

Ex No: 8

Date:

GENERATE THREE ADDRESS CODES

AIM:

To generate three address code using C program.

ALGORITHM:

- Get address code sequence.
- Determine current location of 3 using address (for 1st operand).
- If the current location does not already exist, generate move (B, O).
- Update address of A (for 2nd operand).
- If the current value of B and () is null, exist.
- If they generate operator () A, 3 ADPR.
- Store the move instruction in memory.

PROGRAM:

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>
typedef struct
{
char var[10]; int alive;
}
regist;
regist preg[10];
void substring(char exp[],int st,int end)
{
int i,j=0;
char dup[10]="";
for(i=st;i<end;i++)
dup[j++]=exp[i];
dup[j]='0';

strcpy(exp,dup);
}
```

```

int getregister(char var[])
{
int i; for(i=0;i<10;i++)
{
if(preg[i].alive==0)
{
strcpy(preg[i].var,var);
break;
}
}
return(i);
}
void getvar(char exp[],char v[])
{
int i,j=0;
char var[10]="";
for(i=0;exp[i]!='\0';i++)
if(isalpha(exp[i]))
var[j++]=exp[i];
else
break;
strcpy(v,var);
}
void main()
{
char basic[10][10],var[10][10],fstr[10],op;
int i,j,k,reg,vc,flag=0;
printf("\nEnter the Three Address Code:\n");

for(i=0;;i++)
{
gets(basic[i]);
if(strcmp(basic[i],"exit")==0)
break;
}

```

```

printf("\nThe Equivalent Assembly Code is:\n");
for(j=0;j<i;j++)
{
    getvar(basic[j],var[vc++]);
    strcpy(fstr,var[vc-1]);
    substring(basic[j],strlen(var[vc-1])+1,strlen(basic[j]));
    getvar(basic[j],var[vc++]);
    reg=getregister(var[vc-1]);
    if(preg[reg].alive==0)
    {
        printf("\nMov R%d,%s",reg,var[vc-1]);
        preg[reg].alive=1;
    }
    op=basic[j][strlen(var[vc-1])];
    substring(basic[j],strlen(var[vc-1])+1,strlen(basic[j]));
    getvar(basic[j],var[vc++]);
    switch(op)
    {
        case '+':
            printf("\nAdd");
            break; case '-':
            printf("\nSub");
            break;
        case '*':
            printf("\nMul");
            break;
        case '/':
            printf("\nDiv");
            break;
    }
    flag=1;
    for(k=0;k<=reg;k++)
    {
        if(strcmp(preg[k].var,var[vc-1])==0)
        {
            printf("R%d, R%d",k,reg);

```

```

preg[k].alive=0;
flag=0;
break;
}
}
if(flag)
{
printf(" %s,R%d",var[vc-1],reg);
printf("\nMov %s,R%d",fstr,reg);
}
strcpy(preg[reg].var,var[vc-3]);
}
}
}

```

OUTPUT:

```

→ ~ vl 278.c
→ ~ cc 278.c
278.c: In function 'main':
278.c:52:1: warning: implicit declaration of function 'gets'; did you mean 'fgets'? [-Wimplicit-function-declaration]
   52 | gets(basic[i]);
      | ^~~~~
      | fgets
/usr/bin/ld: /tmp/ccCz9cXd.o: in function 'main':
278.c:(.text+0x24d): warning: the 'gets' function is dangerous and should not be used.
→ ~ ./a.out

Enter the Three Address Code:
a=b+c
b=b*10
a=b-d
exit

The Equivalent Assembly Code is:

Mov R0,b
Add c,R0
Mov a,R0
Mov R1,b
Mul ,R1
Mov b,R1
Mov R2,b
Sub d,R2
Mov a,R2
→ ~

```

RESULT: