Practical 10

Compiler Construction

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Aim :

To implement Code Optimization techniques: Implement any code optimization technique.

Code :

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

struct op{
    char l;
    char r[20];
}

op[10], pr[10];

int main(){
    int a, i, k, j, n, z = 0, m, q;
    char *p, *l;
    char temp, t;
    char *tem;

    printf("Enter the Number of Values:");
    scanf("%d", &n);

    for (i = 0; i < n; i++){
        printf("left: ");
        scanf(" %c", &op[i].l);
        printf("right: ");
        scanf(" %s", &op[i].r);
    }
    printf("\n\nIntermediate 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=", pr[k].l);
        printf("%s\n", pr[k].r);
    }

    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\n", a);
                        pr[i].r[a] = pr[m].l;
                    }
                }
            }
        }
    }
    printf("\nEliminate Common Expression\n");

    for (i = 0; i < z; i++){
        printf("%c=", pr[i].l);
        printf("%s\n", pr[i].r);
    }

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';
            }
        }
    }

    printf("\nOptimized Code\n");
    for (i = 0; i < z; i++){
```

```
        if (pr[i].l != '\0'){
            printf("%c=", pr[i].l);
            printf("%s\n", pr[i].r);
        }
    }
    return 0;
}
```

Output :

```
PS C:\Users\unnat\Downloads\metamorphic-testing-master\metamorphic-testing-master> .\Practical10.exe
Enter the Number of Values:5
left: a 9
right: left: b c+d
right: left: e c+d
right: left: f b+e
right: left: g m+n
right:

Intermediate Code
a=9
b=c+d
e=c+d
f=b+e
g=m+n

After Dead Code Elimination : :
b=c+d
e=c+d
g=m+n

Eliminate Common Expression
b=c+d
b=c+d
g=m+n

Optimized Code
b=c+d
g=m+n
PS C:\Users\unnat\Downloads\metamorphic-testing-master\metamorphic-testing-master>
```

END