

DATA STRUCTURE HOME TASK:

F24-0767

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Task A:

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    char exp[100];
```

```
    int stack[100], top = -1;
```

```
    cout << "Enter Postfix Expression: ";
```

```
    cin.getline(exp, 100);
```

```
    for (int i = 0; exp[i] != '\0'; i++) {
```

```
        char c = exp[i];
```

```
        if (c == ' ') {
```

```
            continue; // skip spaces
```

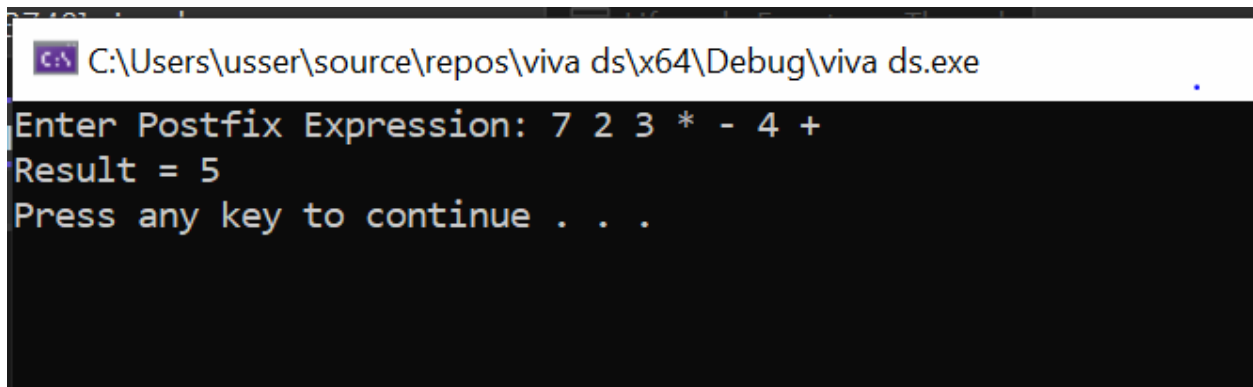
```
        }
```

```
        if (c >= '0' && c <= '9') {
```

```
            stack[++top] = c - '0'; // push digit
```

```
        }
```

```
else {  
    int val2 = stack[top--];  
    int val1 = stack[top--];  
  
    if (c == '+') stack[++top] = val1 + val2;  
    else if (c == '-') stack[++top] = val1 - val2;  
    else if (c == '*') stack[++top] = val1 * val2;  
    else if (c == '/') stack[++top] = val1 / val2;  
}  
}  
  
cout << "Result = " << stack[top] << endl;  
system("pause");  
return 0;  
}
```



The screenshot shows a Windows command prompt window with the title bar "C:\Users\usser\source\repos\viva ds\x64\Debug\viva ds.exe". The prompt displays the following text: "Enter Postfix Expression: 7 2 3 * - 4 +", "Result = 5", and "Press any key to continue . . .". The input "7 2 3 * - 4 +" is entered on the same line as the prompt. The output "Result = 5" is displayed on the next line. The prompt "Press any key to continue . . ." is displayed on the third line.

```
C:\Users\usser\source\repos\viva ds\x64\Debug\viva ds.exe
Enter Postfix Expression: 2 3 1 * + 9 -
Result = -4
Press any key to continue . . .
```

Task B:

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    char exp[100];
```

```
    string stack[100];
```

```
    int top = -1;
```

```
    cout << "Enter Postfix Expression: ";
```

```
    cin.getline(exp, 100);
```

```
    for (int i = 0; exp[i] != '\0'; i++) {
```

```
        char c = exp[i];
```

```
        if (c == ' ') continue; // skip spaces
```

```
        if ((c >= '0' && c <= '9') || (c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z')) {
```

```
            string s = "";
```

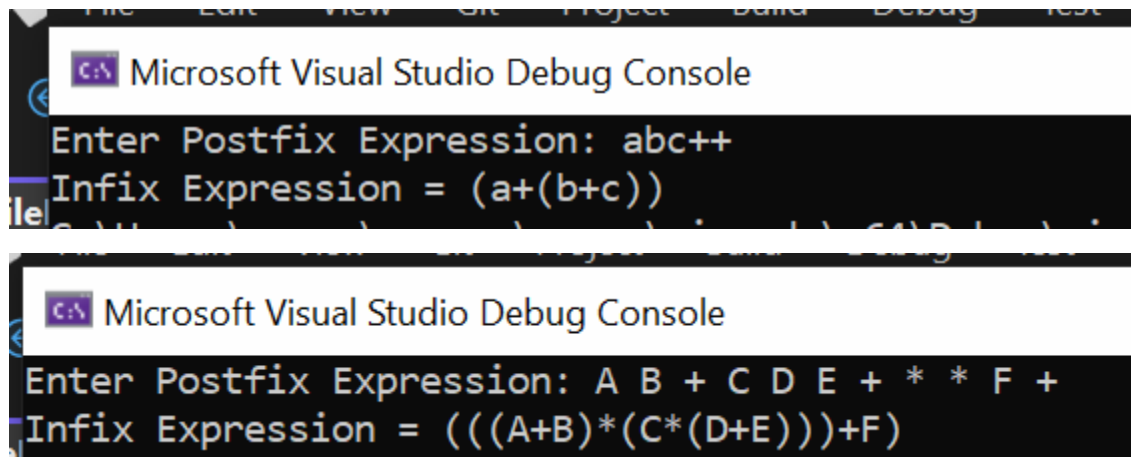
```
s += c;

stack[++top] = s;
}

else {
    if (top < 1) {
        cout << "Invalid Postfix Expression!";
        return 0;
    }
    string val2 = stack[top--];
    string val1 = stack[top--];
    string result = "(" + val1 + c + val2 + ";";
    stack[++top] = result;
}
}

if (top != 0) {
    cout << "Invalid Postfix Expression!";
}
else {
    cout << "Infix Expression = " << stack[top];
}

return 0;
}
```



