Experiment No:5

AIM: To implement a program to find FIRST() for any given Production.

THEORY:

FIRST (α) is defined as the collection of terminal symbols which are the first letters of strings derived from α.

FIRST (α) = {α |α $\rightarrow^*$ αβ for some string β }

If the compiler would have come to know in advance, that what is the "first character of the string produced when a production rule is applied", and comparing it to the current character or token in the input string it sees, it can wisely take decision on which production rule to apply.

Algorithm:

If X is Grammar Symbol, then First (X) will be –

If X is a terminal symbol, then FIRST(X) = {X}

If X $\rightarrow$ ε, then FIRST(X) = {ε}

If X is non-terminal & X $\rightarrow$ a α, then FIRST (X) = {a}

If X $\rightarrow$ Y1, Y2, Y3, then FIRST (X) will be

(a) If Y is terminal, then

FIRST (X) = FIRST (Y1, Y2, Y3) = {Y1}

(b) If Y1 is Non-terminal and

If Y1 does not derive to an empty string i.e., If FIRST (Y1) does not contain ε then, FIRST (X) = FIRST (Y1, Y2, Y3) = FIRST(Y1)

(c) If FIRST (Y1) contains ε, then.

FIRST (X) = FIRST (Y1, Y2, Y3) = FIRST(Y1) – {ε} ∪ FIRST(Y2, Y3)

Similarly, FIRST (Y2, Y3) = {Y2}, If Y2 is terminal otherwise if Y2 is Non-terminal then

FIRST (Y2, Y3) = FIRST (Y2), if FIRST (Y2) does not contain ε.

If FIRST (Y2) contain ε, then

FIRST (Y2, Y3) = FIRST (Y2) – {ε} ∪ FIRST (Y3)

Similarly, this method will be repeated for further Grammar symbols, i.e., for Y4, Y5, Y6 … . YK

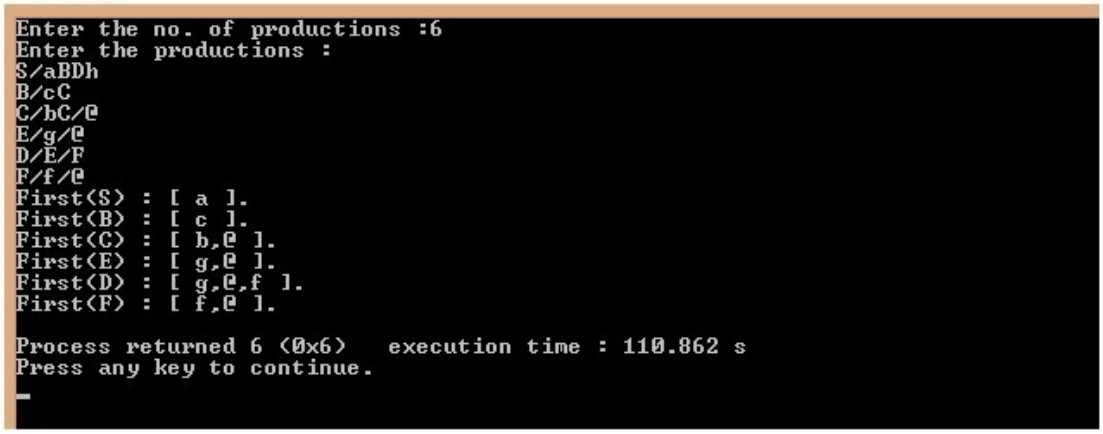
COMPUTING ENVRONMENT

Platform: ubuntu

Programming Language: C / C++ / Java

Expacted Output:

OUTPUT:



Conclusion: Thus the program to find FIRST() is implemented.

Viva Voce Questions:

1. What is FIRST()**?**

Answer: **FIRST ()–** It is a function that gives the set of terminals that begin the strings derived from the production rule.

2. Why FIRST() is CALCULATED.**?**

Answer: If the compiler would have come to know in advance, that what is the **"**first character of the string produced when a production rule is applied**"**, and comparing it to the current character or token in the input string it sees, it can wisely take decision on which production rule to apply.