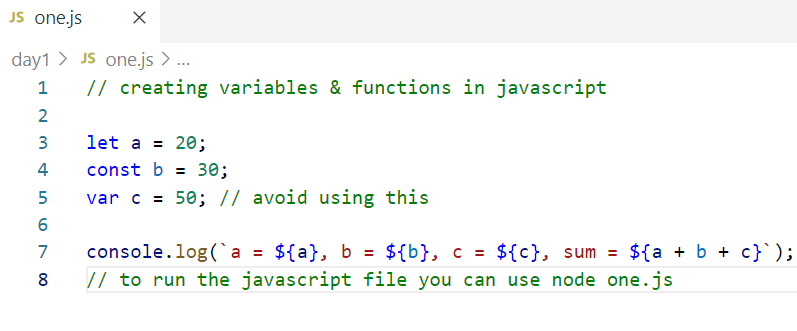
Node.js Training

Node.js: It is a runtime environment used to run Javascript programs at the backend so that you can access various backend resources likes OS, Files, Databases

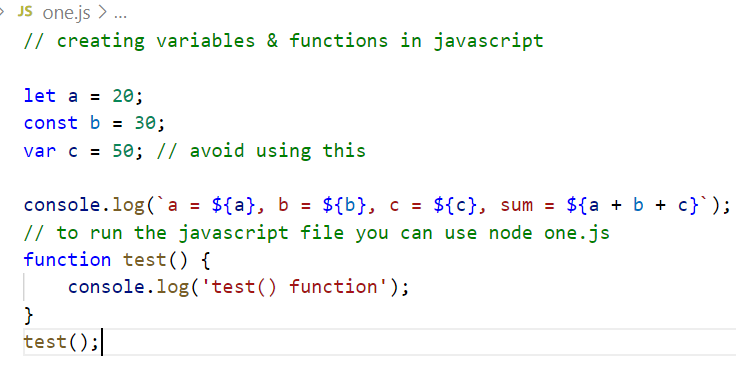
REPL Terminal: It is a node.js terminal which helps you to quickly test your javascript code for simple calculations

REPL stands for Read Evaluate Print and Loop

Understanding variables



Understanding functions



Hoisting:

Javascript loads all the function definitions and var variables at the top of the script hence you can access them before declaring them, however the initializations wouldn’t hoisted

i.e.,

console.log(x)

var x = 30;

The above line only declares x, but doesn’t initialize ‘x’;

which is why you get undefined,

Note: let & const wouldn’t be hoisted you will get error if you access a variable before declaration.

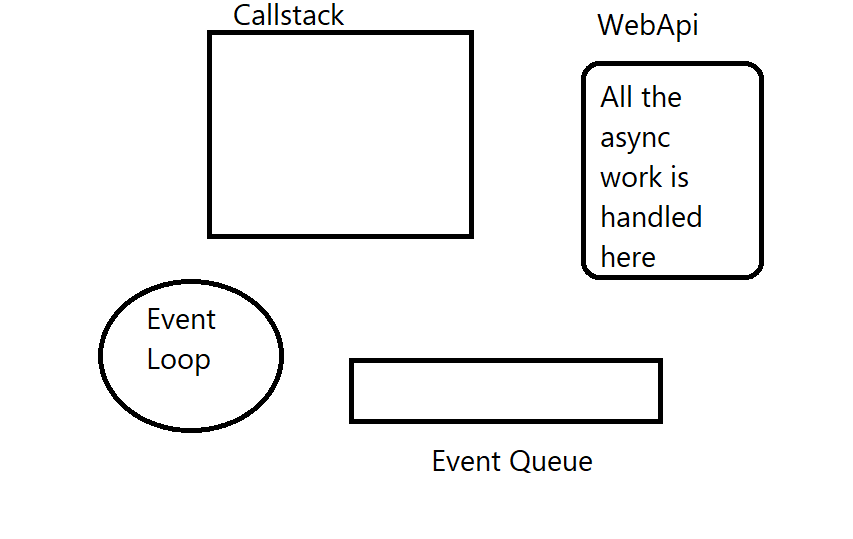
You can create javascript functions as a value but you can’t access it before if its assigned as a value.

