Job No: 01

Job Name: Write a program to check the given string is comment or not.

Theory:

Comments are meaningful way to deliver message. It is used to add information about the code, warnings or suggestions so that end user can easily interpret the code.

There are two types of comments :

1. Single-line Comment
2. Multi-line Comment

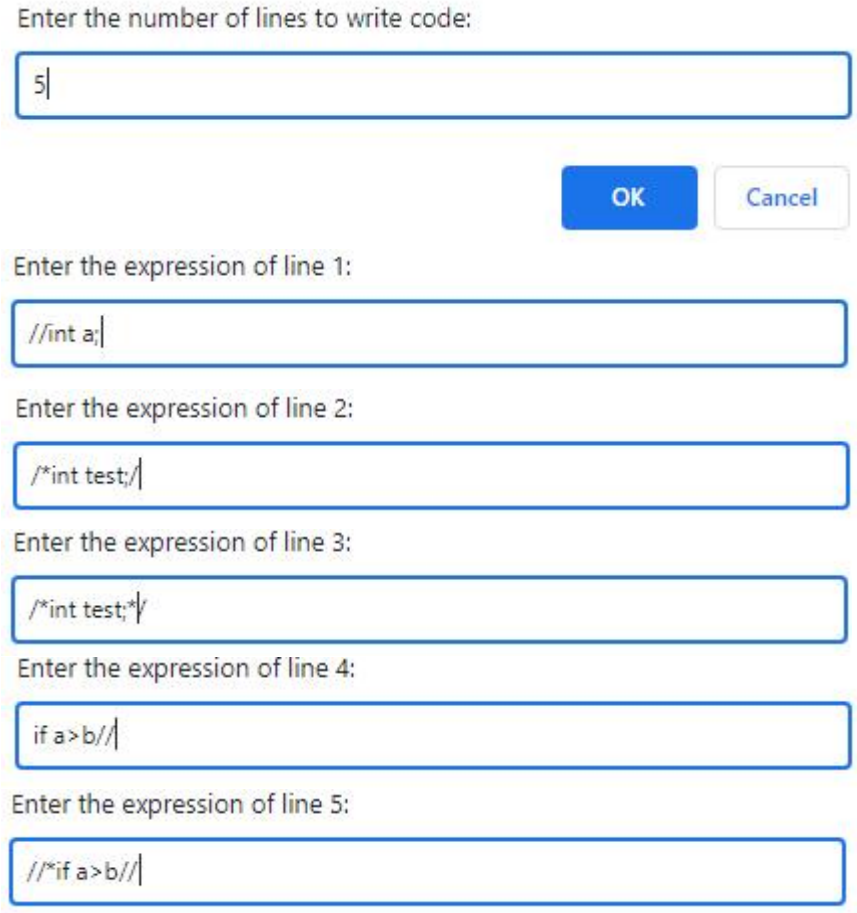
Single line comments start with //

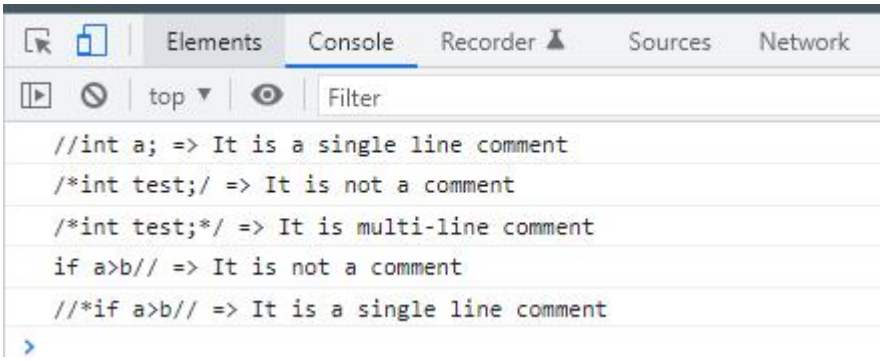
Multi-line comments start with /* and end with */.

Code:

```
const detectComment = expressions => {
    for(let comment of expressions){
        result = (comment.startsWith("/*") && comment.endsWith("*/"))
                  ? "It is multi-line comment"
                  : comment.startsWith("//")? "It is a single line comment"
                  : "It is not a comment";
        console.log(`${comment} => ${result}`);
    }
}

//takes input and runs only in browser console
let line = prompt("Enter the number of lines to write code:");
let expressions = [];

for(let i=0;i<line;i++) {
    expressions.push(prompt(`Enter the expression of line ${i+1}:`));
}

detectComment(expressions);
```

Input/Output:





Job No: 02

Job Name: Write a program to detect operator using lexical analyzer.

Theory: Lexical Analysis is the first phase of the compiler also known as a scanner. It converts the High level input program into a sequence of Tokens.

