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UCS1602 - Compiler Design

Exercise 8: Code optimisation using C

Objective:

Develop a C program to optimise the code generated as intermediate code.

Code:

```
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <string.h>
4
5 void optimize(char *s) {
6
7     // addition
8     if(s[3]=='+'){
9         if(s[2]=='0' || s[4]=='0'){
10             if(s[0]==s[2] || s[0]==s[4]){
```

```

11         printf("\n");
12     }
13     else{
14         printf("%c%c%c\n",s[0],s[1],s[2]=='0'?s[4]:s
[2]);
15     }
16 }
17 else{
18     printf("%s",s);
19 }
20 }
21 else if(s[3]=='*'){
22     if(s[2]=='1' || s[4]=='1'){
23         if(s[0]==s[2] || s[0]==s[4]){
24             printf("\n");
25         }else{
26             printf("%c%c%c\n",s[0],s[1],s[2]=='1'?s[4]:s
[2]);
27         }
28     }
29     if(s[2]==s[4]){
30         printf("%c%c%c+%c\n",s[0],s[1],s[2],s[4]);
31     }
32 }
33 else if(s[3]=='-'){
34     if(s[2]=='0' || s[4]=='0'){
35         if(s[0]==s[2] || s[0]==s[4]){
36             printf("\n");
37         }else{
38             printf("%c%c%c%c\n",s[0],s[1],s[2]=='0'?'-':
',s[2]=='0'?s[4]:s[2]);
39         }
40     }
41     if(s[2]==s[4]){
42         printf("%c%c%c+%c\n",s[0],s[1],s[2],s[4]);
43     }
44 }
45 else if(s[3]=='/'){
46     if(s[4]=='1'){
47         if(s[0]==s[2]){
48             printf("\n");
49         }else{
50             printf("%c%c%c\n",s[0],s[1],s[2]);
51         }
52     }

```

```

53         if(s[2]=='0'){
54             printf("%c%c%c\n",s[0],s[1],'0');
55         }
56     }
57     else if(s[2]=='p'){
58         if(s[8]=='2'){
59             printf("%c%c%c*%c\n",s[0],s[1],s[6],s[6]);
60         }else{
61             printf("%s",s);
62         }
63     }
64 }
65
66 int main(int argc, char *argv[]){
67     FILE *fp;
68     fp = fopen(argv[1], "r");
69     int i = 0;
70     int tot = 0;
71     char lines[100][100];
72     while(fgets(lines[i], 100, fp)) {
73         lines[i][strlen(lines[i])] = '\0';
74         i++;
75     }
76     tot = i;
77
78     for(i = 0; i < tot; ++i) {
79         optimize(lines[i]);
80     }
81 }

```

Input file:

```
1 x=x+0
2 y=y*1
3 x=0+x
4 x=y+1
5 y=1*y
6 x=z+0
7 x=w*w
8 x=pow(i,2)
9 x=pow(i,3)
10 x=0-y
11 x=y-0
12 x=x/1
13 x=y/1
14 x=0/x
```

Output:

```
→ ./a ip.txt
```

```
x=y+1
```

```
x=z
```

```
x=w+w
```

```
x=i*i
```

```
x=pow(i,3)
```

```
x=-y
```

```
x= y
```

```
x=y
```

```
x=0
```