Callback functions:

These functions are initialized first but called later based on some events like response from the server or events from some element or some actions or if timer is over, it is used mainly to perform asynchronous tasks.

Event loop mechanism

Node.js is a single threaded model, it runs scripts with only one thread using the callstack.



Once the asynchronous work is over the task will be added to the event queue and the task present in the event queue is loaded by event loop to the callstack for execution only if the call stack is empty, till that time the task will be there in the event queue.

Arrow functions: These are alternate way of writing callbacks

Note: Callbacks can also be synchronous, ex: the callbacks of forEach, map, filter and so on.

Writing arrow functions instead of callback

|  |  |
| --- | --- |
| Callback | Arrow function |
| function() {   return 20; } | () => 20; |
| function(x, y) {  return (x + y);  } | (x, y) => x + y |
| function(x, y) {  console.log(x + y);  return (x+ y);  } | (x, y) => {   console.log(x + y);  return (x + y); } |
| function() {  console.log(“hello”); } | () => console.log(“hello”) |
| function(x) {  return x + 20; } | x => x + 20 |

Rest & Spread operator

Rest operator accepts 0 or more arguments

function foo(x, y, …z) { }

Here …z is a rest parameter which can accept 0 or more arguments

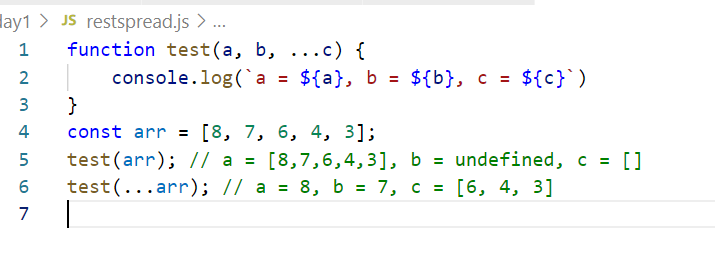
Note: You can have maximum one rest parameter & it must be the last parameter

Spread operator spreads value to multiple parameters, like each value present in the array can be assigned to separate parameters

function foo(x, y, z) { }

arr = [5, 1, 2];

foo(…arr); 5 is passed to x, 1 to y & 2 to z.



Using Rest parameter create a function that can accept a key & an array, the function must iterate the array & find the key is present or not

ex:

key = 2;

arr = [7, 8, 2, 3, 5]

search(key, …arr) // should print 2 is present

key = 9;

arr = [7,8,2,3,5]

search(key, …arr) // should print 9 is not present

== & === operator

== checks only value but not the type

=== checks both value & type

Javascript objects

let emp = { name : “Raj”, salary: 30000 }

Nested objects

let emp = { name : “Raj”, salary: 30000, address : {state : “KA”, city : “BLR”} }

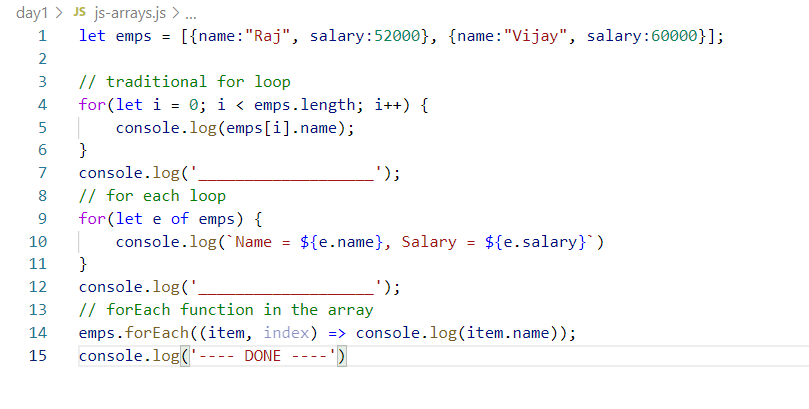
emp.address.state to access state

Javascript object array

let emps = [ {name: “Raj”, salary: 35000}, {name: ”Vijay”, salary: 40000 } ]