An operator in a programming language is a symbol that tells the compiler or interpreter to perform specific mathematical, relational or logical operation and produce final result. For example, + is an operator used for addition, while - is an operator used for subtraction and many more.

Types of Operators :

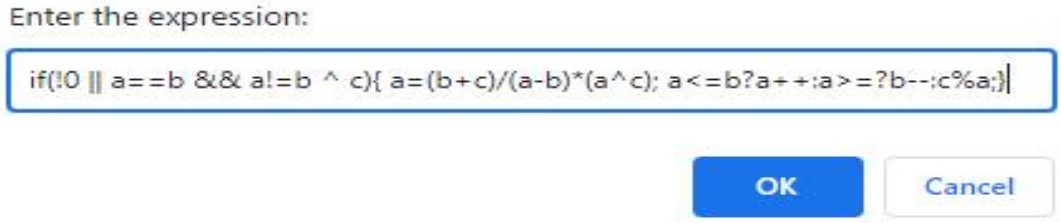
- ✧ Arithmetic operators
- ✧ Relational operators
- ✧ Logical operators
- ✧ Bitwise operators
- ✧ Assignment operators
- ✧ Type Information Operators(Special operators)

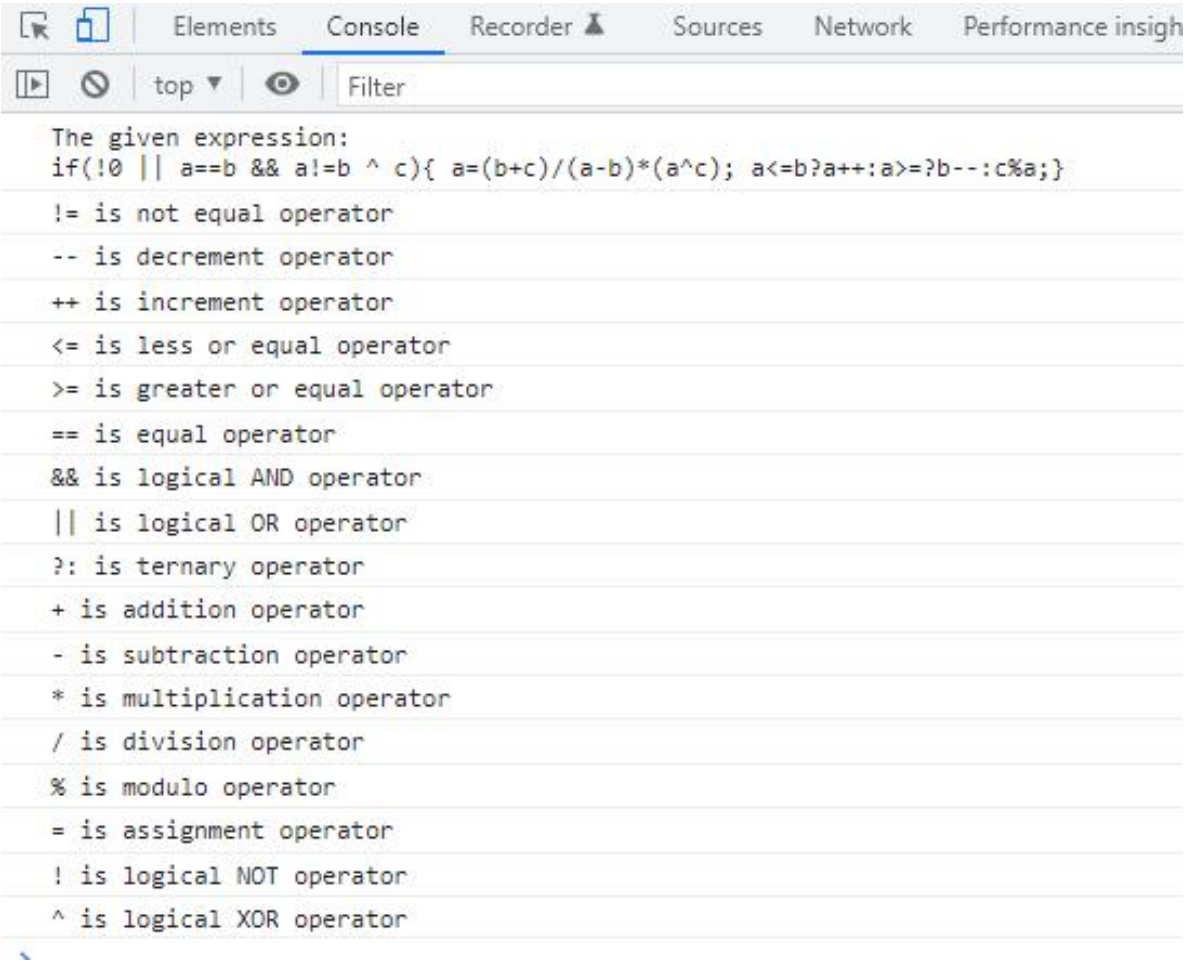
Code:

```
let operators = {
    '+' :'addition',
    '-' :'subtraction',
    '*' :'multiplication',
    '/' :'division',
    '%' :'modulo',
    '>' :'greater than',
    '<' :'lesser than',
    '=' :'assignment',
```

```
    '++':'increment',
    '--':'decrement',
    '<=':'less or equal',
    '>=':'greater or equal',
    '==':'equal',
    '!=':'not equal',
    '&&':'logical AND' ,
    '||':'logical OR',
    '!' :'logical NOT',
    '^' :'logical XOR',
    '?:':'ternary operator',
    '+=': 'assignment addition',
    '-=': 'assignment subtraction',
    '/=': 'assignment division',
    '*/': 'assignment multiplication',
    '**': 'exponential'
};

function detectOperator(expression,operators)
{
    console.log(`The given expression:\n${expression}\n`)
    let double = ['!=','--','++','<=','>=','==','&&','||','+=',
                  '-=','/=','*=','**'];

    for(let dup of double) {
        if(expression.includes(dup)) {
            expression = expression.replace(`${dup}`,'');
            console.log(`${dup} is ${operators[dup]} operator`);
        }
    }

    if(expression.includes('?'&&':')){
        expression = expression.replace('?','').replace(':','');
        console.log(`?: is ternary operator`);
    }

    for(let operator in operators){
        let hasOperator = expression.includes(operator);
        if(hasOperator){
            console.log(`${operator} is ${operators[operator]} operator`);
        }
    }
}

//takes input and runs only in browser console
let expression = prompt("Enter the expression:");
detectOperator(expression,operators)
```

