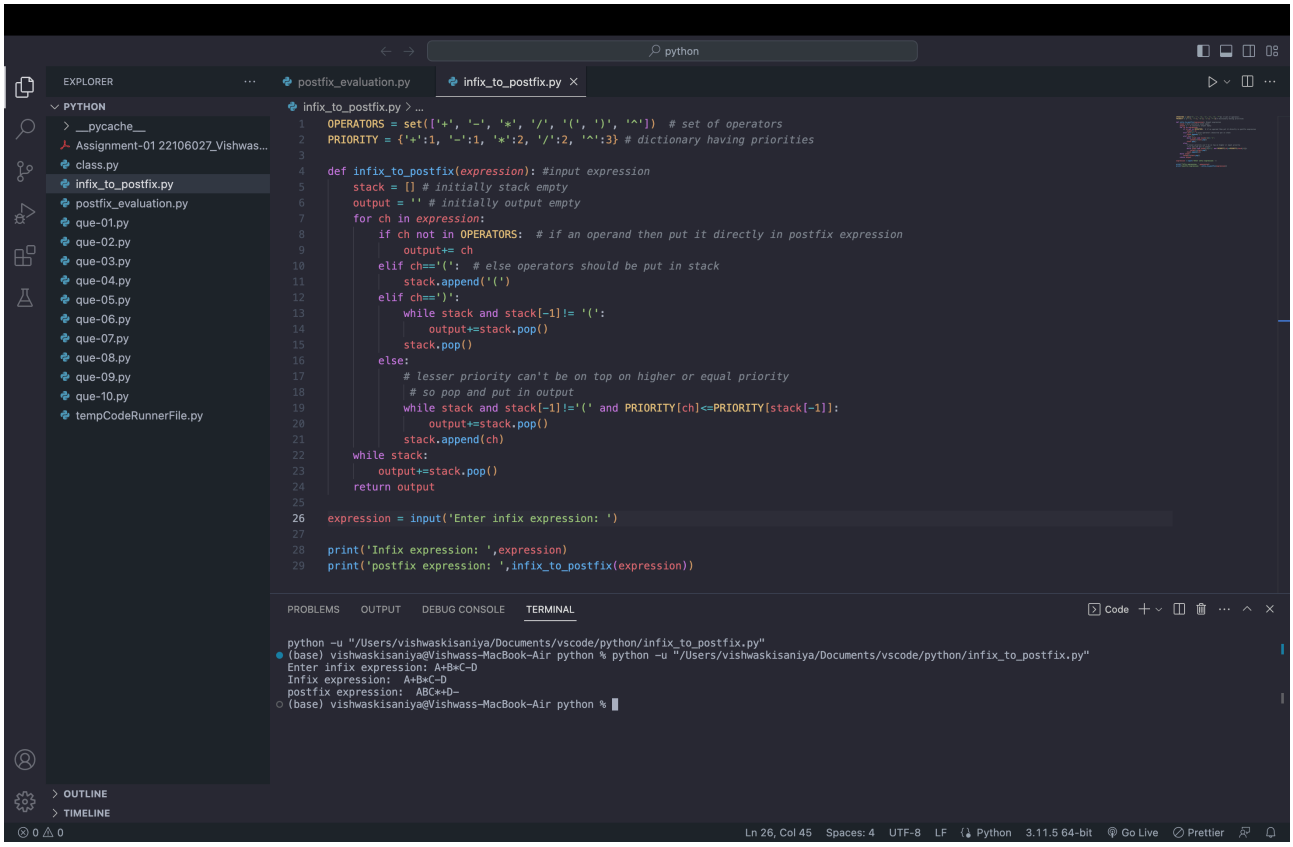
```cpp
#include <iostream>
using namespace std;
// For sorted array
int binarySearch(int input[], int n, int val){
    int start = 0, end = n-1 ;

    while (start <= end){
        int mid = (start + end)/2 ;
        if (input[mid] == val){
            return mid;
        }
        else if( val < input[mid]){
            end = mid - 1 ;
        }
        else{
            start = mid + 1;

        }

    }
    return -1;
}
int main(){
    int n , val;
    cout<< "Enter the length of your array: "<< endl;
    cin>> n;
    cout<< "Input array elements: "<< endl;
    int input[20];
    for(int i = 0; i<n; i++){
        cin>> input[i];

    }
    // the element to find
    cout<< "Enter the element to find: "<<endl;
    cin>> val;

    cout<< binarySearch(input, n, val) <<endl;

}
```

```
cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ BinarySearch.cpp -o BinarySearch && "/Users/vishwaskisaniya/Documents/vscode/"BinarySearch
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode % cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ BinarySearch.cpp -o BinarySearch && "/Users/vishwaskis
aniya/Documents/vscode/"BinarySearch
Enter the length of your array:
5
Input array elements:
3 4 5 6 7
Enter the element to find:
6
3
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode %
```