emps[0].name to access name of the 1st element

emps[1].name to access name of the 2nd element



Array methods: filter, map, sort, reduce, forEach, splice

forEach: It is used to iterate the elements

map: It is used to iterate the elements & generate a new array from the iterated elements, it is mainly to convert from one type to another type

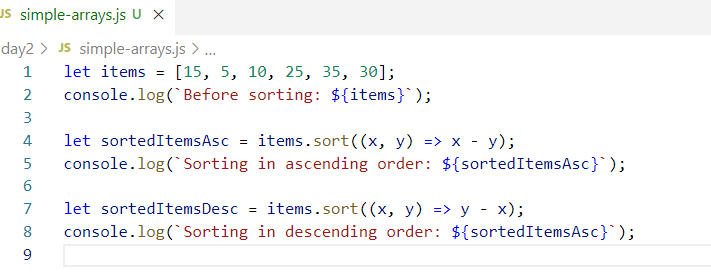
filter: It is used to iterate the elements and generate a new array that matches to specific condition

sort: it used to iterate the elements & sort based on certain conditions like sort based on price, sort based on ram size

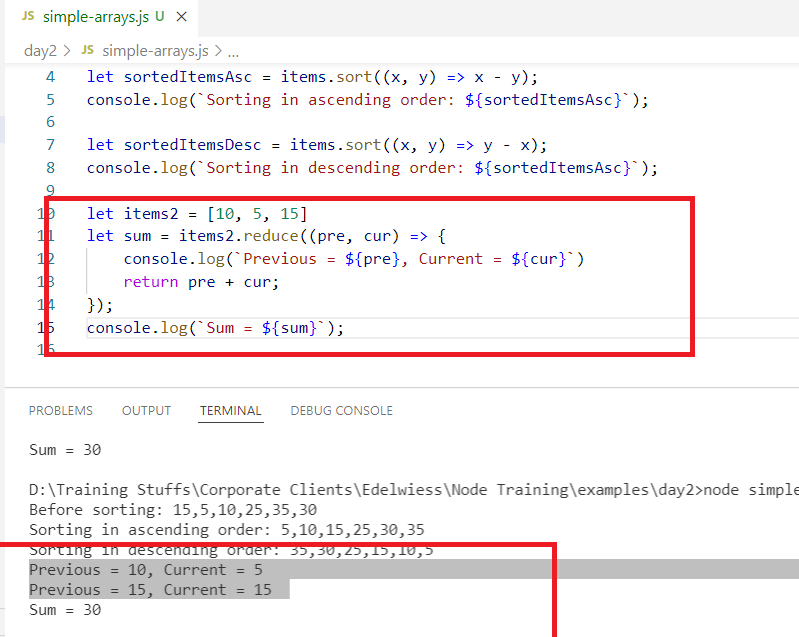
reduce: It used to iterate the elements and reduce it to a single result

splice: it used to remove the elements from the array.

Sort: It takes a callback with 2 parameters which will be compared to sort the data and store them based on the value you get while comparing



reduce: It iterates over the elements in the array & reduces into a single value



Activity:

products = [   
 {name : “chocolate”, qty : 3, price : 50 }, {name: “ice cream”, qty: 5, price: 100},  
 {name : “cake”, qty : 2, price : 70 }, {name: “milk”, qty: 5, price: 20}  
];

1. Sort the above products based on the quantity
2. Display the total price of all the products as a single result i.e., qty \* price

