Yasmin Ansari
TE – CMPN (A)
Roll No: 71

Experiment No. 8

Aim: To implement Code Optimization techniques

Code:

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>

void input();
void output();
void change(int p,int q,char*res);
void expression();
void constant();

struct expr
{
char op[2],op1[5],op2[5],res[5];
int flag;
}
arr[10];

int n;
void main()
{
input();
constant();
expression();
output();
getch();
}

void input()
{
int i;
printf("\n\nEnter the maximum number of ecpressions:");
scanf("%d",&n);
printf("\n Enter the input:\n");
for(i=0;i<n;i++)
{
scanf("%s",arr[i].op);
scanf("%s",arr[i].op1);
scanf("%s",arr[i].op2);
scanf("%s",arr[i].res);
arr[i].flag=0;
}
}

void constant()
{
int i;
```

```
int op1,op2,res;
char op,res1[5];
for(i=0;i<n;i++)
{
if(isdigit(arr[i].op1[0])&&isdigit(arr[i].op2[0]))//if both digits,store them in variables
{
op1=atoi(arr[i].op1);
op2=atoi(arr[i].op2);
op=arr[i].op[0];
switch(op)
{
case'+':
  res=op1+op2;
  break;

  case'-':
  res=op1-op2;
  break;

  case'*':
  res=op1*op2;
  break;

  case'/':
  res=op1/op2;
  break;
  }
  sprintf(res1,"%d",res);
  arr[i].flag=1;//eliminate expr and replace any operand below that uses result of this expr

  change(i,i,res1);
  }
  }
  }

  void expression()
  {
  int i,j;
  for(i=0;i<n;i++)
  {
  for(j=i+1;j<n;j++)
  {
  if(strcmp(arr[i].op,arr[j].op)==0)
  {
  if(strcmp(arr[i].op,"+")==0||strcmp(arr[i].op,"*")==0)
  {
  if(strcmp(arr[i].op1,arr[j].op1)==0&&strcmp(arr[i].op2,arr[j].op2)==0||
strcmp(arr[i].op1,arr[j].op2)==0&&strcmp(arr[i].op2,arr[j].op1)==0)
  {
  arr[j].flag=1;
  change(i,j,NULL);
```

```
}
}
else
{
if(strcmp(arr[i].op1,arr[j].op1)==0&&strcmp(arr[i].op2,arr[j].op2)==0)
{
arr[j].flag=1;
change(i,j,NULL);
}
}
}
}
}
}

void output()
{
int i=0;
printf("\nOptimized code is:");
for(i=0;i<n;i++)
{
if(!arr[i].flag)
{
printf("\n %s %s %s %s",arr[i].op,arr[i].op1,arr[i].op2,arr[i].res);
}
}
}

void change(int p,int q,char*res)
{
int i;
for(i=q+1;i<n;i++)
{
if(strcmp(arr[q].res,arr[i].op1)==0)
if(res==NULL)                    //for csub
strcpy(arr[i].op1,arr[p].res);
else                              //for ceval
strcpy(arr[i].op1,res);
else if(strcmp(arr[q].res,arr[i].op2)==0)
if(res==NULL)                //for csub
strcpy(arr[i].op2,arr[p].res);
else                        //for ceval
strcpy(arr[i].op2,res);
}
}
```

Output:

```
Enter the maximum number of ecpressions:6

 Enter the input:
* 4 i t1
+ t1 a t2
* 4 j t3
* 4 i t4
+ n t4 t5
+ t4 t5 t6

Optimized code is:
 * 4 i t1
 + t1 a t2
 * 4 j t3
 + n t1 t5
 + t1 t5 t6_
```