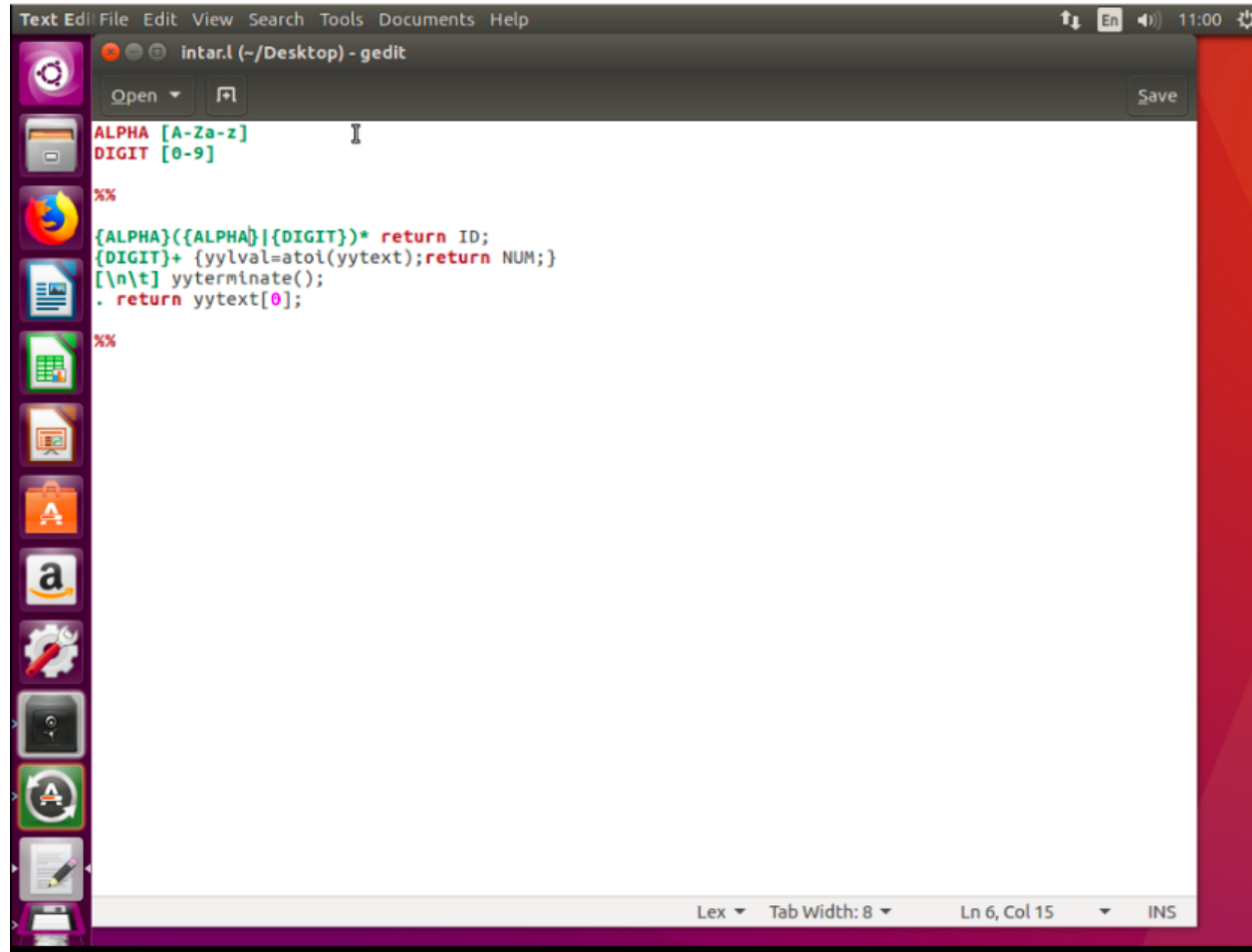Name: Arundarasi Rajendran
PRN:18070122081
Batch: C3