Task C:

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    char exp[100];
```

```
    string stack[100];
```

```
    int top = -1;
```

```
    cout << "Enter Prefix Expression: ";
```

```
    cin.getline(exp, 100);
```

```
    int len = 0;
```

```
    while (exp[len] != '\0') len++;
```

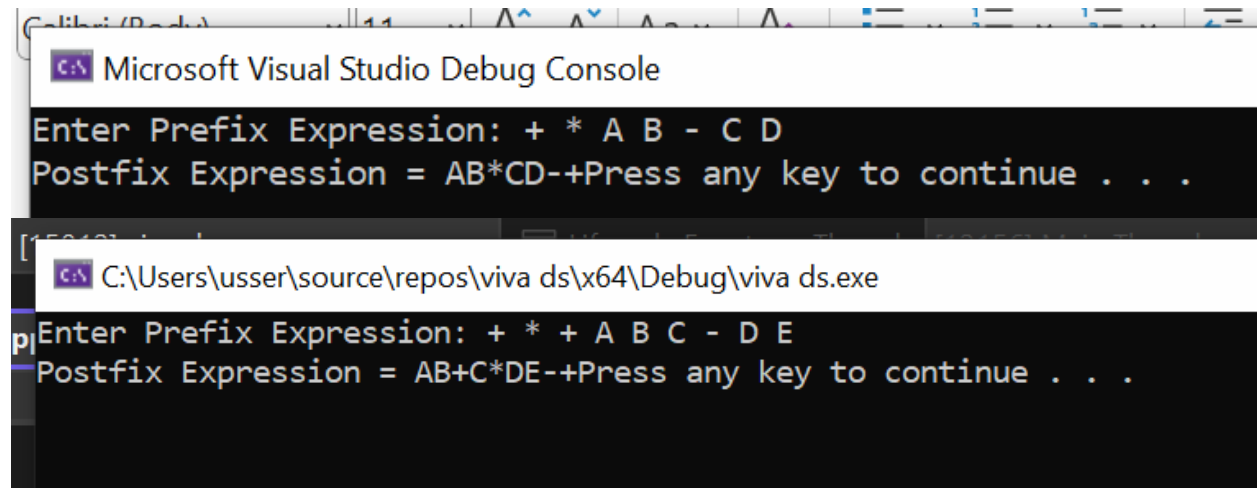
```
    for (int i = len - 1; i >= 0; i--) {
```

```
        char c = exp[i];
```

```
        if (c == ' ') continue; // skip spaces
```

```
if ((c >= '0' && c <= '9') || (c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z')) {  
    string s = "";  
    s += c;  
    stack[++top] = s;  
}  
  
else {  
    if (top < 1) {  
        cout << "Invalid Prefix Expression!";  
        return 0;  
    }  
    string val1 = stack[top--];  
    string val2 = stack[top--];  
    string result = val1 + val2 + c;  
    stack[++top] = result;  
}  
}  
  
if (top != 0) {  
    cout << "Invalid Prefix Expression!";  
}  
else {  
    cout << "Postfix Expression = " << stack[top];  
}  
  
system("pause");  
return 0;
```

}



The image shows two overlapping windows from the Microsoft Visual Studio Debug Console. The top window, titled "C:\> Microsoft Visual Studio Debug Console", displays the text "Enter Prefix Expression: + * A B - C D" and "Postfix Expression = AB*CD-+Press any key to continue . . .". The bottom window, titled "C:\Users\usser\source\repos\viva ds\x64\Debug\viva ds.exe", displays the text "Enter Prefix Expression: + * + A B C - D E" and "Postfix Expression = AB+C*DE-+Press any key to continue . . .".

```
C:\> Microsoft Visual Studio Debug Console
Enter Prefix Expression: + * A B - C D
Postfix Expression = AB*CD-+Press any key to continue . . .

C:\Users\usser\source\repos\viva ds\x64\Debug\viva ds.exe
Enter Prefix Expression: + * + A B C - D E
Postfix Expression = AB+C*DE-+Press any key to continue . . .
```