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Aim : Develop, Implement and execute a program using YACC/Bison tool to recognize all strings ending with b preceded by n a's using the grammar $a^n b$ (note: input n value), also create DFA of given grammar using JFLAP

Theory :

- YACC/Bison (Yet Another Compiler Compiler) is a tool used for generating parsers or syntax analyzers. It takes a formal grammar description as input and produces a parser for that grammar.
- You'll need to define the grammar rules in a YACC/Bison file and then compile it to generate the parser.

JFLAP, which stands for "Java Formal Language and Automata Package," is a software tool primarily used in the field of theoretical computer science and automata theory. It offers various features that aid in the study, experimentation, and visualization of formal languages, automata, and related concepts. Here are some common uses of JFLAP:

Constructing Finite Automata (FA):

JFLAP allows users to create, edit, and visualize finite automata, including deterministic finite automata (DFA), non-deterministic finite automata (NFA), and epsilon-NFA.

Creating Turing Machines (TM):

Users can design and simulate Turing machines, which are theoretical models of computation used to study computability and decidability.

Testing and Simulating Automata:

JFLAP provides functionalities to input strings and test them against the constructed automata to observe their behavior, including acceptance or rejection.

Minimizing Automata:

JFLAP offers tools for minimizing DFAs and NFAs, which helps in simplifying automata while preserving their language recognition capabilities.

Converting between Automata Types:

Users can convert between different types of automata, such as converting a non-deterministic automaton to an equivalent deterministic one.

Visualizing Automata:

The graphical interface of JFLAP allows users to visualize automata structures and their transitions, aiding in understanding complex concepts through interactive diagrams.

Learning and Teaching Tool:

JFLAP is widely used as an educational tool in courses related to automata theory, formal languages, and computational theory. It helps students grasp abstract concepts through hands-on experimentation and visualization.

Research and Experimentation:

Researchers and practitioners use JFLAP for conducting experiments, testing hypotheses, and exploring various aspects of formal languages and automata theory.

CODE

prac4.lex

```
%{  
  
#include "y.tab.h"  
  
extern int yyval;  
  
%}
```

A [a]

B [b]

%%

{A} {yylval=yytext[0];return A;}

{B} {yylval=yytext[1];return B;}

\n {return 0;}

. {return yytext[0];}

%%

int yywrap()

{

return 1;

}

prac4.y

%{

#include<stdio.h>

int yylex(void);

int yyerror(char *);

%}

%token A B //tokens : the alphabets of language 'a' and 'b'

%%

//production rules for grammar

expr: s B

;

s : s A

| A

;

%%

int main()

{

printf("Enter the string \n");

yyparse();

printf("Valid string");

return 0;

}

int yyerror(char *s)

{

printf("Invalid: Not a part of the language - a^n b \n");

}

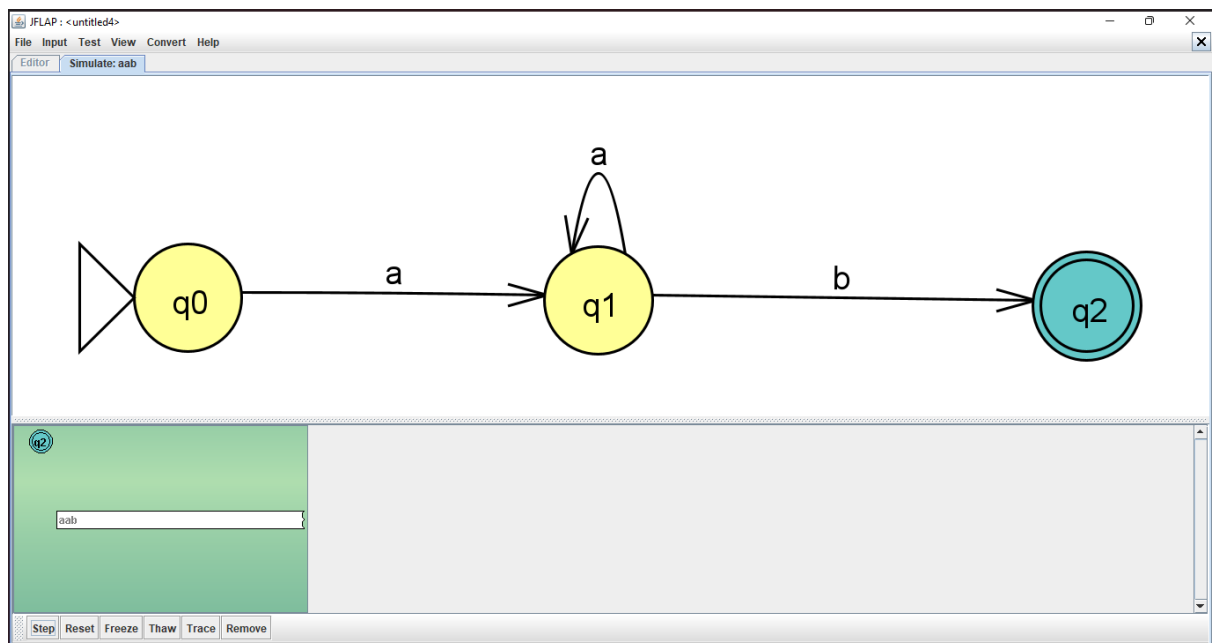
```
Microsoft Windows [Version 10.0.22631.3296]
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E:\lexcodes>flex prac4.l

E:\lexcodes>bison -dy prac4.y

E:\lexcodes>gcc lex.yy.c y.tab.c

E:\lexcodes>a.exe
Enter the string
aab
Valid string
E:\lexcodes>a.exe
Enter the string
aaaabbbb
Invalid: Not a part of the language - a^n b
Valid string
E:\lexcodes>
```



Conclusion : we have successfully developed, implemented and executed a program using YACC/Bison tool to recognize all strings ending with b preceded by n a's using the grammar $a^n b$ (note: input n value), also created DFA of given grammar using JFLAP