JavaScript
Essential Review Lab Work

Name: _____ **Mark: _____/100**

Important Notes:

- **Use your Team group to work on this lab-work. Each team must work individually. For example, team1 members can work together they CANNOT work with or assist another member from a different team**
- **Although this lab-work is a team based, but each student must submit his/her work individually**
- The lab-work should be **submitted (uploaded) before the due date** in order not to lose marks
- Follow the **exact naming rules** for all your variables as explained in the instructions
- The lab-work is intensively loaded with all the needed steps and instructions to solve the entire problem, but as we know, in programming we can use different logic or way of coding to achieve different tasks, so feel free if you like/prefer to use other different ways or methods etc.
- **At the end of the lab-work**, you will end up by the following **single file** after answering all the questions which you will have to upload it to your private shared folder:
  - **YourFirstNameFirstInitial-js-lab-work1.HTML**

(5 Marks)

Lab-work Contents:

- You will ask the user to input the number of the courses that he/she has finished, then loop for x number of times based on the number of courses to let the user input the grade/mark for each course then you will find the average of all these courses and display his/her grade.
- This lab-work will a be demonstration of your skills in JavaScript for:
  - Creating and initializing variable following JavaScript naming convention
  - Reading/output data from/to the browser window
  - Converting string data type to integer/float numbers
  - Using the two types of loops: While and For
  - Arithmetic operations with BEDMAS/PEDMAS Rules
  - Using Arrays and Array's method
  - Validation and Decision making with If/else if/else blocks with logical operators
- For this lab-work you will use **Internal JavaScript (within the HTML file)**
- You need to place the script element in the proper location based on what we have covered

Lab-work Instructions:

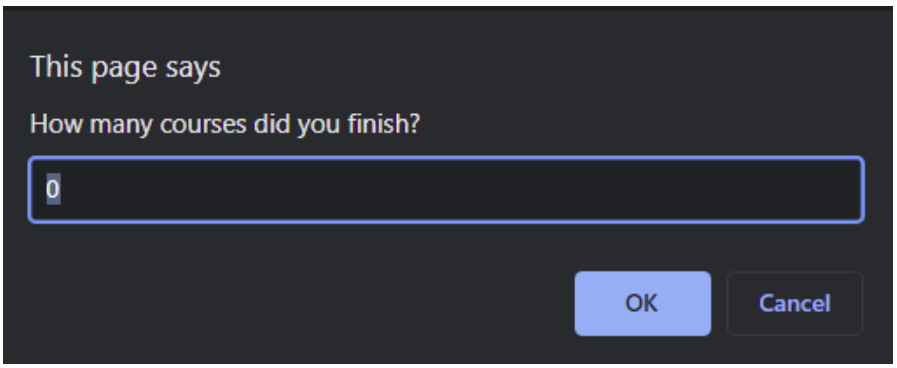
1) Create a new **.html file** using HTML5 document Type, then place your **internal JavaScript** code inside the **HTML <body>** tag:

```
<body>
  <script>
      // Your code goes here…
  </script>
</body>
```

2) Save your **.html file** as "**YourFirstNameFirstInitial-js-lab-work1.HTML**"
   Like: **MartinS-js-lab-work1.HTML (for student's name Martin Smith)**
3) You will only use **document.write()** to output all your results so please make sure to surround all the **document.write()** output messages with the HTML **<p>** element

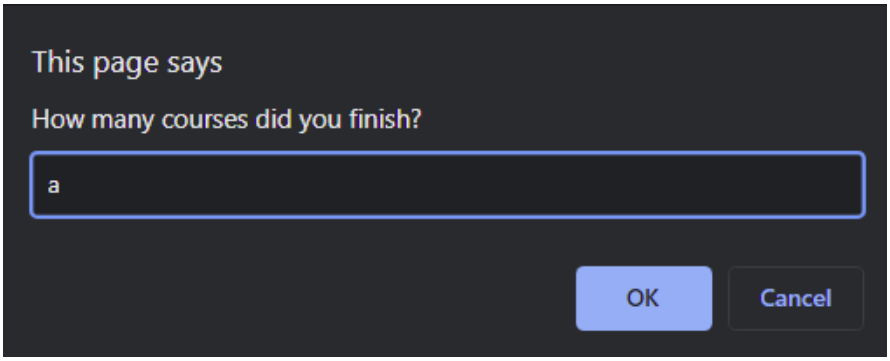
Part 1:

