Ex No: 10

Date:

IMPLEMENT CODE OPTIMIZATION TECHNIQUES
DEAD CODE AND COMMON SUB EXPRESSION ELIMINATION

AIM:

To write a C program to implement the dead code elimination and common sub expression elimination (code optimization) techniques.

ALGORITHM:

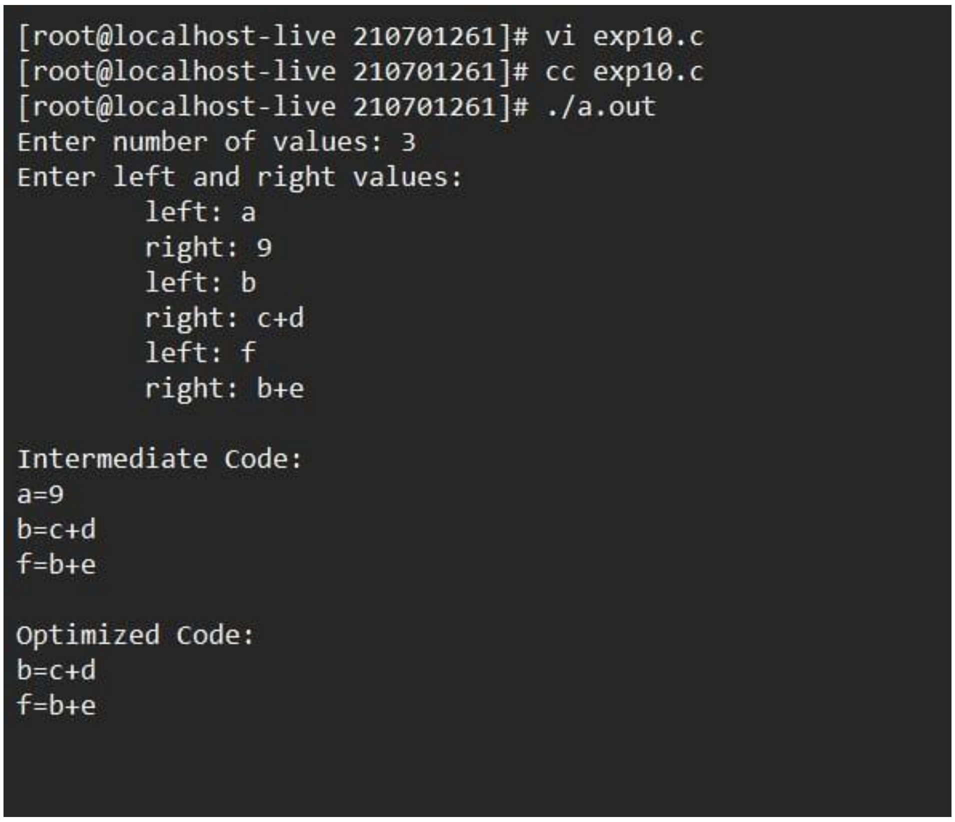
- Start
- Create the input file which contains three address code.
- Open the file in read mode.
- If the file pointer returns NULL, exit the program else go to 5.
- Scan the input symbol from left to right.
- Store the first expression in a string.
- Compare the string with the other expressions in the file.
- If there is a match, remove the expression from the input file.
- Perform these steps 5-8 for all the input symbols in the file.
- Scan the input symbol from the file from left to right.
- Get the operand before the operator from the three address code.
- Check whether the operand is used in any other expression in the three address code.
- If the operand is not used, then eliminate the complete expression from the threeaddress code else go to 14.
- Perform steps 11 to 13 for all the operands in the three address code till end of the file is reached.
- Stop.

PROGRAM:

```
#include<stdio.h>

#include<conio.h>

#include<string.h>

 struct op

{ char l;
   char
   r[20];
  } op[10],
pr[10];

void main()
```

```
{ int a, i, k, j, n, z = 0, m,
  q; char * p, * l; char
  temp, t; char * tem;
  clrscr(); printf("enter no of
  values"); scanf("%d", &
  n); for (i = 0; i < n; i++)
{
    printf("\tleft\t");
    op[i].l = getche();
    printf("\tright:\t");
    scanf("%s", op[i].r); }
  printf("intermediate
  Code\n"); for (i = 0; i < n;
  i++)
{ printf("%c=",
    op[i].l);
    printf("%s\n",
  op[i].r); } for (i = 0; i
  < n - 1; i++)
{ temp = op[i].l; for (j
    = 0; j < n; j++)
{ p = strchr(op[j].r, temp);
      if (p)
{
        pr[z].l = op[i].l;
        strcpy(pr[z].r, op[i].r);
        z++;

      }
    }
  } pr[z].l = op[n - 1].l;
  strcpy(pr[z].r, op[n -
  1].r); z++;
  printf("\nafter dead code elimination\n");
  for (k = 0; k < z; k++)
{
    printf("%c\t=", pr[k].l);
    printf("%s\n", pr[k].r);
  }

  //sub expression elimination
  for (m = 0; m < z; m++)
{ tem = pr[m].r; for (j = m
    + 1; j < z; j++)
{
      p = strstr(tem, pr[j].r);
      if (p)
{
        t = pr[j].l;
        pr[j].l =
        pr[m].l;
        for (i = 0; i < z; i++)
{
          l = strchr(pr[i].r, t);
          if (l) {
            a = l - pr[i].r;
            //printf("pos: %d",a);
            pr[i].r[a] = pr[m].l;
          }
        }
      }
    }
  }
  printf("eliminate common expression\n");
  for (i = 0; i < z; i++) {
    printf("%c\t=", pr[i].l);
    printf("%s\n", pr[i].r);
  }
  // duplicate production elimination

  for (i = 0; i < z; i++)
{ for (j = i + 1; j < z;
  j++)
{ q = strcmp(pr[i].r, pr[j].r); if
    ((pr[i].l == pr[j].l) && !q)

      {
        pr[i].l = '\0';
        strcpy(pr[i].r, '\0');
      }
    }
  } printf("optimized
  code"); for (i = 0; i < z;
  i++)
{
    if (pr[i].l != '\0') {
      printf("%c=", pr[i].l);
      printf("%s\n", pr[i].r);
    }     }
getch(); }
```

OUTPUT:



```
[root@localhost-live 210701261]# vi exp10.c
[root@localhost-live 210701261]# cc exp10.c
[root@localhost-live 210701261]# ./a.out
Enter number of values: 3
Enter left and right values:
        left: a
        right: 9
        left: b
        right: c+d
        left: f
        right: b+e

Intermediate Code:
a=9
b=c+d
f=b+e

Optimized Code:
b=c+d
f=b+e
```

RESULT: