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SYSTEM SOFTWARES - ASSIGNMENT -2

Write a C program to detect tokens.

Code=>

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

bool isDelimiter(char ch)
{

    if  (
            (ch == ' ' || ch == '+' || ch == '-' || ch == '*' ) ||
            (ch == ',' || ch == ';' || ch == '>' || ch == '<' ) ||
            (ch == '(' || ch == ')' || ch == '[' || ch == ']' ) ||
            (ch == '}' || ch == '/' || ch == '=' || ch == '{' )
        )
        return true;
    return false;
}

bool isOperator(char ch)
{
    if  (
            (ch == '+' || ch == '-' || ch == '*' || ch == '/') ||
            (ch == '>' || ch == '<' || ch == '=')
        )
        return true;
    return false;
}

bool validIdentifier(char *str)
{
    if  (
            str[0] == '0' || str[0] == '1' || str[0] == '2' ||
            str[0] == '3' || str[0] == '4' || str[0] == '5' ||
            str[0] == '6' || str[0] == '7' || str[0] == '8' ||
            str[0] == '9' || isDelimiter(str[0]) == true
        )
        return false;
    return true;
}

bool isKeyword(char *str)
{
    if  (
            !strcmp(str, "if") || !strcmp(str, "else") ||
```

```
            !strcmp(str, "while") || !strcmp(str, "do") ||
            !strcmp(str, "break") || !strcmp(str, "continue") ||
            !strcmp(str, "int") ||  !strcmp(str,"double") ||
            !strcmp(str, "float") || !strcmp(str,  "return") ||
            !strcmp(str, "char") || !strcmp(str, "case") ||
            !strcmp(str,  "char") || !strcmp(str, "sizeof") ||
            !strcmp(str, "long") ||  !strcmp(str, "short") ||
            !strcmp(str, "typedef") || !strcmp(str, "switch") ||
            !strcmp(str, "unsigned") || !strcmp(str, "void") ||
            !strcmp(str, "static") || !strcmp(str,  "struct") ||
            !strcmp(str, "goto")
        )
        return true;
    return false;
}

bool isInteger(char *str)
{
    int len = strlen(str);
    if (len == 0)
        return false;
    for (int i = 0; i < len; i++)
    {
        if (
                str[i] != '0' && str[i] != '1' && str[i] != '2' &&
                str[i] != '3' && str[i] != '4' && str[i] != '5' &&
                str[i] != '6' && str[i] != '7' && str[i] != '8' &&
                str[i] != '9' || (str[i] == '-' && i > 0)
            )
            return false;
    }
    return true;
}

bool isRealNumber(char *str)
{
    int len = strlen(str);
    bool hasDecimal = false;
    if (len == 0)
        return false;
    for (int i = 0; i < len; i++) {
        if (
                str[i] != '0' && str[i] != '1' && str[i] != '2' &&
                str[i] != '3' && str[i] != '4' && str[i] != '5' &&
                str[i] != '6' && str[i] != '7' && str[i] != '8' &&
                str[i] != '9' && str[i] != '.' || (str[i] == '-' && i > 0)
            )
            return false;
        if (str[i] == '.')
            hasDecimal = true;
    }
    return (hasDecimal);
}
```

```
char *subString(char *str, int left, int right)
{
    char *subStr = (char *)malloc(sizeof(char) * (right - left + 2));
    for (int i = left; i <= right; i++)
        subStr[i - left] = str[i];
    subStr[right - left + 1] = '\0';
    return (subStr);
}

void findToken(char *str)
{
    int left = 0, right = 0;
    int len = strlen(str);
    while (right <= len && left <= right)
    {
        if (isDelimiter(str[right]) == false)
            right++;
        if (isDelimiter(str[right]) == true && left == right)
        {
            if (isOperator(str[right]) == true)
                printf("'%c' IS AN OPERATOR\n", str[right]);
            right++;
            left = right;
        }
        else if (
                    isDelimiter(str[right]) == true && left != right ||
                    (right == len && left != right)
                )
        {
            char *subStr = subString(str, left, right - 1);
            if (isKeyword(subStr))
                printf("'%s' IS A KEYWORD\n", subStr);
            else if (isInteger(subStr))
                printf("'%s' IS AN INTEGER\n", subStr);
            else if (isRealNumber(subStr))
                printf("'%s' IS A REAL NUMBER\n", subStr);
            else if (
                        validIdentifier(subStr) &&
                        isDelimiter(str[right - 1]) == false
                    )
                printf("'%s' IS A VALID IDENTIFIER\n", subStr);
            else if (
                        !validIdentifier(subStr) &&
                        !isDelimiter(str[right - 1])
                    )
                printf("'%s' IS NOT A VALID IDENTIFIER\n", subStr);
            left = right;
        }
    }
    return;
}
int main()
```

```c
{
    char str[20] = "float = a*b + c*d";
    printf("\nThe string is %s\n", str);
    findToken(str);
    printf("\n");
    return 0;
}
```

Output=>