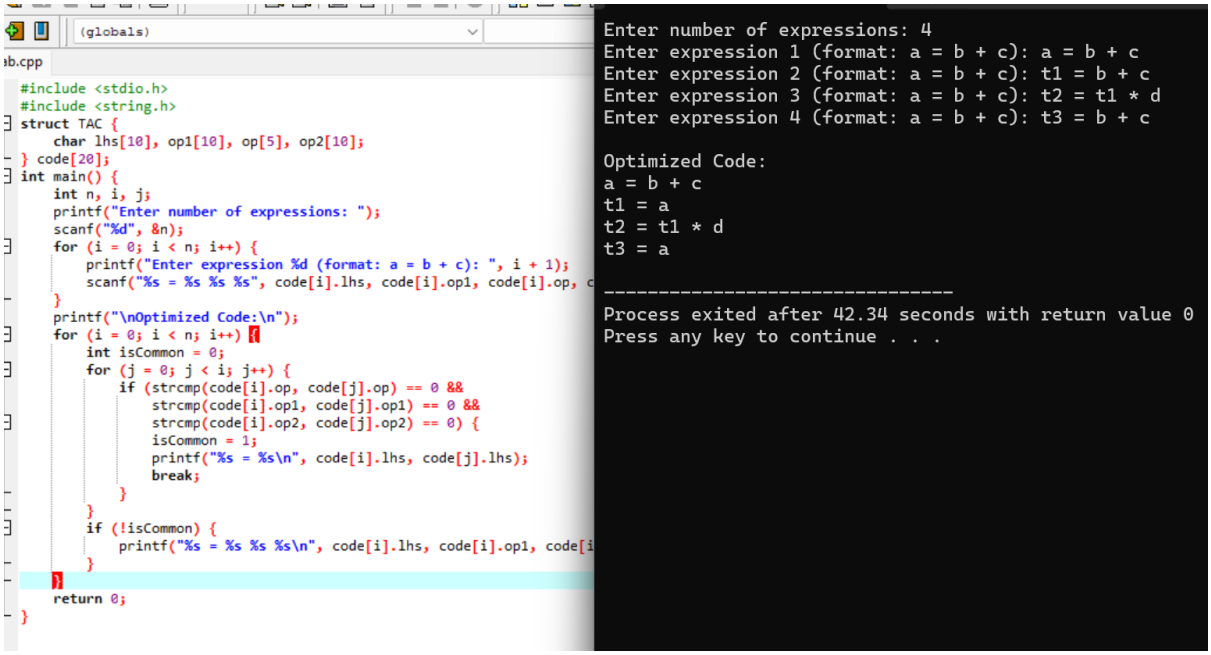
14. Write a C Program for code optimization to eliminate common subexpression.

```
#include <stdio.h>
#include <string.h>
struct TAC {
   char lhs[10], op1[10], op[5], op2[10];
} code[20];
int main() {
   int n, i, j;
   printf("Enter number of expressions: ");
   scanf("%d", &n);
   for (i = 0; i < n; i++) {
      printf("Enter expression %d (format: a = b + c): ", i + 1);
      scanf("%s = %s %s %s", code[i].lhs, code[i].op1, code[i].op, code[i].op2);
   }
   printf("\nOptimized Code:\n");
   for (i = 0; i < n; i++) {
      int isCommon = 0;
      for (j = 0; j < i; j++) {
         if (strcmp(code[i].op, code[j].op) == 0 &&
            strcmp(code[i].op1, code[j].op1) == 0 &&
            strcmp(code[i].op2, code[j].op2) == 0) {
            isCommon = 1;
            printf("%s = %s\n", code[i].lhs, code[j].lhs);
            break;
         }
      }
      if (!isCommon) {
         printf("%s = %s %s %s\n", code[i].lhs, code[i].op1, code[i].op, code[i].op2);
```

```
    }
  }
  return 0;
}
```

Output:



```
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#include <string.h>
struct TAC {
    char lhs[10], op1[10], op[5], op2[10];
} code[20];
int main() {
    int n, i, j;
    printf("Enter number of expressions: ");
    scanf("%d", &n);
    for (i = 0; i < n; i++) {
        printf("Enter expression %d (format: a = b + c): ", i + 1);
        scanf("%s = %s %s %s", code[i].lhs, code[i].op1, code[i].op, c
    }
    printf("\nOptimized Code:\n");
    for (i = 0; i < n; i++) {
        int isCommon = 0;
        for (j = 0; j < i; j++) {
            if (strcmp(code[i].op, code[j].op) == 0 &&
                strcmp(code[i].op1, code[j].op1) == 0 &&
                strcmp(code[i].op2, code[j].op2) == 0) {
                isCommon = 1;
                printf("%s = %s\n", code[i].lhs, code[j].lhs);
                break;
            }
        }
        if (!isCommon) {
            printf("%s = %s %s %s\n", code[i].lhs, code[i].op1, code[i
        }
    }
    return 0;
}
```

```
Enter number of expressions: 4
Enter expression 1 (format: a = b + c): a = b + c
Enter expression 2 (format: a = b + c): t1 = b + c
Enter expression 3 (format: a = b + c): t2 = t1 * d
Enter expression 4 (format: a = b + c): t3 = b + c

Optimized Code:
a = b + c
t1 = a
t2 = t1 * d
t3 = a

--------------------------------
Process exited after 42.34 seconds with return value 0
Press any key to continue . . .
```