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# A8-Implementation of code optimization techniques

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## 1 Code

### Optv1.c - Algebraic Expression Optimization (+,-,\*,/)

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```
1 #include <stdio.h>
2 #include <string.h>
3 #include <ctype.h>
4
5 void CodeOptimizer();
6
7 int main()
8 {
9     CodeOptimizer();
10    return 0;
11 }
12 void CodeOptimizer()
13 {
14     char file[10][128];
15     int i = 0;
16     FILE *fd = fopen("Code.txt", "r");
17     while (fgets(file[i], sizeof(file[i]), fd))
18         i++;
19     for (int j = 0; j < i; j++)
20     {
21         if (file[j][3] == '+') //addition
22         {
23             if (file[j][2] == '0')
24             {
25                 if (file[j][0] != file[j][4])
26                     printf("%c=%c\n", file[j][0], file[j][4]);
27             }
28             else if (file[j][4] == '0')
29             {
30                 if (file[j][0] != file[j][2])
```

```

31         printf("%c=%c\n", file[j][0], file[j][2]);
32     }
33     else
34         printf("%s", file[j]);
35 }
36 else if (file[j][3] == '*') //multiplication
37 {
38     if (file[j][2] == '1')
39     {
40         if (file[j][0] != file[j][4])
41             printf("%c=%c\n", file[j][0], file[j][4]);
42     }
43     else if (file[j][4] == '1')
44     {
45         if (file[j][0] != file[j][2])
46             printf("%c=%c\n", file[j][0], file[j][2]);
47     }
48     else
49         printf("%s", file[j]);
50 }
51 else if (file[j][3] == '-') //subtraction
52 {
53     if (file[j][4] == '0')
54     {
55         if (file[j][0] != file[j][2])
56             printf("%c=%c\n", file[j][0], file[j][2]);
57     }
58     else if (file[j][2] == '0')
59     {
60         printf("%c=-%c\n", file[j][0], file[j][4]);
61     }
62     else
63         printf("%s", file[j]);
64 }
65 else if (file[j][3] == '/') //division
66 {
67     if (file[j][4] == '1')
68     {
69         if (file[j][0] != file[j][2])
70             printf("%c=%c\n", file[j][0], file[j][2]);
71     }
72     else
73         printf("%s", file[j]);
74 }
75 else
76 {
77     printf("%s", file[j]);
78 }
79 }

```

80 }

## Optv2.c - Algebraic Expression and Strength Reduction

```
1 #include <stdio.h>
2 #include <string.h>
3 #include <ctype.h>
4
5 void CodeOptimizer();
6
7 int main()
8 {
9     CodeOptimizer();
10    return 0;
11 }
12 void CodeOptimizer()
13 {
14     char file[10][128];
15     int i = 0;
16     FILE *fd = fopen("Code2.txt", "r");
17     while (fgets(file[i], sizeof(file[i]), fd))
18         i++;
19     for (int j = 0; j < i; j++)
20     {
21         if (file[j][3] == '+') //addition
22         {
23             if (file[j][2] == '0')
24             {
25                 if (file[j][0] != file[j][4])
26                     printf("%c=%c\n", file[j][0], file[j][4]);
27             }
28             else if (file[j][4] == '0')
29             {
30                 if (file[j][0] != file[j][2])
31                     printf("%c=%c\n", file[j][0], file[j][2]);
32             }
33             else
34                 printf("%s", file[j]);
35         }
36         else if (file[j][3] == '*' && file[j][4] != '*') //
multiplication
37         {
38             if (file[j][2] == '1')
39             {
40                 if (file[j][0] != file[j][4])
41                     printf("%c=%c\n", file[j][0], file[j][4]);
```

```

42     }
43     else if (file[j][4] == '1')
44     {
45         if (file[j][0] != file[j][2])
46             printf("%c=%c\n", file[j][0], file[j][2]);
47     }
48     else
49         printf("%s", file[j]);
50 }
51 else if (file[j][3] == '-') //subtraction
52 {
53     if (file[j][4] == '0')
54     {
55         if (file[j][0] != file[j][2])
56             printf("%c=%c\n", file[j][0], file[j][2]);
57     }
58     else if (file[j][2] == '0')
59     {
60         printf("%c=-%c\n", file[j][0], file[j][4]);
61     }
62     else
63         printf("%s", file[j]);
64 }
65 else if (file[j][3] == '/') //division
66 {
67     if (file[j][4] == '1')
68     {
69         if (file[j][0] != file[j][2])
70             printf("%c=%c\n", file[j][0], file[j][2]);
71     }
72     else
73         printf("%s", file[j]);
74 }
75 else if (file[j][3] == file[j][4] && file[j][4] == '*')
76 {
77     if (file[j][5] == '2')
78         printf("%c=%c*%c\n", file[j][0], file[j][2],
79 file[j][2]);
80     else
81         printf("%s", file[j]);
82 }
83 else if (file[j][3] == file[j][4] && file[j][4] == '*')
84 {
85     if (file[j][5] == '2')
86         printf("%c=%c*%c\n", file[j][0], file[j][2],
87 file[j][2]);
88     else
89         printf("%s", file[j]);
90 }

```

```

89     else if (file[j][2] == 'p' && file[j][3] == 'o' && file
[j][4] == 'w' && file[j][8] == '2')
90     {
91         printf("%c=%c*%c\n", file[j][0], file[j][6], file[j
][6]);
92     }
93     else
94     {
95         printf("%s", file[j]);
96     }
97 }
98 }

```

## 2 Output Screenshots

```

A8-Code Optimization > ≡ Code.txt
1  x=t+3
2  y=x+0
3  z=x*1
4  j=0-j
5  c=d/1
6  c=c/1
7  x=s-0

```

Figure 1: Input Version 1

```

x=t+3
y=x
z=x
a=y+z
j=-j
c=d
X=S

```

Figure 2: Output Version 1

```
A8-Code Optimization > ≡ Code2.txt
1  x=t+3
2  y=0+x
3  x=s-0
4  x=x**2
5  y=pow(a,2)
```

Figure 3: Input Version 2

```
x=t+3
y=x
x=s
x=x*x
y=a*a
```

Figure 4: Output Version 2