University of Maryland College Park
Department of Computer Science
CMSC122 Fall 2025
Exam #2

FIRSTNAME, LASTNAME (PRINT IN UPPERCASE): KEY

STUDENT ID (e.g. 123456789):

Instructions

- Please print your answers and use a pencil.
- This exam is a closed-book, closed-notes exam with a duration of 50 minutes and 100 total points.
- **Do not remove the exam's staple.** Removing it will interfere with the scanning process (even if you staple the exam again).
- Write your directory id (e.g., terps1, not UID) at the bottom of pages with **DirectoryId**.
- Provide answers on the provided lines or the rectangular areas.
- Do not remove any exam pages. Even if you don't use the extra pages for scratch work, return them with the rest of the exam.
- Your code must be efficient and as short as possible.
- If you continue a problem on the extra page(s) provided, make a note on the particular problem.
- You don't need to use meaningful variable names; however, we expect good indentation.
- **You must write your name and id at this point (we will not wait for you after time is up).**
- You must stop writing once time is up.

Grader Use Only

#1	Part #1 (Short Answer 3pts each)	45
#2	Part #2 (Write the Code)	55
Total	Total	100

Part #1 (Short Answer – 3 pts each)

1. Given:

```
let n = 5;
n += 3;
n--;
alert(++n);
```

What will the alert box display? **8**.

2. Assume an array with elements 8, 9, 10, 2, 1. Which **two values** would be the first swap in bubble sort?

10 and 2.

3. Given the array [8, 4, 9, 2], what will the array look like after the first pass of insertion sort (i.e., after inserting the second element into its correct position in the sorted portion)? **List all four values**.

4, 8, 9, 2

4. Given:

```
let list1 = [3, 4, 5];
let list2 = list1;
list1 = [9, 10];
alert(list2[1]+list1[1]);
```

What will the alert box display? **14**.

5. Given:

```
let a = 15, b = 25;
if (a < 20 || b > 30)
     alert("Option A");
else if (a == 15)
     alert("Option B");
else
     alert("Option C");
```

What will the alert box display? **Option A**.

6. Given:

```
let x = 3, y = 9;
if (x > 5 && y == 9)
      alert("A");
if (x != 3)
      alert("B");
else if(y != 9)
      alert("C");
      alert("D");
```

What will the alert box display? **D**.

7. Given the code below, how many alert boxes with **Hi** will show up? **once**.

```
let count = 2;
do {
      alert("Hi");
      count += 4;
      if (count == 6)
            count = 15;
} while (count <= 12);
```

8. Given the code below, how many alert boxes with **Hi** will show up? **Ten times**.

```
for (let i = 1; i < 10; i += 2) {
      for (let j = 2; j >= 1; j--)
            alert("Hi");
}
```

9. Given:

```
let msg = "world";
let len = msg.length;
alert(msg.toUpperCase() + len);
```

What will the alert box display? **WORLD5 (*only partial credit it space between WORLD and 5*)**.

10. Given:

```
function test1(x) {
     x = 10;
}

let val = 50;
val = test1(val);
alert(val);
```

What will the alert box display? **undefined**.

11. Given:

```
function test2(arr) {
  arr[1] = 99;
}

let nums = [4, 5];
test2(nums);
nums.push(100);
alert(nums);
```

What will the alert box display? **4, 99, 100**

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12. Given:

```
function test3(num) {
  return num * 2;
}

let n = 3;
test3(n);
n *= test3(n);
alert(n + test3(7));
```

What will the alert box display? **32**.

13. Given:

```
function test4(str) {
   str = str + "!";
}

let lang = "JS";
test4(lang);
alert(lang);
```

What will the alert box display? JS (*full credit only if missing !*).

14. Given:

```
let z = 10;
if (z > 5) {
   let note = "inside";
   alert("Greater than 5");
} else {
   alert("5 or less");
}
alert(note);
```

There is an error in this code. What is wrong with it? (You can assume that it has been correctly placed in the <script> element in an html document).

