Question3.cpp

```cpp
1   // <----Lab 05 - Stacks---->
2
3   // Q3. Write a program using stacks which takes an expression as input and determines whether
    the
4   //      delimiters are matched or not.
5
6   #include<iostream>
7   #include<string>
8
9   using namespace std;
10
11  class stack {
12          char arr[20];
13          int top=-1;
14      public:
15          stack() {
16              for(int i=0; i<20; i++) {
17                  arr[i]=0;
18              }
19          }
20          bool full() {
21              return top==19;
22          }
23          bool empty() {
24              return top==-1;
25          }
26
27          void push(char value) {
28              if(!full()) {
29                  top++;
30                  arr[top]=value;
31              } else {
32                  cout<<"Array is Full.\n";
33                  return;
34              }
35          }
36          void pop() {
37              if(!empty()) {
38                  top--;
39              }
40              else{
41                  cout<<"Stack is Empty!"<<endl;
42              }
43          }
44          char Top(){
45              if(!empty()){
46                  return arr[top];
47              }
48              else{
49                  cout<<"Array Empty, Returning 'X'...\n";
50                  return 'X';
51              }
52          }
```

```cpp
53          void display() {
54              cout<<"\n--";
55              for(int i=0; i<=top; i++) {
56                  cout<<arr[i];
57              }
58              cout<<"--\n";
59          }
60  };
61
62  bool MatchDelim(string ex){
63      stack delims;
64      for(int i=0;i<ex.length();i++){
65          if(ex[i]=='{'||ex[i]=='('||ex[i]=='['){
66              delims.push(ex[i]);
67          }
68          else if(ex[i]==')'||ex[i]=='}'||ex[i]==']'){
69              if(ex[i]==')' && delims.Top()=='('){
70                  delims.pop();
71              }
72              else if(ex[i]==']' && delims.Top()=='['){
73                  delims.pop();
74              }
75              else if(ex[i]=='}' && delims.Top()=='{'){
76                  delims.pop();
77              }
78              else{
79                  cout<<"Open and Close Brackets Mismatched at position "<<i<<endl;
80                  return false;
81              }
82          }
83      }
84      if(delims.empty()){
85          cout<<"Expression is valid\n";
86          return true;
87      }
88      else{
89          cout<<"Unclosed Delimiters Remain\n";
90          delims.display();
91          return false;
92      }
93  }
94
95  int main(){
96      string exp;
97      cout<<"Enter Expressions to match the Delimiters:\n";
98      getline(cin,exp);
99      MatchDelim(exp);
100
101 }
```