1) You will ask the user to enter how many courses did he/she finish using the **prompt()** built-in function (Browser's method):
    a. The text to be display with the prompt: **"How many courses did you finish?"**
    b. Add a default value of "0" in case if the use doesn't input any value
    c. Declare a variable named "**numOfCourses**" to save the **number of courses** (which is the value that will be returned from the prompt method based on the user's input).
    d. The **"numOfCourses"** should be just an int variable (variable with integer value). Make sure that the input value (which is string) is converted into number (numeric) using any one of the appropriate JavaScript built-in methods/functions



2) You will have to check If the user enters an ***invalid input*** like a string value instead of numeric as shown in the scenario with images below:

In the image below, the user made a mistake by typing letter "a" instead of a number



Then you should do the following **two steps:**

*a) Use **document.write** to output the text **"Invalid Input!"** as shown in the image below*

*b) Stop the rest of your code from being executed **(you can use if/else condition)***

Then the user should see only the following message

Invalid Input

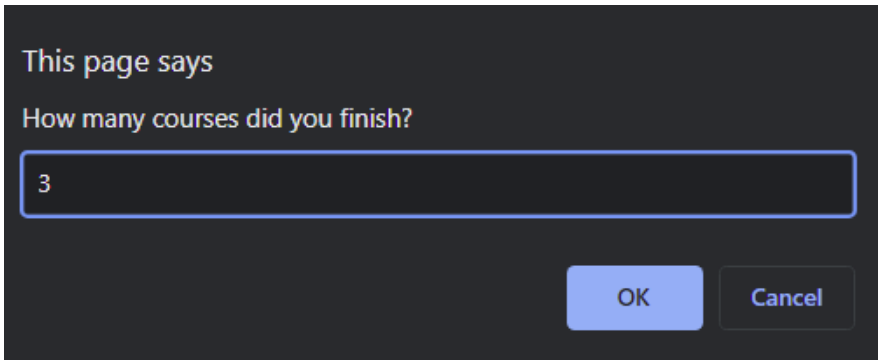
The logic for this task:

if user's input value is invalid (Not a number) ➔ output the error message "Invalid Input"
else ➔ continue writing your code to get the courses marks and find the average, ***which means that all your logic (the main lab-work requirements) will be inside the "else block"*** as shown below:

```
If (user input is invalid) {
    Output: Invalid Input
} else {
    Your code which is the main part to answer the lab-work goes here (starting from point 3 and
    moving forward till the end)
}
```

Hint: For point (2), you can use JavaScript **isNaN()** built-in function to check if the value is number or not.

The image below is just a sample of what the user should see when they open (visit) the page, so he/she can enter 3, for example, which refers to the number of courses they finished:



3) Declare an **empty array variable named "courseMarks",** this variable will be used to contain the course marks (later). This **"courseMarks"** will be just an empty array object
4) You will loop for a specific number of times based on your variable **numOfCourses**, for example if **numOfCourses** value is 3 as shown in the image above, you will make the loop iterate for 3 times by setting its condition. In each iteration of the loop, you will ask the user to enter his/her course mark. This mark will be inserted into the array "**courseMarks**" immediately (instantly on the fly), so you will populate this array with the user input through this while loop.