Input/Output:





Job No: 03

Job Name: **Write a program to detect keyword and identifier**

Theory:

Keywords are predefined, reserved words used in programming that have special meanings to the compiler. Keywords are part of the syntax and they cannot be used as an identifier.

Identifier refers to name given to entities such as variables, functions, structures etc. Identifiers must be unique. They are created to give a unique name to an entity to identify it during the execution of the program.

Code:

```
let keywords = ["auto","double","int","struct","break","else","long",
"switch","case","enum","register","typedef","char",
"extern","return","union","const","float","short",
"unsigned","continue","for","signed","void","default",
"goto","sizeof","voltile","do","if","static","while"
];

let expression = "int 9int = float(b) + double(c) + $text = char(ABC)";
let separators = ["=",",","+","-","*","/","%","{","}","(",")"];

function hasSeparators (separators) {
    for(let separator of separators){
        if(expression.includes(separator)){
            expression = expression.replaceAll(`${separator}`,' ');
        }
    }
    return expression;
}

function detectKeyword(keywords,newExpression) {
    let resultKeywords = [];
    for(let expression of newExpression){
        for(let keyword of keywords){
            if(keyword==expression){
                console.log(`${keyword} is a keyword`);
                resultKeywords.push(keyword);
```

```
            }
        }
    }
    return resultKeywords;
}

function detectIdentifier(keywordList,newExpression) {
    let resultIdentifiers = newExpression.filter(keyword => {
        let regex = "^([a-zA-Z_$][a-zA-Z\\d_$]*)$";
        return !keywordList.includes(keyword) && keyword.match(regex);
    })

    console.log(`\n`);
    resultIdentifiers.forEach(element=>{
        console.log(`${element} is an identifier`)
    })
}

function detectKeywordIndentifier(){
    console.log(`The given expression:\n ${expression}\n`)
    // split into array and remove empty elements
    let newExpression = hasSeparators(separators).split(" ")
                        .filter(e => e != "");

    let keywordList = detectKeyword(keywords,newExpression);
    detectIdentifier(keywordList,newExpression);
};

detectKeywordIndentifier();
```

Input/Output:

```
The given expression:
 int 9int = float(b) + double(c) + $text = char(ABC)

int is a keyword
float is a keyword
double is a keyword
char is a keyword


b is an identifier
c is an identifier
$text is an identifier
ABC is an identifier
```

Job No: 04

Job Name: Write a program to detect integer and real number.

Theory:

An integer is a positive or negative whole number with no fractional or decimal part. Integers include the subsets, whole numbers and natural numbers.

A real number is any number on the number line and includes subsets of numbers including natural, whole, integer, rational and irrational numbers. In simpler terms, all numbers are real numbers except for imaginary numbers.

Code:

```
let num1 = 10.50;

if(typeof num1 === 'number'){
    console.log(num1 + " is a real number");
}else{
    console.log(num1 + " is not a real number");
}
if(num1 === parseInt(num1)){
    console.log(num1 + " is an integer number");
}else{
    console.log(num1 + " is not an integer number");
}
```

Input/Output:

```
10.5 is a real number
10.5 is not an integer number
```