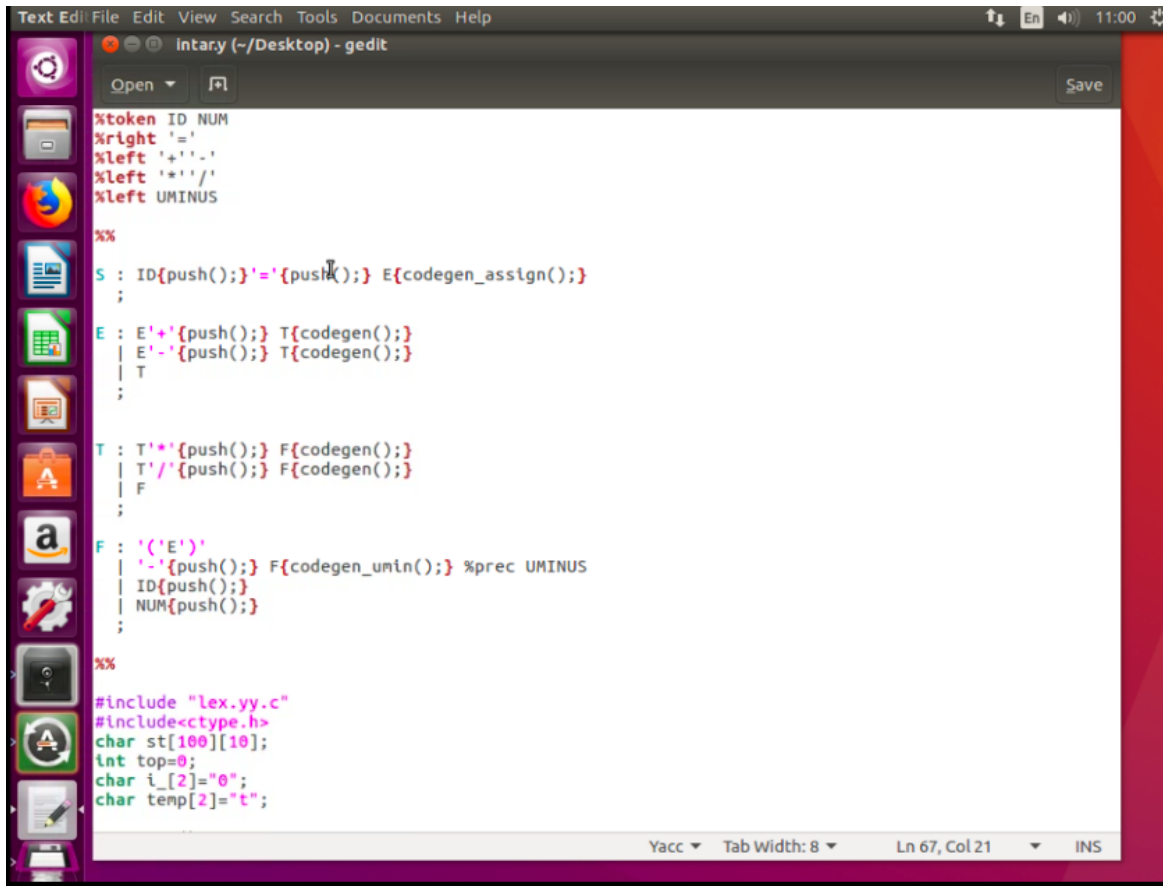**LEX PROGRAM - INTERMEDIATE CODE (IC) GENERATOR FOR ARITHMETIC EXPRESSION**


```lex
ALPHA [A-Za-z]
DIGIT [0-9]

%%

{ALPHA}({ALPHA}|{DIGIT})* return ID;
{DIGIT}+ {yylval=atoi(yytext);return NUM;}
[\n\t] yyterminate();
. return yytext[0];

%%
```

YACC PROGRAM - INTERMEDIATE CODE (IC) GENERATOR FOR ARITHMETIC EXPRESSION

intar.y (~/Desktop) - gedit

Open   Save

```yacc
%token ID NUM
%right '='
%left '+''-'
%left '*''/'
%left UMINUS

%%

S : ID{push();}'='{push();} E{codegen_assign();}
  ;

E : E'+'{push();} T{codegen();}
  | E'-'{push();} T{codegen();}
  | T
  ;

T : T'*'{push();} F{codegen();}
  | T'/'{push();} F{codegen();}
  | F
  ;

F : '('E')'
  | '-'{push();} F{codegen_umin();} %prec UMINUS
  | ID{push();}
  | NUM{push();}
  ;

%%

#include "lex.yy.c"
#include<ctype.h>
char st[100][10];
int top=0;
char i_[2]="0";
char temp[2]="t";
```

