```javascript
/*
* this is a notebook for JavaScript. Most syntax is the same as Java
*/
let x = 5;
//let is of block scope and cannot be re-declared
console.log(x);
//output to the console

var y = 2;
//var is of global scope and can be re-declared
const age = 19;
//create a constant; also of block scope
x == y
//equal to
console.log(x === 5);
//equal value, equal type
console.log(typeof(x));
//JavaScript has 8 data types:
//number, string, boolean,
//Undefined, Null, symbol,Object (object, array, date)
//JavaScript types are dynamic to change

big_num = "12345678912345678912345678897";
console.log(big_num.length);
//the length of the string
console.log(big_num.slice(1,4));    //like substring, allow negative indexing
console.log(big_num.substring(1,4));//not allow negative indexing
console.log(big_num.substr(1,3));
//like C++ version: specify the length of string
str = "You are my first crush, You!";
console.log(str.replace("you", "U"));
//replace method: replace on ly the first match
console.log(str.replace(/YOU/i, "U"));
//case-insensitive replace
console.log(str.replace(/You/g, "U"));
//replace all (globally)
console.log(str.match(/Y/gi));
//find "match" strings to form an array
console.log(str.includes("crush"));
//includes: contains method

//big integer
x = BigInt(big_num);
x++;
console.log("The value of x: " + x);
//Big integer: arithmetic operations are the same

let p = 567600;
console.log(p.toExponential(3));
//turn a number into scientific notation with specified decimals
let q = 3.145;
console.log(q.toFixed(2));
//change the number of decimals
console.log(q.toPrecision(2));
//change the number of figures
num = "2321";
console.log(parseInt(num)+ 2);
//parseInt method

console.log(Number.EPSILON);
//epsilon
console.log(Number.MAX_VALUE);
console.log(Number.MIN_VALUE);
//extreme floating numbers
console.log(Number.MAX_SAFE_INTEGER);
console.log(Number.MIN_SAFE_INTEGER);
```

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//extreme integers

//arrays
const arr = [1,3,4,7];
console.log(arr.length);
//array length
arr.sort();
//sort the array
arr.reverse();
//reverse the array
console.log(arr);
//notice: array in JS is dynamic
arr.push(6); //add element at the back
arr.pop();    //remove the last element
arr.unshift(8); //add element at the front
arr.shift();  //remove the first element
console.log(arr.toString());
//convert array to string (separated by commas)

const arr2 = [90,20,30];
const merged = arr.concat(arr2);
//concatenate two arrays
console.log(merged);
merged.splice(2,0,9,6);//add two elements
//first parameter: #elements to add
//second parameter: #elements to remove
//following parameters: specific elements to add
//merged.splice(0,2);
//remove two elements
console.log(merged);
console.log(merged.slice(2,5));
//like substring on arrays
//this method create new array, not modify the original array

const numbers = [45, 4, 9, 16, 25];

let txt = "";
for (let e in numbers) {
  txt += numbers[e]+" ";
}
console.log(txt);
//enhanced for loop -- array -- use "in" keyword

let language = "JavaScript";
let text = "";
for (let x of language) {
  text += x;
}
//enhanced for loop -- array -- use “of” keyword


const cars = [
  {type:"Volvo", year:2016},
  {type:"Saab", year:2001},
  {type:"BMW", year:2010}
];
cars.sort(function(a, b) {
            return a.year - b.year
          }
         );
//customized sort (like a comparator in Java)
console.log(cars);

//user-defined function
function add(n1, n2){
  return n1+n2;
```

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}

console.log(add(1,2));
//call the function

//object
const person = {
  firstName: "Yusen",
  lastName: "Peng",
  age: 19,
  //attributes

  infoPrinting: function(){
      return this.firstName + "_" + this.lastName + "_(" + age + ")";
  }
  //formatting is a little bit different: just like declare
};
console.log(person.infoPrinting());
//call object's function
```