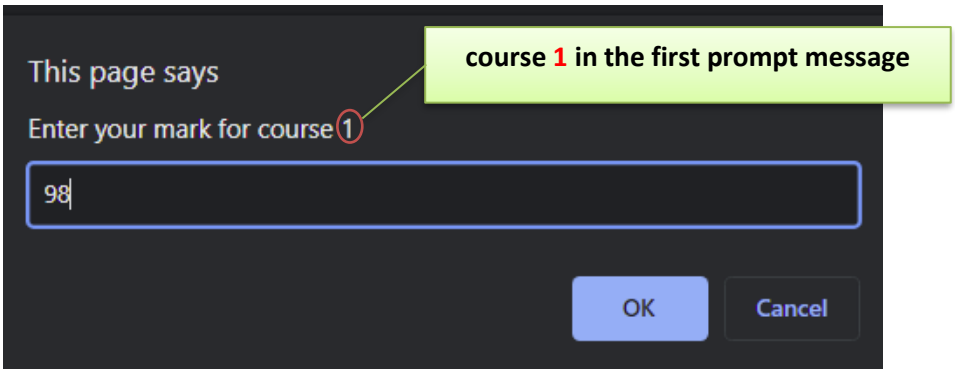
HINT:

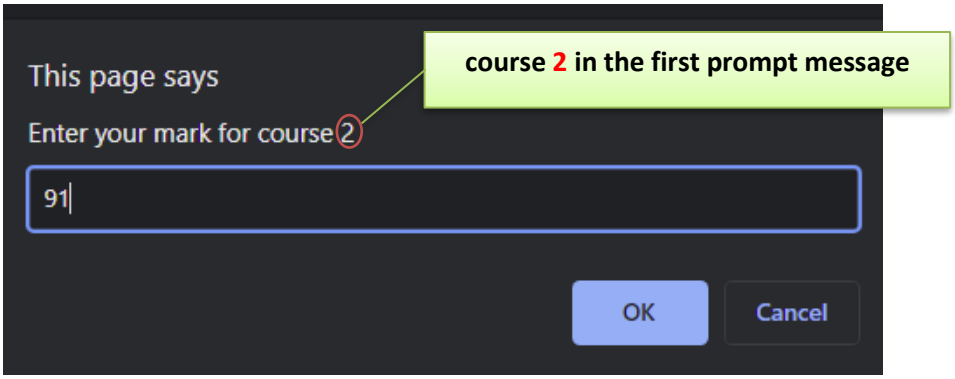
To insert a value into the array "courseMarks", you can use any of the ways that we covered in our class (Check my examples for the shopping list):
https://github.com/anmarjarjees/javascript-class/blob/master/lesson03/k.shopping-list-basic.html
https://github.com/anmarjarjees/javascript-class/blob/master/lesson03/l.shopping-list-if.html

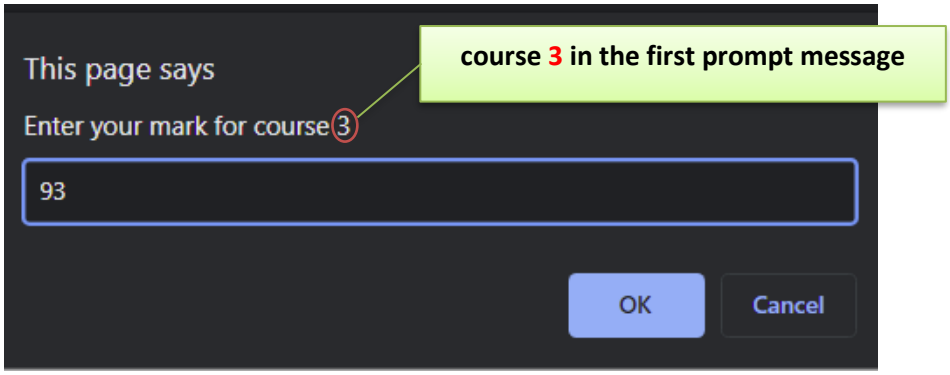
Notice that You need to modify the course number in the print message for every iteration throughout the loop as shown below
(Hint: you can user the same while loop counter if it starts with 1):

- For the **first time**: **Enter your mark for course 1**
- For the **second time**: **Enter your mark for course 2**
- And so on for the **x time**: **Enter your mark for course x**

The images below are what the user should see next, after entering the number of courses. This prompt window **will ask the user three times** based on the number of courses that they entered before:







