1. Write a function that takes a string which has lower and upper case letters as a parameter and converts upper case letters to lowercase, and lowercase letters to uppercase. (using String library).

Ans.

```
function myFunction(name){
  console.log(name)
  pattern_l = /a-z/;
  pattern_u = /A-Z/;
  // if (name.match)

  array = name.split('');
  console.log(array);

  for (let index = 0;index < array.length;index++){
       let char = array[index];
       console.log(char);
       if (char == char.toUpperCase()){
       array[index] = char.toLowerCase();
       console.log(array[index]);
       }
       else{
       array[index] = char.toUpperCase();
       }
  }
  console.log(array);
  let new_string = array.join("");
  console.log(new_string);


  function check(char)
  {
       if(char === char.toUpperCase())
       {
       char=char.toLowerCase();
       }
       else{
       char=char.toUpperCase();
       }
       return char;
  }

  newarray = array.map(check);
  console.log(newarray);

}

myFunction("Halloo");
```

2. Implement a function sumOfSquares that takes an array of numbers as input and returns the sum of squares of all the numbers in the array using functional programming techniques

Ans. function sumOfSquares(numArray)
{
  console.log(numArray);

  function add(total,num){
        num = num * num;
        return total+num;
  }

  new_array = numArray.reduce(add,0);

  // new_array = numArray.map(a);
  console.log(new_array);
}

sumOfSquares([1,2,3,4]);

3. Write a function called countVowels that takes a string as input and returns the count of vowels (case-insensitive) present in the input string.

Ans. function countVowels(text){
  var pattern = /[aeiou]/i;
  array=text.split('');
  var count = 0;
  function countV(char)
  {
        if(char.match(pattern))
        {
        count += 1;
        }
        return char
  }
  new_array = array.map(countV);
  console.log(count);
}

countVowels("aeiouzswAbcE");

4. Write a regex pattern to extract all valid email addresses from the text.
```
"Contact us at: john@example.com, mary@gmail.com, and info@example."
```

Ans. function countValidMail(text){

```javascript
  var pattern = /([a-zA-Z0-9._-]+@[a-zA-Z0-9._-]+\.[a-zA-Z0-9_-]+)/g;
  if(text.match(pattern)){
        console.log(text);
  }
}

countValidMail("Contact us at: john@example.com, mary@gmail.com, and info@example.");
```