SCHOOL OF COMPUTING

ST0523 Fundamentals of Programming

Practical 5: Arrays

What you will learn / do in this lab

- Declare and use Arrays
- Write program to read, process and display array contents

1) Determine the output of the following code segments:

a)

```
var arr1 = [-1, 0, 'one', '2', true, false, 5];

console.log(arr1.length);
console.log(arr1[0]);
console.log(arr1[2] + arr1[6]);
console.log(arr1[4] + arr1[3]);
console.log(typeof(arr1[4]));
console.log(arr1[arr1[1]]);
console.log(arr1[arr1.length + arr1[0]]);
```

Output:

b)

```
var arr2 = new Array(24, 0, 19, 21, 6, -5, 10, 16);
var arr3 = [], sum = 0;

for (var k = 0; k < arr2.length; k += 2) {
    sum += arr2[k];
    if (arr2[k] < arr2[k+1])
        arr3.push(arr2[k+1]);
}
console.log(sum);
console.log(arr3.length);
```

Output:

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2) Complete the missing codes below such that the program will count the number of elements in the *numArr* array that is less than 50 and more than or equal to 30.

```
var numArr = new Array(100);
var count = 0;

for(var i = 0 ; i < numArr.length ; i++) {
    //generate a random integer between 1 & 100
    numArr[i] = Math.floor(Math.random() * 100) + 1;
}

//Insert code here




console.log ("There are " + count + " numbers.");
```

3) Complete the program below that find the largest number and its index location in the integer array *intArr*.

```
var intArr = new Array(10);
var biggest, biggestIndex;
for(var i = 0 ; i < intArr.length ; i++) {
    //generate a random integer between 1 & 10
    intArr[i] = Math.floor(Math.random() * 10) + 1;
}  // for e.g. [1,8,7,1,5,6,2,7,4,3]

// Insert code here




console.log("The largest number is " + biggest);
console.log(biggest + " is stored at array index #" + biggestIndex);
```

You may open up your Visual Studio Code (VSC) and work from there for the remaining questions.

[Optional : After you have completed each question, try challenging yourself to include some data validation in your program. Do remember to prepare test cases to ensure your validation works for all possible cases.]

4) Write a program that prints the number of days in the months from January to December. Here are the program requirements:

a) Declare and create an array of String that stores the names of the months -- *January, February, March, April, May, June, July, August, September, October, November and December*.

b) Declare and create an array of int that stores the numbers of days in each month -- *31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31*.

c) Use *for* loop to display the numbers of days in each month.

Sample output:

```
January has 31 days.
February has 28 days.
March has 31 days.
April has 30 days.
May has 31 days.
June has 30 days.
July has 31 days.
August has 31 days.
September has 30 days.
October has 31 days.
November has 30 days.
December has 31 days.
```

5) Write a program that receives the marks of 6 students, and then finds and displays the number of students getting *A* grade (mark is 80 or more).

a) Declare and create an array named **marks** to store the marks of 6 students.

b) Use *for* loop to receive the marks of the 6 students from the user input and store in the **marks** array, and then find the number of students getting *A* grade.

c) Compute and display the average mark among the 6 students.

Sample output:

```
Enter marks for student #1: 55
Enter marks for student #2: 88
Enter marks for student #3: 76
Enter marks for student #4: 80
Enter marks for student #5: 44
Enter marks for student #6: 92

3 students scored A grade
The average mark is 72.5
```

6) Write a program to test whether two arrays are strictly identical.

Note: Two arrays *list1* and *list2* are strictly identical if they have the same length and *list1[i]* is equal to *list2[i]* for each *i*.

Given the *list1* and *list2* as shown:

```
var list1 = [12, 56, 76, 32, 12, 34];
var list2 = [12, 56, 76, 32, 12, 34];
```

Sample output:

```
Two lists are strictly identical.
```

7) Write a program that performs the following tasks:

a)   Declare and create an array named ***intArray*** to store 5 integers.

b)   Use *for* loop, randomly generate 5 integer values (0-11) and store them in ***intArray***.

c)   Use another *for* loop to find the highest value stored in the array and display the results as shown below:

```
Elements of int array : 2 6 1 5 10
Highest Value : 10
```

8) Write a program that performs the following tasks:

a) Declare and create an array named *intArray* to store 50 random integers between 1 and 100 (inclusive).

b) Use *for* loop to assign odd numbers and even numbers in *intArrays* to *oddArray* and *evenArray* respectively.

c) Use another *for* loop to display the output as shown below:

```
Original Array :
13 60 69 10 99 42 67 79 71 6 23 58 11 16 8 61 21 89 72 7
34 40 43 97 9 62 87 55 9 96

Even Numbers :
60 10 42 6 58 16 8 72 34 40 62 96

Odd Numbers :
13 69 99 67 79 71 23 11 61 21 89 7 43 97 9 87 55 9
```

- END -