DS Assignment-3

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1. #include <iostream>

using namespace std;

#define SIZE 100

class Stack {

int arr[SIZE], top;

public:

Stack() { top = -1; }

void push(int x) {

if (isFull()) return;

arr[++top] = x;

}

void pop() {

if (isEmpty()) return;

top--;

}

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

bool isFull() { return top == SIZE - 1; }

void display() {

for (int i = top; i >= 0; i--) cout << arr[i] << " ";

cout << endl;

}

void peek() {

if (!isEmpty()) cout << arr[top] << endl;

}

};

int main() {

Stack s;

int ch, val;

do {

cin >> ch;

switch (ch) {

case 1: cin >> val; s.push(val); break;

case 2: s.pop(); break;

case 3: cout << s.isEmpty() << endl; break;

case 4: cout << s.isFull() << endl; break;

case 5: s.display(); break;

case 6: s.peek(); break;

}

} while (ch != 0);

}

2. #include <iostream>

#include <stack>

using namespace std;

int main() {

string s;

cin >> s;

stack<char> st;

for (char c : s)

{st.push(c);}

while (!st.empty()) {

cout << st.top();

st.pop();

}

}

3. class Solution {

public:

bool isValid(string s) {

stack<char> st;

for(char c : s){

if(c == '(' || c == '{' || c == '['){

st.push(c);

}

else {

if(st.empty()) return false;

char ch = st.top();

if((c == ')' && ch == '(') ||

(c == '}' && ch == '{') ||

(c == ']' && ch == '[')){

st.pop();

} else {

return false;

}

}

}

return st.empty();

}

};

}

int main() {

string s; cin >> s;

cout << (isBalanced(s) ? "Yes" : "No");

}

4. #include <iostream>

#include <stack>

using namespace std;

int prec(char c) {

if (c=='^') return 3;

if (c=='\*'||c=='/') return 2;

if (c=='+'||c=='-') return 1;

return -1;

}

int main() {

string s; cin >> s;

stack<char> st; string res;

for (char c : s) {

if (isalnum(c)) res += c;

else if (c=='(') st.push(c);

else if (c==')') {

while (!st.empty() && st.top()!='(') { res+=st.top(); st.pop(); }

st.pop();

} else {

while (!st.empty() && prec(st.top())>=prec(c)) { res+=st.top(); st.pop(); }

st.push(c);

}

}

while (!st.empty()) { res+=st.top(); st.pop(); }

cout << res;

}

5. #include <iostream>

#include <stack>

using namespace std;

int main() {

string s; cin >> s;

stack<int> st;

for (char c : s) {

if (isdigit(c)) st.push(c-'0');

else {

int b=st.top(); st.pop();

int a=st.top(); st.pop();

if (c=='+') st.push(a+b);

else if (c=='-') st.push(a-b);

else if (c=='\*') st.push(a\*b);

else if (c=='/') st.push(a/b);

}

}

cout << st.top();

}