



COMSATS Institute of  
Information Technology

**Group Members:**

M. Abdullah Arshad

(SP20-BCS-033)

Hasnain Ahmed

(FA20-BCS-005)

**Class/Section:**            BCS-7 (A)

**Subject:**                    CC-Lab (Compiler Construction)

**Submission To:**           Sir Bilal Haider

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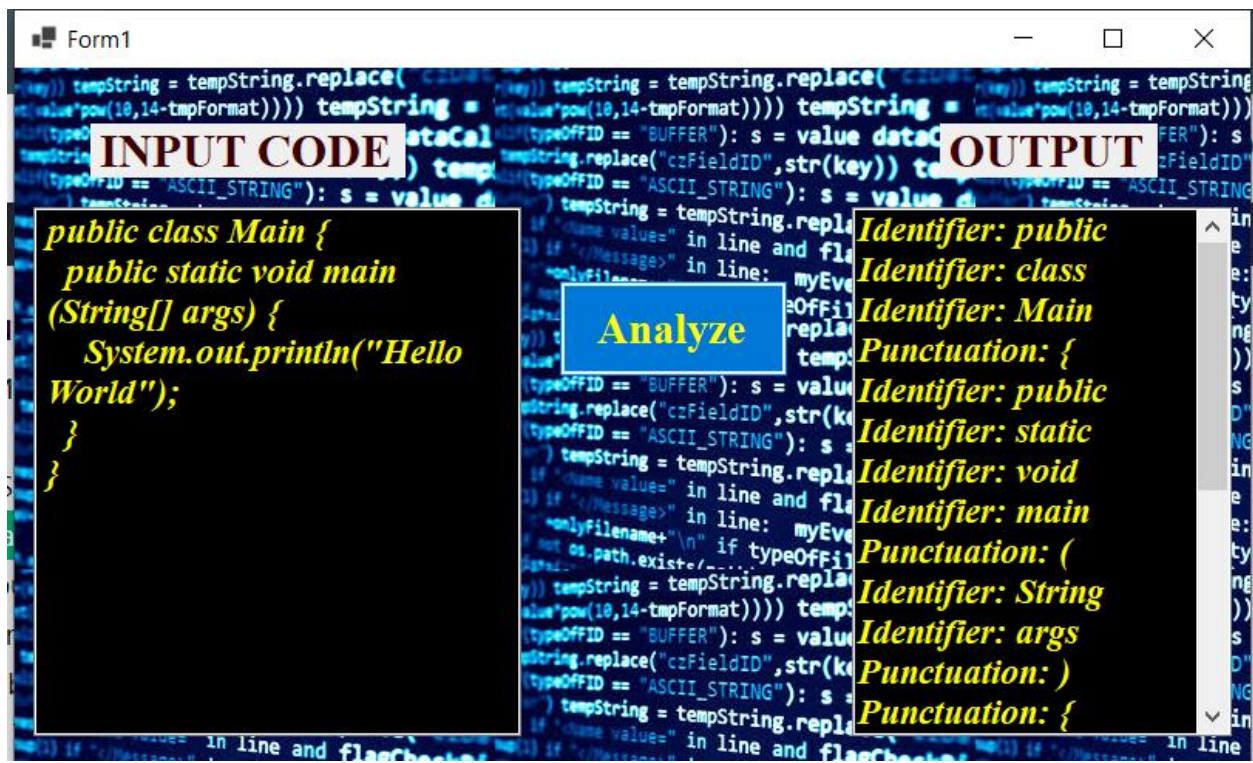
## CC-Lab Terminal:

**Question 3: Give Input and then show its Output.**

**Answer:**

## ❖ Lexical analyzer:

- **Input 1 & its Output:**



- Input 2 & its Output:

Form1

INPUT CODE

```
>>> print("Hello, World!")
Hello, World!
```

Analyze

OUTPUT

```
Identifier: print
Punctuation: (
StringLiteral: "Hello, Wo
Identifier: Hello
Punctuation: ,
Identifier: World
Punctuation: )
Identifier: Hello
Punctuation: ,
Identifier: World
```

- Input 3 & its Output:

Form1

INPUT CODE

```
#include <iostream>
using namespace std;

int main() {
    cout << "Hello World!";
    return 0;
}
```