The "courseMarks" array will be updated inside the loop in each iteration to save the current user input which represents the current course mark (with a new index for each mark using the loop counter if it counts from 0.
or you can just simply use the array method: .push()

The logic with hints:

Outside the while loop:

- **You can use either For Loop or While Loop with this condition** (the loop counter <= numOfCourses)
- If decide to use While Loop, don't forget to:
    - declare a loop counter with its initial value before the loop
    - increment the while loop counter (otherwise you will get infinite loop)

Then (inside the loop):

- You can populate (putting the values from the user input into) "**courseMarks" array** on the fly (throughout the loop iteration) by **using one of these ways:**
    - adding the user input to the array with **push() method [also includes prompt and parsing]**
    - adding the user input to the array using the index notation and you can use the loop counter variable if it counts from 0
- Using **prompt() function** that contains the course mark question ending with (concatenating to) the loop counter variable to show the question and course 1, course 2, course 3 etc.
- Remember that the **push() method** will just append/push/insert/add the current value to the end of our array so you will need place the prompt() function inside the push() method as a parameter (Refer to my code example about shopping list):

Hints:

- **The prompt() function should be nested inside the push() method of the array**
- **You will need to use the appropriate JavaScript function to convert the user input into a numeric value, which means the prompt () function also need to be nested inside a JavaScript method for converting string number to an integer or float(decimal) number:**
    - ⇨ **myArrayVaraible.function1(function2(function3()))**
        - **function1: "push" method() ➔ belongs to the "array" object**
        - **function2: the convert function ➔ converting string to number**
        - **function3: prompt function ➔ to receive the user input**
- **Remember that we used 3 different JS functions to convert string into a number *(Review my lectures)***

5) Now you will need to print or display all the course marks that is saved into the "**courseMarks" array** to the user using any kind of loop. You will print them all with **document.write()** as shown below or in the image in the last page of this document:

98

91

93

(Part 1: 60 Marks)

Part 2:

1) You will find the **average (the mean)** for all the courses:
    a. First, you need to find the total of all the courses marks inside the array (for sure) using any type of loop you want.

       HINT:
       Instead of creating another ***for loop block*** and increase your code lines, you can just use/modify the same first loop for asking the user to input the marks.
       So, inside the same loop you can do/achieve two tasks:
       - Ask the user to input their marks to be inserted immediately into the "courseMarks"
       - Using the formula for calculating the total (Refer to my code examples)

       I will accept any answer you provide because in Programming there is no specific or fixed way to follow, *the rule of thumb is always trying to write less code as mush as you can to get the right result.*

    b. Then (after the loop) you can divide the result of the **total of the courses** by **the number of courses** and assign the result into a new variable named "**average**":
       - The math formula for average:
         - The total of the numeric values / How many numeric values
       - The math code for average:
         - The total of all the marks in our array(list) / The length of our array

The logic to find the total:

- You need to create a variable to act as a container to sum all the number in the list with an initial value of 0.
- Using the same loop for getting the values or create a loop (for loop will be also a better option here) to loop through the marks in the "courseMarks" and add each one in every iteration to the continuer variable that you had declared before the loop with initial value of 0.
  So, in first iteration of the loop, you will get the value of the first item (element) in the list and add it to your container variable and so on for the rest:

To find the average:

- In math, we can find the average by adding all the numbers and divide the result by how many numbers we have

  Example 😊:

  To find the average for three exams:

  average = (exam1+exam2+exam3) / 3
- In our code example, you should have already found the total of all the course marks and saved it in your container variable (The total variable). You can now divide the total by the number of the element in the array. Notice that you can easily know how many elements in the list either by using the same variable **"numOfCourses"** or using **the length() property** of the array object.
- Assign the result of the average formula into the new variable named **"average"**

Note:

To find the total, you can go with the same logic as explained in this point (point 1). If you don't want to create another extra loop block, you can also find the total using any one from the previous loops; either the loop for entering the courses' marks or the loop for printing them.

