Ex No: 1
Date:

IMPLEMENT CODE TO RECOGNIZE TOKENS IN C

AIM:

To implement the program to identify C keywords, identifiers, operators, end statements like [], {} using the C tool.

ALGORITHM:

- We identify the basic tokens in c such as keywords, numbers, variables, etc.
- Declare the required header files.
- Get the input from the user as a string and it is passed to a function for processing.
- The functions are written separately for each token and the result is returned in the form of bool either true or false to the main computation function.
- Functions are issymbol() for checking basic symbols such as () etc , isoperator() to check for operators like +, -, *, / , isidentifier() to check for variables like a,b, iskeyword() to check the 32 keywords like while etc., isInteger() to check for numbers in combinations of 0-9, isnumber() to check for digits and substring().
- Declare a function detecttokens() that is used for string manipulation and iteration then the result is returned from the functions to the main. If it's an invalid identifier error must be printed.
- Declare main function get the input from the user and pass to detecttokens() function.

PROGRAM:

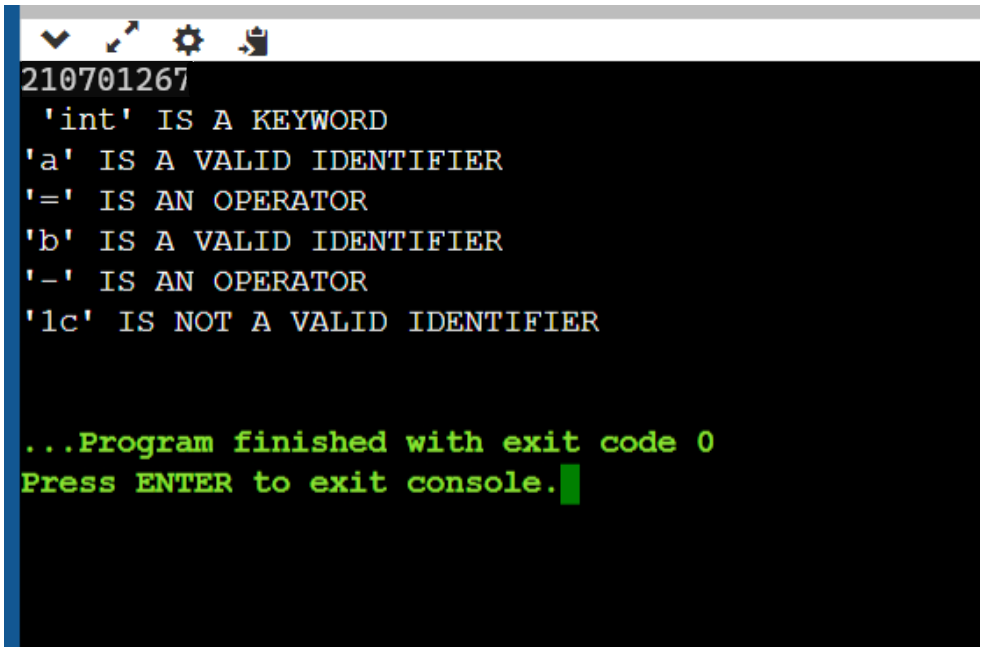
```
#include <stdbool.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
bool isDelimiter(char ch)
{
        if (ch == ' ' || ch == '+' || ch == '-' || ch == '*' ||
                ch == '/' || ch == ',' || ch == ';' || ch == '>' ||
                ch == '<' || ch == '=' || ch == '(' || ch == ')' ||
                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 i, len = strlen(str);

	if (len == 0)
		return (false);
	for (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 i, len = strlen(str);
        bool hasDecimal = false;

        if (len == 0)
                return (false);
        for (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)
{
        int i;
        char* subStr = (char*)malloc(sizeof(char) * (right - left + 2));

        for (i = left; i <= right; i++)
                subStr[i - left] = str[i];
        subStr[right - left + 1] = '\0';
        return (subStr);
}
void parse(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) == true)
printf("'%s' IS A KEYWORD\n", subStr);
else if (isInteger(subStr) == true)
printf("'%s' IS AN INTEGER\n", subStr);

else if (isRealNumber(subStr) == true)
printf("'%s' IS A REAL NUMBER\n", subStr);

else if (validIdentifier(subStr) == true
&& isDelimiter(str[right - 1]) == false)
printf("'%s' IS A VALID IDENTIFIER\n", subStr);

else if (validIdentifier(subStr) == false
&& isDelimiter(str[right - 1]) == false)
printf("'%s' IS NOT A VALID IDENTIFIER\n", subStr);
left = right;
}
}
return;
}



int main()
{
printf("210701300\n ");
char str[100] = "int a = b + 1c; ";
parse(str);
return (0);
}
```

OUTPUT:



RESULT :