**CYK ALGORITHM**

201001159-Abhishek Shah

DA-IICT

**Course:**

IT-215 System Software

**Project Assigned by:**

Professor Sanjay Chaudhary

**Goal :**

To implement the CYK(Cocke-Younger-Kasami) algorithm dynamically or in the table-filling way in the server so that it solves the problem of the clients which gives the grammar rules and string to be tested.

Information about CYK algorithm:

This algorithm determines whether a string can be generated by a giving context free grammar. This is known as parsing the string. The algorithm employs bottom-up parsing and dynamic programming.

**Files:**

cyk.c contains the basic implementation of the algorithm.

cyk\_server.c contains the implementation of the algorithm using thread where argument as a port no. have to be specified.

cyk\_client.c contains the way to present demand to the server where argument is ip address, port no. and the file containing grammar respectively in the same order.

**Libraries :**

<sys/types.h>

<sys/socket.h>

<pthread.h>

<fcntl.h>

etc.

**Extra Points:**

->We have used C programming , gcc compiler to compile the code.

->Some assumptions regarding maximum file length and maximum string length have been made been.

->You need to provide the S->AB|BC grammar rule in the form of S-AB|BC and each new grammar rule should be written in new line. Now CNF grammar doesn’t contain S on the right side of the arrow so user should take care of it.

->Terminals are represented by small characters and non-terminals are represented by capital characters.

->If the output answer has S which is symbol for the sentence, that means that particular sentence can be created with the help of the particular set of grammar rules.

->Multithreading to introduce parallelism in the CYK algorithm has been used. Moreover the client and server system have been used to give the request and answer.

->We have provided a snapshot of the program running.

For example,

* + CNF grammar
    - S à AB | BC
    - A à BA | a
    - B à CC | b
    - C à AB | a

and string is baaba.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X1, 5** |  |  |  |  |
| **X1, 4** | **X2, 5** |  |  |  |
| **X1, 3** | **X2, 4** | **X3, 5** |  |  |
| **X1, 2** | **X2, 3** | **X3, 4** | **X4, 5** |  |
| **X1, 1** | **X2, 2** | **X3, 3** | **X4, 4** | **XX5, 5** |
| **w1** | **w2** | **w3** | **w4** | **ww5** |

Now X[i,j]=(X[i,i],X[i+1,j]) U (X[i,i+1],X[i+2,j])U…….U(X[i][i+k-1],X[i+k][j])

Where i+k=j

If top of the table i.e. in this case X1,5 if it contains S then the sentence baaba can be generated by the given grammar rules.