

1. Create a pseudocode program that asks students to enter a word. Call a function to compute the different ways in which the letters that make up the word can be arranged.

```
Function factorial(n) {
```

```
  Var result <- 1;
```

```
  For (Var i <- 2, until i <= n, i++) do.. {
```

```
    result <- result * i;
```

```
  }
```

```
  Return result;
```

```
}
```

```
Function permGen(word) {
```

```
  Var length <- Length of word;
```

```
  Var numPermutations <- factorial(length);
```

```
  For (Var i <- 0, until i < numPermutations, i++) do.. {
```

```
    Var permutation <- "";
```

```
    Var tempWord <- word;
```

```
    Var temp <- i;
```

```
    For (Var pos <- 0, until pos < length, pos++) do.. {
```

```
      Var charIndex <- temp % (length - pos);
```

```
      permutation <- permutation + tempWord[charIndex];
```

```
      Var newTempWord <- "";
```

```
      For (Var j <- 0, until j < tempWord.length, j++) do.. {
```

```
        If (j != charIndex) then.. {
```

```
          newTempWord <- newTempWord + tempWord[j];
```

```
        }
```

```
      End for}
```

```
      tempWord <- newTempWord;
```

```
      temp <- Floor(temp / (length - pos));
```

```
    End for}
```

```
    Print(permutation);
```

```
  End for}
```

```
}
```

```
Function main() {
```

```
  Var word <- Prompt("Enter a word (Every letter must be unique): ");
```

```
  If (word is not empty) then.. {
```

```
    Print("This is every single combination of letters from the word " + word + ": ");
```

```
    permGen(word);
```

```
  Print(Invalid response. (No response));
```

```
}
```

2. Convert the pseudocode in question one to JavaScript and test your program.

```
function factorial(n) {
```

```
  result = 1;
```

```
  for (let i = 2; i <= n; i++) {
```

```
    result *= i;
  }
  return result;
}
```

```
function permGen(word) {
  let length = word.length;
  let numPermutations = factorial(length);
  for (let i = 0; i < numPermutations; i++) {
    let permutation = "";
    let tempWord = word;
    let temp = i;
    for (let pos = 0; pos < length; pos++) {
      let charIndex = temp % (length - pos);
      permutation += tempWord[charIndex];
      let newTempWord = "";
      for (let j = 0; j < tempWord.length; j++) {
        if (j !== charIndex) {
          newTempWord += tempWord[j];
        }
      }
      tempWord = newTempWord;
      temp = Math.floor(temp / (length - pos));
    }
    console.log(permutation);
  }
}
```

```
function main() {
  let word = prompt("Enter a word (Every letter must be unique): ");
  if (word) {
    console.log("This is every single combination of letters from the word " + word + ": ");
    permGen(word);
  } else {
    console.log("Invalid response. (No response)");
  }
}
```

```
main();
```

Test here: <https://jsfiddle.net/daryljcb/snaw6xg2/98/>