Practical 6

Compiler Construction

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Aim :

Intermediate Code Generation: To generate Three Address code for assignment statement

File.l :

```
%{
#include "y.tab.h"
%}

%%


[0-9]+? {yylval.sym=(char)yytext[0]; return NUMBER;}
[a-zA-Z]+? {yylval.sym=(char)yytext[0];return LETTER;}

\n {return 0;}
. {return yytext[0];}

%%
yywrap()
{
 return 1;
}
```

File.y :

```
%{
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
void ThreeAddressCode();
void triple();
void qudraple();
char AddToTable(char ,char, char);

int ind=0;//count number of lines
char temp = '1';//for t1,t2,t3.....
struct incod
{
char opd1;
char opd2;
char opr;
};
%}

%union
{
 char sym;
}

%token <sym> LETTER NUMBER
```

```
%type <sym> expr
%left '+'
%left '*''/'
%left '-'
%%

statement: LETTER '=' expr ';' {AddToTable((char)$1,(char)$3,'=');}
| expr ';'
;

expr:
 expr '+' expr {$$ = AddToTable((char)$1,(char)$3,'+');}
| expr '-' expr {$$ = AddToTable((char)$1,(char)$3,'-');}
| expr '*' expr {$$ = AddToTable((char)$1,(char)$3,'*');}
| expr '/' expr {$$ = AddToTable((char)$1,(char)$3,'/');}
| '(' expr ')' {$$ = (char)$2;}
| NUMBER {$$ = (char)$1;}
| LETTER {$$ = (char)$1;}
|'-' expr {$$ = AddToTable((char)$2,(char)'\t','-');}
;

%%

yyerror(char *s)
{
 printf("%s",s);
 exit(0);
}

struct incod code[20];

char AddToTable(char opd1,char opd2,char opr)
{
 code[ind].opd1=opd1;
 code[ind].opd2=opd2;
 code[ind].opr=opr;
 ind++;
 return temp++;
}

void ThreeAddressCode()
{
 int cnt = 0;
 char temp = '1';
 printf("\n\n\t THREE ADDRESS CODE\n\n");
 while(cnt<ind)
 {
  if(code[cnt].opr != '=')
    printf("t%c : = \t",temp++);

  if(isalpha(code[cnt].opd1))
    printf(" %c\t",code[cnt].opd1);
  else if(code[cnt].opd1 >='1' && code[cnt].opd1 <='9')
    printf("t%c\t",code[cnt].opd1);

  printf(" %c\t",code[cnt].opr);
```

```
  if(isalpha(code[cnt].opd2))
    printf(" %c\n",code[cnt].opd2);
  else if(code[cnt].opd2 >='1' && code[cnt].opd2 <='9')
    printf("t%c\n",code[cnt].opd2);

  cnt++;
 }
}



main()
{
printf("\n Enter the Expression : ");
yyparse();
ThreeAddressCode();
}
```

OUTPUT :

```
D:\BE\Sem-7\CC\Lab\Practical\Practical 6>a.exe

 Enter the Expression : 1+2+3-4;


         THREE ADDRESS CODE

t1 : =  t1       +      t2
t2 : =  t3       -      t4
t3 : =  t1       +      t2

D:\BE\Sem-7\CC\Lab\Practical\Practical 6>a.exe

 Enter the Expression : a*b+c-d*e
syntax error
D:\BE\Sem-7\CC\Lab\Practical\Practical 6>a.exe;

 Enter the Expression : a*b+c-d*e;


         THREE ADDRESS CODE

t1 : =   a       *       b
t2 : =   c       -       d
t3 : =  t2       *       e
t4 : =  t1       +      t3
```