Analyze

OUTPUT

```
Identifier: include
Identifier: iostream
Identifier: using
Identifier: namespace
Identifier: std
Punctuation: ;
Identifier: int
Identifier: main
Punctuation: (
Punctuation: )
Punctuation: {
Identifier: cout
StringLiteral: "Hello W
```

## ❖ LR Parsing:

- Grammar 1:

**G -> S**

**S -> aSb**

**S -> ab**

- **Test String:** aaabbb

```
Run LRparsing x
"C:\Users\Junaid Computers\AppData\Local\Programs\Python\Python39\python.exe" "C:\Users\
Enter the name of the file: grammarinput2
Terminals: ['a', 'b', '#']
Non-terminals: ['G', 'S']
Action list
{0: {'a': 1}, 1: {'a': 1, 'b': 2}, 4: {'b': 5}}
Goto list
{0: {'S': 3}, 1: {'S': 4}}
Reduction states
{2: ('S', 'ab'), 3: ('G', 'S'), 5: ('S', 'aSb')}
Accept state 3
Enter some string: aaabbb
0 [0] a shift 1
1 [1, 0] a shift 1
1 [1, 1, 0] a shift 1
1 [1, 1, 1, 0] b shift 2
2 [2, 1, 1, 1, 0] b reduce S -> ab
4 [4, 1, 1, 0] b shift 5
5 [5, 4, 1, 1, 0] b reduce S -> aSb
4 [4, 1, 0] b shift 5
5 [5, 4, 1, 0] # reduce S -> aSb
3 [3, 0] # accept

Process finished with exit code 0
|
```



- **Grammar 2:**

**G -> S**

**S -> aB**

**B -> aBAB**

**B ->**

**A -> +**

**A -> \***

- **Test string : aa\*ab**

```
Run LRparsing x
"C:\Users\Junaid Computers\AppData\Local\Programs\Python\Python39\python.exe" "C:\Users\Junaid Com
Enter the name of the file: grammarinput3
Terminals: ['a', '+', '*', '#']
Non-terminals: ['G', 'S', 'B', 'A']
Action list
{0: {'a': 1}, 1: {'a': 2}, 2: {'a': 2}, 5: {'*': 9, '+': 8}, 6: {'a': 2}}
Goto list
{0: {'S': 3}, 1: {'B': 4}, 2: {'B': 5}, 5: {'A': 6}, 6: {'B': 7}}
Reduction states
{1: ('B', ''),
 2: ('B', ''),
 3: ('G', 'S'),
 4: ('S', 'aB'),
 6: ('B', ''),
 7: ('B', 'aBAB'),
 8: ('A', '+'),
 9: ('A', '*')}
Accept state 3
Enter some string: aa*ab
0 [0] a shift 1
1 [1, 0] a reduce B ->
4 [4, 1, 0] a reduce S -> aB
3 [3, 0] a accept

Process finished with exit code 0
```

- **Grammar 3:**

**$G \rightarrow E$**

**$E \rightarrow E+T$**

**$E \rightarrow E-T$**

**$E \rightarrow T$**

**$T \rightarrow T * F$**

**$T \rightarrow T / F$**

**$T \rightarrow F$**

**$F \rightarrow x$**

- **Test string :  $x * x + x$**

```
Run LRparsing x
3: {'*': 7, '/': 8},
5: {'x': 1},
6: {'x': 1},
7: {'x': 1},
8: {'x': 1},
9: {'*': 7, '/': 8},
10: {'*': 7, '/': 8}}
Goto list
{0: {'E': 2, 'F': 4, 'T': 3},
 5: {'F': 4, 'T': 9},
 6: {'F': 4, 'T': 10},
 7: {'F': 11},
 8: {'F': 12}}
Reduction states
{1: ('F', 'x'),
 2: ('G', 'E'),
 3: ('E', 'T'),
 4: ('T', 'F'),
 9: ('E', 'E+T'),
10: ('E', 'E-T'),
11: ('T', 'T*F'),
12: ('T', 'T/F')}
Accept state 2
Enter some string: x*x+x
0 [0] x shift 1
1 [1, 0] * reduce F -> x
4 [4, 0] * reduce T -> F
3 [3, 0] * reduce E -> T
2 [2, 0] * accept
```

-End