Answer note has block scope and is out of scope for the last alert.

15. Given:

```
function test5(num) {
 let data = [2, 4, 6];
 data[2] = num;
 return data;
}

let v = 9;
alert(test5(v));
```

What will the alert box display? **2, 4, 9**.

Section 2–Write the code – YOU ONLY NEED TO WRITE THE FUNCTIONS

16. (18 pts) Write a function called **`capitalizeAfterNumber`** that has one array parameter called **`arr`**. The function will traverse the array from the beginning. Once it finds the **first numeric element**, it will **convert all following string elements** in the array to uppercase. The function does not return anything and does not write anything on the webpage. You can assume that the array has at least one element and all elements are Strings or numbers. Use the **`isNaN`** function and the **`toUpperCase`**( ) method to help you write your code.

`<script>`

```
function capitalizeAfterNumber(arr) {
    let seenNumber = false;

    for (let i = 0; i < arr.length; i++) {
        if (!seenNumber && !isNaN(arr[i])) {
            seenNumber = true;
        } else if (seenNumber && isNaN(arr[i])) {
            arr[i] = arr[i].toUpperCase();
        }
    }
```

```
function main() {

    let data = ["hi", "there", 5, "apple", "banana", 10, "cat"];
    capitalizeAfterNumber(data);
    alert(data);  //hi,there,5,APPLE,BANANA,10,CAT


}
main();
</script>
```


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17. (19 pts) Write a function called **`writePattern`** that will have an array parameter called **`symbol`**. The function will print to the webpage each element of the array in order, **printing each symbol as many times as its index + 1**. After printing the last element, the function will continue by printing the symbols **in reverse order**, again printing each symbol (other than the last) as many times as its index + 1. The function does **not** return anything; it uses **`document.write`** to display the output on the webpage. You can assume that **`symbol`** will be an array containing one-character strings and that it has at least one element. Notice the last character in the array is only printed the middle row.

`<script>`

```
function writePattern(symbol) {
    // Forward part: from first to last element
    for (let i = 0; i < symbol.length; i++) {
        for (let j = 0; j <= i; j++) {
            document.write(symbol[i]);
        }
        document.write("<br>");
    }

    // Backward part: from second-to-last down to first
    for (let i = symbol.length - 2; i >= 0; i--) {
        for (let j = 0; j <= i; j++) {
            document.write(symbol[i]);
        }
        document.write("<br>");
    }
}
```

`</script>`

The call	The output to the webpage
`let data = ["A", "B", "C", "D", "E", "F"];` `writePattern(data);`	A BB CCC DDDD EEEEE FFFFFF EEEEE DDDD CCC BB A

18. (18 pts) Write a function called **`transformArray`** with three parameters: `arr` — an array of integers (length ≥ 1), `flag` — a boolean value, and `adder` — an integer. The function should behave as follows: If `flag` is `true`, return a **new array** where **`adder` is added** to each element of `arr`. If `flag` is `false`, return a **new array** where each element of `arr` is **duplicated once** (i.e., every element appears twice in a row) in the same order. The original array should **not** be modified. You can use the array method `push` to add elements to the new array and can assume the array will only have integers.

<script>

```
function transformArray(arr, flag, adder) {
    let result = [];

    if (flag) {
        // Add 'adder' to each element
        for (let i = 0; i < arr.length; i++) {
            result.push(arr[i] + adder);
        }
    } else {
        // Duplicate each element once
        for (let i = 0; i < arr.length; i++) {
            result.push(arr[i]);
            result.push(arr[i]);
        }
    }

    return result;
}
```

```
function main() {
          let nums = [1, 2, 3];
          alert(transformArray(nums, true, 5));  // 6, 7, 8
          alert(transformArray(nums, false, 5)); // 1, 1, 2, 2, 3, 3}

main();
</script>
```

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EXTRA PAGE IN CASE YOU NEED IT (SUBMIT WITH THE EXAM)

LAST PAGE