



University of Maryland College Park

Department of Computer Science

CMSC122 Fall 2024

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 x = 8;  
x %=4;  
let y = x--;  
alert(x+y);
```

What will the alert box display? **-1**

2. Assume an array with elements 5, 7, 8, 10, 9, 6. Which two values would be the first swap in bubble sort?

10 and 9 (or 9 and 10)

3. We talked about 3 sorting algorithms in class: Bubble sort, selection sort, and **insertion sort**

_____.

4. Given:

```
let arr1 = [1,2,3];  
let arr2 = arr1;  
arr1 = arr2.push(arr1[0]+arr1[2]);  
alert(arr2);
```

What will the alert box display? **1,2,3,4**

5. Given:

```
let myVar1 = 10, myVar2 = 30;  
if (myVar1 == 10 && myVar2 !=30)  
    alert("line 1");  
else if (myVar1 != 10)  
    alert("line 2");  
else if(myVar1 > myVar2 )  
    alert("line 3");  
    alert("line 4");
```

What will the alert box display? **line 4**

6. Given:

```
let myVar1 = 10, myVar2 = 30;  
if (myVar1 == 10 && myVar2 > 30)  
    alert("line 1");  
if (myVar1 < 10 || myVar2 < 29 || myVar1 < myVar2 )  
    alert("line 2");  
else  
    alert("line 3");
```

What will the alert box display? **line 2**

7. Given the code below, how many alert boxes with Hello will show up? **6**

```
let count = 1;
while (count <=100){
  alert("Hello");
  if (count % 2 == 0)
    alert("Hello");
  count += 25;
}
```

8. Given the code below, how many alert boxes with Hello will show up? **60**

```
for (let i =1; i<=30; i++)
{
  for (let j=3; j>=2; j--)
    alert("Hello");
}
```

9. Given:

```
let myVar1 = "hello";
let myVar2 = myVar1;
alert(myVar1.toUpperCase()+ myVar2);
```

What will the alert box display? **HELLOhello (must be exactly like this)**

10. Given:

```
function example1(num){
  num++;
  num = 0;
  return num;
}

let myNum = 100;
myNum = example1(myNum);
alert(myNum);
```

What will the alert box display? **0**

11. Given:

```
function example2(myArray) {
  myArray = [7, 6];
}

let myVar=[5,4];
myVar = example2(myVar);
alert(myVar);
```

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

12. Given:

```
function example3(myNum) {
    for (let i = 0; i<100; i++);
        myNum += 2;
    return myNum;
}
let myVar = 5;
myVar += example3(myVar);
alert(myVar);
```

What will the alert box display? **12**

13. Given:

```
function example4(myStr)
{
    myStr = "js";

}

let str = "html";
if (str.toUpperCase() == str)
    myStr=example4(str);
else
    str = "css"
alert(str);
```

What will the alert box display? **css**

14. Given:

```
const x = 1;
if (x < 5) {
    x = 10;
}
else {
    x = 20
}
alert(x);
```

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 if const, you cannot change it to 10

15. Given:

```
function example5(myVar) {
    for (let i = 0; i < 2 ; i++)
        myVar[i]++;
    myVar = [1,2,3];
}

let arr = [5,6,7];
example5(arr);
alert(arr);
```

What will the alert box display? **6,7,7**

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

16. (18 pts) Write a function called **processArray** that will have an array parameter called **arr**. The function will traverse the array in order, replace the non-numeric elements and odd integers with X, and double the even integers. You can assume that **arr** will be an array with at least one element and that all numeric elements will be integers. The function does not return anything, nor does it write anything on the webpage. Use the **isNaN** function to help you write your code.

<script>

```
function processArray(arr) {  
    for (let i = 0; i < arr.length; i++) {  
        if (isNaN(arr[i]) || arr[i] % 2 !== 0) {  
            arr[i] = "X"; // Replace odd numbers and non-numeric values with "X"  
        } else {  
            arr[i] *= 2; // Double even numbers  
        }  
    }  
}
```

```
function main() {  
  
    let myArr = [1, 2, 3, 4, "hello", 6, -7, 7];  
    processArray(myArr);  
    alert(myArr); // ["X", 4, "X", 8, "X", 12, "X", "X"]  
  
}  
main();  
</script>
```

Directory id:

17. (19 pts) Write a function called **writeTriangle** that will have an array parameter called **symbol** and an integer parameter called **rows**. The function will print to the webpage a triangle with the number of rows equal to the **rows** parameter. A triangle just means that each row will have one more symbol than the previous row. The symbols will start out with the first element of the **symbol** array and go to the next element for the next row. If you run out of characters, restart at the start of the array. The function is not returning anything, it uses **document.write** to make the triangle on the webpage. You can assume that **symbol** will have one character per element and that **rows** will be an integer 1 or larger.

<script>

```
function drawTriangle(symbols, rows) {
    let symbolIndex = 0; // Initialize a variable to track the current symbol index

    for (let i = 1; i <= rows; i++) {
        let row = ""; // Initialize an empty string for the current row

        for (let j = 0; j < i; j++) {
            row += symbols[symbolIndex]; // Append the current symbol to the row
        }

        document.write(row+"<br>");
        symbolIndex++; // Move to the next symbol

        // Reset symbolIndex if it exceeds the length of the symbols array
        if (symbolIndex > symbols.length - 1) {
            symbolIndex = 0; // Reset to the first symbol
        }
    }
}
```

</script>

| The call | The output to the webpage |
|---|--|
| <pre>const symbolsArray = ['a', 'b', 'c', 'd']; drawTriangle(symbolsArray, 7);</pre> | <pre>a bb ccc dddd aaaaa bbbbbb cccccc</pre> |
| <pre>const symbolsArray = ['a', 'b', 'c', 'd']; drawTriangle(symbolsArray, 3);</pre> | <pre>a bb ccc</pre> |

18. (18 pts) Write a function called **compareStrings** with 2 string parameters called **str1** and **str2**. If the parameters have the same length, return the string **Same**. Otherwise, return an array that has the characters of the longer string in reverse order. Assume the **str1** and **str2** are strings with each having length of at least one. You can use the string method **charAt** to get one character at a time.

<script>

```
function compareStrings(str1, str2) {
    if (str1.length === str2.length) {
        return "Same"; // Return "Same" if lengths are equal
    }

    let longerStr; // Declare a variable for the longer string

    // Determine which string is longer
    if (str1.length > str2.length) {
        longerStr = str1; // str1 is longer
    } else {
        longerStr = str2; // str2 is longer
    }

    let reversedArray = []; // Initialize an empty array for the reversed characters

    // Fill the array with characters from the longer string in reverse order
    for (let i = longerStr.length - 1; i >= 0; i--) {
        reversedArray[longerStr.length - 1 - i] = longerStr.charAt(i);
    }

    return reversedArray; // Return the array of reversed characters
}
```

```
function main() {
    alert(compareStrings("hello", "world")); // "Same"
    alert(compareStrings("hello", "world!")); // ['!', 'd', 'l', 'r', 'o', 'w']
    alert(compareStrings("hi", "there")); // ['e', 'r', 'e', 'h', 't' ]
}
```

main();

</script>

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

LAST PAGE