

**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:**

```
[VaruneshB210701303@localhost ~]$ vi assembly303.c  
[VaruneshB210701303@localhost ~]$ gcc assembly303.c  
[VaruneshB210701303@localhost ~]$ ./a.out
```

Enter the Three Address Code:

```
x=y+z  
a=b*x  
c=a-d  
exit
```

The Equivalent Assembly Code is:

```
Mov RO, y  
Add z, RO  
Mov x, RO  
Mov R1,b  
Mul RO, R1  
Mov RO, a  
Sub d, RO  
Mov c, RO  
[VaruneshB210701303@localhost ~]$
```

**RESULT:**