(Part 2: 5 Marks)

Part 3:

1) Use **document.write()** to output the **average value** plus **the grade**, so you will use "**if condition**" to check the average value as explained below:
    a. If average >= 90 and average <=100 ➔ display:
    "Your final average is X. Your grade is A+"
    b. If average >= 80 and average <=89 ➔ display:
    "Your final average is X. Your grade is B"
    c. If average >= 70 and average <=79 ➔ display:
    "Your final average is X. Your grade is C"
    d. If average >= 60 and average <=69 ➔ display:
    "Your final average is X. Your grade is D"
    e. If average <60 ➔ display:
    "Your final average is X. Your grade is F"
    f. Else display:
    "Sorry, All the marks have to be from minimum 0 to maximum 100!"

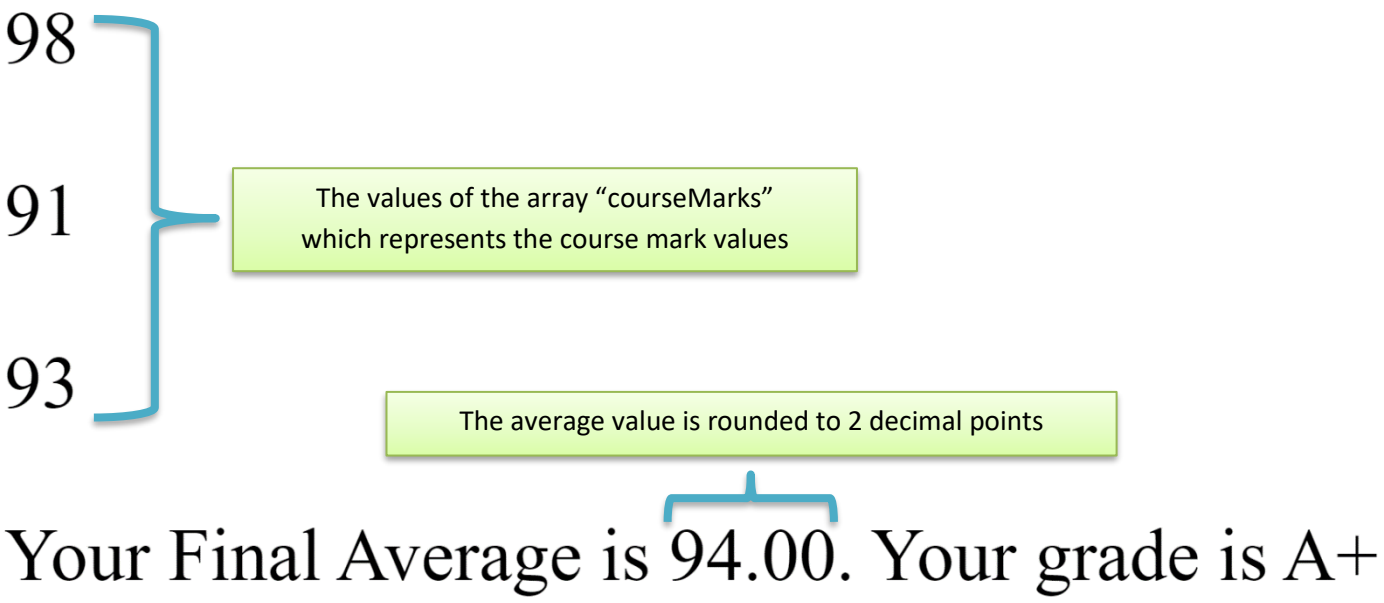
Notes to do:

- **All the if condition messages have to be displayed using "document.wirte()" method (as mentioned before)**
- **You will have to round the average value to 2 decimal points**

Hint: To round your answer, you will need to use the appropriate native JavaScript method to round your average value *(refer to my other code example or search)*.

(Part 3: 30 Marks)

The image below is just a sample of what the user should see when they enter all the required values. It represents the lab-work final result or output:



Notes:

- Your code needs to be formatted nicely like indenting your statements. You can use the hotkeys of your favourite code editor to format all the code automatically.
  - VS code (Windows) ➔ ALT + SHIFT + F
- The texts in the images might not match exactly the texts in the instruction, so **you just need to follow the instructions**

Happy Coding 😊