LAB ASSIGNMENT 01

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Compiler Construction

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Table of Contents

1. Task 1

1.1 Code

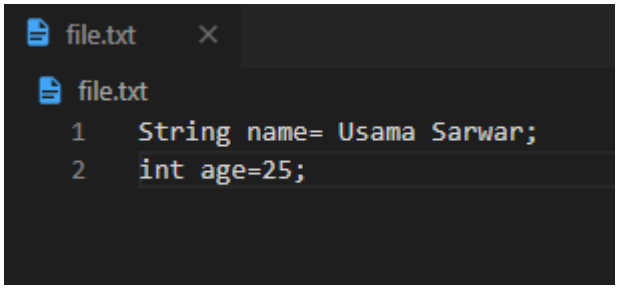
```dart
import 'dart:io';
main() {
  var file = new File('./file.txt');
  // Create Text File
  file.create();
  // Write operation
  stdout.write('User Input: ');
  String _input = stdin.readLineSync();
  file.writeAsStringSync(_input + '\n', mode: FileMode.append);
  // Append Method
  stdout.write('User Input (Append): ');
  _input = stdin.readLineSync();
  file.writeAsStringSync(_input + '\n', mode: FileMode.append);
  // Read Operation
  stdout.write(file.readAsStringSync());
  // Find Word From File
  stdout.write('Search in File: ');
  _input = stdin.readLineSync();
  if (file.readAsStringSync().contains(_input)) {
    print('Found!');
  } else {
    print('Not Found!');
  }
  List _characters = file.readAsStringSync().codeUnits.map((unit) {
    return String.fromCharCode(unit);
  }).toList();
  stdout.write('Alphabetic Characters: ');
  for (var i in _characters) {
    if (RegExp('[a-z]', caseSensitive: false, multiLine: true).hasMatch(i)) {
      stdout.write(i + ' ');
    }
  }
  stdout.write('\nNumeric Characters: ');
  for (var i in _characters) {
    if (RegExp('[0-9]', multiLine: true).hasMatch(i)) {
      stdout.write(i + ' ');
    }
  }
  stdout.write('\nSpecial Characters: ');
  for (var i in _characters) {
    if (!RegExp('[a-z ' ' A-Z 0-9]').hasMatch(i)) {
      stdout.write(i + ' ');
    }
  }
}
```

1.2 Output

```
PS C:\Users\Usama\Desktop\CC LAB Assignment 1> dart "c:\Users\Usama\Desktop\CC LAB Assignment 1\task1.dart"
User Input: String name= Usama Sarwar;
User Input (Append): int age=25;
String name= Usama Sarwar;
int age=25;
Search in File: Usama
Found!
Alphabetic Characters: S t r i n g n a m e U s a m a S a r w a r i n t a g e
Numeric Characters: 2 5
Special Characters: = ;
 = ;

PS C:\Users\Usama\Desktop\CC LAB Assignment 1>
```

Text File Created



2. Task 02

2.1 Code

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

// If the string is a VALID IDENTIFIER.
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);
}

// If the string is a KEYWORD.
bool isKeyword(char *str)
{
    if (!strcmp(str, "if") || !strcmp(str, "else") || !strcmp(str, "while") ||
 !strcmp(str, "do") || !strcmp(str, "break") || !strcmp(str, "continue") || !s
trcmp(str, "int") || !strcmp(str, "double") || !strcmp(str, "float") || !strcm
p(str, "return") || !strcmp(str, "char") || !strcmp(str, "case") || !strcmp(st
r, "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);
}

// If the string is an INTEGER.
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);
}

// If the character is a DELIMITER.
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);
}

// If the character is an OPERATOR.

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

// Extracts the SUBSTRING.

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);
}

// Parsing the input STRING.
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 (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;
}

// MAIN FUNCTION
int main()
{
    // maximum legth of program is 100 here
    char str[500] = "int age = 25 ;";
    parse(str);
    return (0);
}
```

2.2 Output