Session 3: Symbol Table Generation

Assignment:

> ➢ Suppose, a given C source program has been scanned, filtered and then lexically analyzed as it was done in Session 2. We have all the lexemes marked as different types of tokens like keywords, identifiers, operators, separators, parentheses, numbers, etc. We now get corrected the unknown lexemes first, and then generate a Symbol Table describing the features of the identifiers. Finally, we generate a modified token stream in accordance with the Symbol Table for processing by the next phase, that is, Syntactic Analysis.

Sample program fragment

```
/* A program fragment */
float x1 = 3.125;

/* Definition of function f1 */
double  f1(int x)
{
  double z;
  z = 0.01+x*5.5;
  return z;
}

/* Beginning of 'main'*/
int main(void)
{
  int n1;  double z;
  n1=25;  z=f1(n1);
```

Sample input based on the program fragment:

[kw float] [id x1] [op =] [num 3.125] [sep ;] [kw double] [id f1] [par (] [kw int] [id x] [par)] [brc {] [kw double] [id z] [sep ;] [id z] [op =] [num 0.01] [op +] [id x] [op *] [num 5.5] [sep ;] [id return] [id z] [sep ;] [brc }] [kw int] [id main] [par (] [kw void] [par)] [brc {] [kw int] [id n1] [sep ;] [kw double] [id z] [sep ;] [id n1] [op =] [num 25] [sep ;] [id z] [op =] [id f1] [par (] [id n1] [par)] [sep ;]

Step 2: Symbol Table generation:

Symbol Table:

1	x1	var	float	global
2	f1	func	double	global
3	x	var	int	f1
4	z	var	double	f1
5	main	func	int	global
6	n1	var	int	main
7	z	var	double	main

Step 1: After complete recognition of all the lexemes only identifiers are kept in pairs for formation of Symbol Tables. The token stream should look like the one as follows:

[float][id x1][=][3.125][;][double][id f1][(][int][id x][)][{][double][id z][;][id z][=][0.01][+][id x][*][5.5][;][return][id z][;][}][int][id main][(][void][)][{][int][id n1][;][double][id z][;][id n1][=][25][;][id z][=][id f1][(][id n1][)][;]

Step 3: Modified token stream for Syntactic Analysis:

[float][id 1][=][3.125][;][double][id 2][(][int][id 3][)][{][double][id 4][;][id 4][=][0.01][+][id 3][*][5.5][;][return][id 4][;][}][int][id 5][(][void][)][{][int][id 6][;][double][id 7][;][id 6][=][25][;][id 7][=][id 2][(][id 6][)][;]