Postfix evaluation:



Infix to postfix conversion:



Circular queue implémentation:

Code:

```
#include <iostream>

using namespace std;

class CircularQueue {
private:
    int *arr;
    int front;
    int rear;
    int size;
    int capacity;

public:
    CircularQueue(int capacity) {
        this->capacity = capacity;
        arr = new int[capacity];
        front = rear = -1;
        size = 0;
    }

    ~CircularQueue() {
        delete[] arr;
    }

    bool isEmpty() {
        return size == 0;
    }

    bool isFull() {
        return size == capacity;
    }

    void enqueue(int value) {
        if (isFull()) {
            cout << "Queue is full. Cannot enqueue." << endl;
            return;
        }

        if (isEmpty()) {
            front = rear = 0;
        } else {
            rear = (rear + 1) % capacity;
        }

        arr[rear] = value;
        size++;
    }

    void dequeue() {
        if (isEmpty()) {
            cout << "Queue is empty. Cannot dequeue." << endl;
            return;
        }

        if (front == rear) {
            front = rear = -1;
```

```
        } else {
            front = (front + 1) % capacity;
        }

        size--;
    }

    int peek() {
        if (isEmpty()) {
            cout << "Queue is empty. Cannot peek." << endl;
            return -1;
        }

        return arr[front];
    }

    void display() {
        if (isEmpty()) {
            cout << "Queue is empty." << endl;
            return;
        }

        int i = front;
        do {
            cout << arr[i] << " ";
            i = (i + 1) % capacity;
        } while (i != (rear + 1) % capacity);

        cout << endl;
    }
};

int main() {
    CircularQueue queue(5);

    queue.enqueue(1);
    queue.enqueue(2);
    queue.enqueue(3);
    queue.enqueue(4);
    queue.enqueue(5);

    cout << "Queue elements: ";
    queue.display();

    cout << "Dequeue: ";
    queue.dequeue();
    queue.display();

    cout << "Peek: " << queue.peek() << endl;

    return 0;
}
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL                                                    Code

cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ circular_queue.cpp -o circular_queue && "/Users/vishwaskisaniya/Documents/vscode/"circular_queue
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode % cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ circular_queue.cpp -o circular_queue && "/Users/vishwa
skisaniya/Documents/vscode/"circular_queue
Queue elements: 1 2 3 4 5
Dequeue: 2 3 4 5
Peek: 2
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode %
```

Linear queue implementation:

Code:

```
#include <iostream>

using namespace std;

class LinearQueue {
private:
    int *arr;
    int front;
    int rear;
    int size;
    int capacity;

public:
    LinearQueue(int capacity) {
        this->capacity = capacity;
        arr = new int[capacity];
        front = rear = -1;
        size = 0;
    }

    ~LinearQueue() {
        delete[] arr;
    }

    bool isEmpty() {
        return size == 0;
    }

    bool isFull() {
        return size == capacity;
    }

    void enqueue(int value) {
        if (isFull()) {
            cout << "Queue is full. Cannot enqueue." << endl;
            return;
        }

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

        arr[rear] = value;
        size++;
    }

    void dequeue() {
        if (isEmpty()) {
            cout << "Queue is empty. Cannot dequeue." << endl;
            return;
        }

        if (front == rear) {
            front = rear = -1;
```

```
        } else {
            front++;
        }

        size--;
    }

    int peek() {
        if (isEmpty()) {
            cout << "Queue is empty. Cannot peek." << endl;
            return -1;
        }

        return arr[front];
    }

    void display() {
        if (isEmpty()) {
            cout << "Queue is empty." << endl;
            return;
        }

        for (int i = front; i <= rear; i++) {
            cout << arr[i] << " ";
        }

        cout << endl;
    }
};

int main() {
    LinearQueue queue(5);

    queue.enqueue(1);
    queue.enqueue(2);
    queue.enqueue(3);
    queue.enqueue(4);
    queue.enqueue(5);

    cout << "Queue elements: ";
    queue.display();

    cout << "Dequeue: ";
    queue.dequeue();
    queue.display();

    cout << "Peek: " << queue.peek() << endl;

    return 0;
}
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL                                    Code

cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ linear_queue.cpp -o linear_queue && "/Users/vishwaskisaniya/Documents/vscode/"linear_queue
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode % cd "/Users/vishwaskisaniya/Documents/vscode/" && g++ linear_queue.cpp -o linear_queue && "/Users/vishwaskis
aniya/Documents/vscode/"linear_queue
Queue elements: 22 32 54 86 30
Dequeue: 32 54 86 30
Peek: 32
(base) vishwaskisaniya@Vishwass-MacBook-Air vscode %
```