Yacc ▼   Tab Width: 8 ▼   Ln 67, Col 21   ▼   INS

```
  ;
E : E'+'{push();} T{codegen();}
  | E'-'{push();} T{codegen();}
  | T
  ;


T : T'*'{push();} F{codegen();}
  | T'/'{push();} F{codegen();}
  | F
  ;

F : '('E')'
  | '-'{push();} F{codegen_umin();} %prec UMINUS
  | ID{push();}
  | NUM{push();}
  ;

%%

#include "lex.yy.c"
#include<ctype.h>
char st[100][10];
int top=0;
char i_[2]="0";
char temp[2]="t";

int main()
{
printf("Enter the expression:");
yyparse();
}
int push()
{
strcpy(st[++top],yytext);
}
```
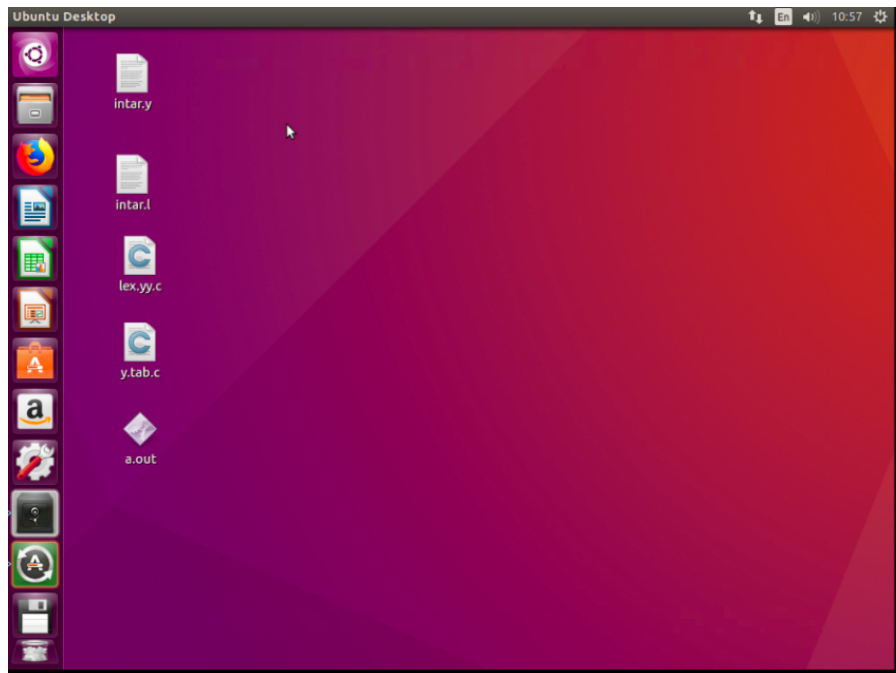
```
{
strcpy(st[++top],yytext);
}
int codegen()
{
strcpy(temp,"t");
strcat(temp,i_);
printf("%s=%s%s%s\n",temp,st[top-2],st[top-1],st[top]);
top-=2;
strcpy(st[top],temp);
i_[0]++;
}

int codegen_umin()
{
strcpy(temp,"t");
strcat(temp,i_);
printf("%s=-%s\n",temp,st[top]);
top--;
strcpy(st[top],temp);
i_[0]++;
}

int codegen_assign()

{
printf("%s=%s\n",st[top-2],st[top]);
top-=2;
}
```

LEX and YACC PROGRAM FILES

OUTPUT

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cd Desktop
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~/Desktop$ lex intar.l
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~/Desktop$ yacc intar.y
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~/Desktop$ gcc y.tab.c -ll -ly
y.tab.c: In function 'yyparse':
y.tab.c:1124:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
        yychar = yylex ();
                 ^
intar.y:9:6: warning: implicit declaration of function 'push' [-Wimplicit-function-declaration]
 S : ID{push();}'='{push();} E{codegen_assign();}
      ^
intar.y:9:6: warning: implicit declaration of function 'codegen_assign' [-Wimplicit-function-declaration]
 S : ID{push();}'='{push();} E{codegen_assign();}
      ^
intar.y:12:6: warning: implicit declaration of function 'codegen' [-Wimplicit-function-declaration]
 E : E'+'{push();} T{codegen();}
      ^
intar.y:24:6: warning: implicit declaration of function 'codegen_umin' [-Wimplicit-function-declaration]
   | '-'{push();} F{codegen_umin();} %prec UMINUS
      ^
y.tab.c:1343:7: warning: implicit declaration of function 'yyerror' [-Wimplicit-function-declaration]
        yyerror (YY_("syntax error"));
        ^
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~/Desktop$ ./a.out
Enter the expression:a=(k+8)*(c-s)
t0=k+8
t1=c-s
t2=t0*t1
a=t2
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~/Desktop$
```