18CSC304J   Compiler Design Lab

Ex 12

A Simple Code Generator

Submitted To:-

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CODE:-

```c
#include<stdio.h>
#include<conio.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);
}
```

```c
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]);
        getch();
    }
}
```

OUTPUT:-

```
Enter the Three Address Code:
a=b+c
c=a*c
exit

The Equivalent Assembly Code is:

Mov R0,b
Add c,R0
Mov a,R0
Mov R1,a
Mul c,R1
Mov c,R1
```