INTRO-CS-3 - Algorithm Design and Problem Solving – Introduction

Exercises

Logical

On pen and paper, solve the logical exercises and give the expected output statement (true / false):

```
( true && true ) => verdadero
( false && true ) => falso
( true && false ) => verdadero
( false && false ) => falso
( true || true)    => verdadero
( true || false )   => verdadero
( false || true)   => verdadero
( false || false )  => falso
!( false || true )   => falso
!( false && true ) => verdadero
( !false && true ) => verdadero
( !true && true )  => falso
( !false || false ) => verdadero
```

Comparison

```
/** Exercise #1
 * Create a function that takes in one number and checks if the number is greater than 10. Print out to the console true if it is greater and false otherwise.
 */
userNum = prompt('Escribe un número: ' );
function greaterNumberthanTen(num) {
  if (num > 10) {
    return "the number is greater than 10";
  }else {
    return 'error!'
  }
}
console.log(greaterNumberthanTen(userNum));
```

```
/**
 * Exercise #2
 * Create a function that takes in one number
 * and checks if it is divisible by 4 or divisible by 9.
 * Print out to the console true if a number
 * if divisible by 4 or 9, and false if a
 * number is not divisible by either number.
 */
userNum = prompt('Escribe un numero: ')
function divisibleNumbers(num) {
  if (num % 4 == 0 || num % 9 == 0) {
    console.log(true);
    console.log('it is divisible by 4 or divisible by 9');
  }else {
    console.log(false);
  }
}

console.log(divisibleNumbers(userNum));
```

String Function

```
/**
 * Exercise 1:
 * We want to check if a string is empty.
 * If a string is not empty, we want to print
 * out the first character of that string.
 * If a string is empty, print out a text saying
 * "This string is empty"
 */
```

```
var cadena = prompt("Introduce una palabra");

function checkEmptyString(str) {
  if(str === "") {
    console.log("La cadena esta vacia");
  } else {
    console.log(str.charAt(0));
  }

}

// Example test, should return a
checkEmptyString(cadena);

/**
 * Exercise 2:
 * We want to compare two strings and check if
 * they are the same - case insensitive.
 * Return a boolean - true if the two strings are
 * the same, and false if they are not
 */
var str1 = ("Equipo Generation").toLowerCase;
var str2 = ("Equipo Generation").toLowerCase;

function checkTwoStringsSame(str1, str2) {
  if( str1==str2){
    alert(str1 == str2);
  } else {
    console.log('False');
  }

}

// Example test, should return true
checkTwoStringsSame("String1", "string1");
```

User Input

```
/**
 *
 *  Create a function that takes in 2 inputs (using prompt)
 *  and goes through the 5 arithmetic operators (+, -, /,
*,
 *  %). The expected output on the console is:
 * `The sum is x` -> x is the calculated sum
 * `The subtraction is y` -> y is the calculated difference
 * `The multiplication is z` -> z is the calculated
multiplication
 * `The division is w` -> w is the calculated division
 * `The remainder is q` -> q is the calculated remainder
 */
let num1 = parseInt(prompt('Introduce un numero: '));
let num2 = parseInt(prompt('Introduce otro numero: '));

function mathematicOperations(num1,num2) {
  let suma = num1 + num2 ;
  let resta = num1 - num2 ;
  let multiply = num1 * num2 ;
  let division = num1 / num2 ;
  let remainder =  num1 % num2 ;

  alert(`The sum is ${suma}
  The subtraction is ${resta}
  The multiplication is ${multiply}
  The division is ${division}
  The remainder is ${remainder}`);
}

mathematicOperations(num1, num2);
```

PRACTICE

Part 1

1. Open a repl.it Javascript page and call it Algorithms Introduction Exercise 1.
2. Write a program where a user enters the number of tasks they have completed. The program returns one of the following labels to the console:

```
**Failed**
**Insufficient**
**Good**
**Excellent**
**Error**
```

based on the conditions:

- **Failed** if they scored 6 or less
- **Insufficient** if they scored > 6 but less than 9 (9 included)
- **Good** if they scored > 9 but less than 14 (14 included)
- **Excellent** if they scored 15
- **Error** if participants enter a negative number or a number outside the range supported (outside 0 - 15)

```
//Se piden los datos

let tareas=parseInt(prompt("¿Cuantas tareas entregaste?"));

function homeworksDone() {
    if (tareas>=0&&tareas<=6){
    alert("Failed");
    }
    else if (tareas>=7&&tareas<9) {
```

```
      alert("Insufficient");
      }
      else if (tareas>=9&&tareas<=14) {
      alert("Good");
      }
      else if (tareas==15) {
      alert("Excellent");
      }
      else {
      alert("Error, dato no valido");
      }
  };

  alert(homeworksDone());
```

Part 2

1. Open a repl.it Javascript page and call it Algorithms Introduction Exercise 2.
2. Write an algorithm to find the largest among 5 different numbers entered by the user.
3. Print out the largest number to the console.

```
4. //Se piden los datos
5. let num=parseInt(prompt("Ingresa un numero: "));
6.
7. function largestNumber(){
8.     let mayor=0;
9. //se crea un ciclo for de 5 repeticiones
10.    for (var i = 0; i<5; i++ ){
11.    //Se piden los datos
12.        let n1=parseInt(prompt("Ingresa numero"));
13.    //Se compara si el numero ingresado es mayor
14.        if(n1>mayor)
15.        {
16.         //Si es mayor, se guarda como el numero mayor
17.            mayor=n1;
18.        }
19.    }
20.//Mensaje de numero mayor
```

```
21. alert("el numero mayor es "+ mayor);
```

Part 3

1. Open a repl.it Javascript page and call it Algorithms Introduction Exercise 3.
2. We have 3 items and we know the price for each. However, we can only buy the two least expensive items.
3. Write an algorithm that takes in three user inputs and outputs the two smallest prices to the console.

```
4. // Algoritmo que señaña el producto con el precio más bajo
5. //Se crea una funcion que muestra al usuario los dos productos con el
   precio más bajo
6. function lowestPrice(){
7.     let mayor=0;
8.     // se declaran variables para los arrays que guardaran los valores
   de los productos y precios
9.     let products = [];
10.    let prices = [];
11.    //se crea un ciclo for de 3 repeticiones
12.    for (var i = 0; i<3; i++ ){
13.        // se declaran variables para la informacion dada por el
   usuario: productos y precios
14.        let userList = prompt('Ingresa los productos que deseas
   comprar: ');
15.        let addPrice = prompt('Ingresa los precios: ');
16.
17.        // Se agregan con el metodo push de JS a la variables products
   y prices
18.        products.push(userList);
19.        prices.push(parseInt(addPrice));
20.    }
21.    if (prices[0] < prices[1]){
22.        if (prices[2] < prices[1]){
```

```
23.         alert(`Nosotros vamos a compar: ${products[0]} por
    ${prices[0]} y ${products[2]} por ${prices[2]}`);
24.         } else {
25.             alert(`Nosotros vamos a compar: ${products[0]} por
    ${prices[0]} y ${products[1]} por ${prices[1]}`);
26.         }
27.     } else {
28.         alert('ERROR!');
29.     }
30.}
31.
32.
33.alert(lowestPrice());
```