Benefits of Node.js

* You can write server side programs using Javascript
* Developers who already have knowledge in Javascript for front end can easily switch to the back end development without learning a new language
* JSON is usually used to exchange the data between front-end and back-end & JSON is the native language in Javascript & you don’t need any complex parsers
* Node.js also follows ECMA Standard so it can understand all the new features of Javascript
* Node.js provides NPM (Node Package Manager) using which you can download any Javascript libraries from the internet

Node.js uses a file called package.json which is a very important file in any node project, it contains the complete project informations like name, version, dependencies, commands, you can use npm init -y to create package.json

Modules

These are reusable unit of code which could be a variable, function, class you can import in other javascript files and use them

There are 3 types of modules

1. Core: Available in the node itself like os, fs, http
2. Local: Created within the project
3. 3rd Party: Need to download from the internet like express, body-parser, readline-sync

Exporting & Importing

db.js  
module.exports.dbOperations = {   
 store: function() { … } ,

fetch: function() { …. }  
}

a.js

let dbop = require(“db.js”);

dbop.store();

dbop.fetch();

The above exports & imports are used before ES6, but in ES6 you have export & import keyword which are much simpler to use

db.js

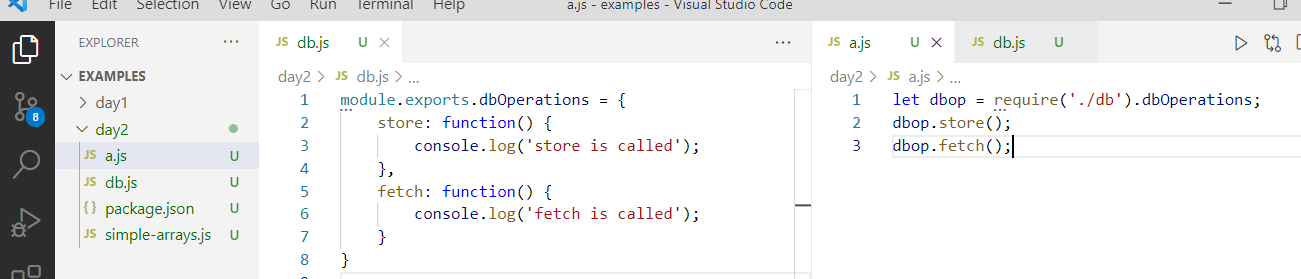
export function store() { … }  
export function fetch() { … }

a.js

import { store, fetch } from ‘./db.js’;

Note: If you want to use es6 import & export then you must specify type : module in the package.json, because by default node.js uses common module and you must use module.exports & require.

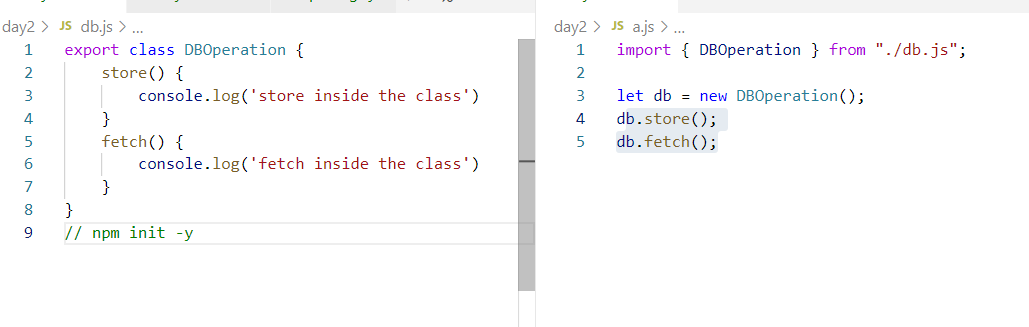
Using old way of import & export



New method of importing and exporting

package.json

{   
 type : “module”  
}



Two types of exports

1. Named exports: You need to import it by name
2. Default export: You can use any name while importing

Note: You can use default exports when the javascript file has only one module

simple.js

class Abc {   
  
}

export default Abc;

demo.js

import Abc from ‘./simple.js’

or

import anyName from ‘./simple.js’; // imports Abc class only

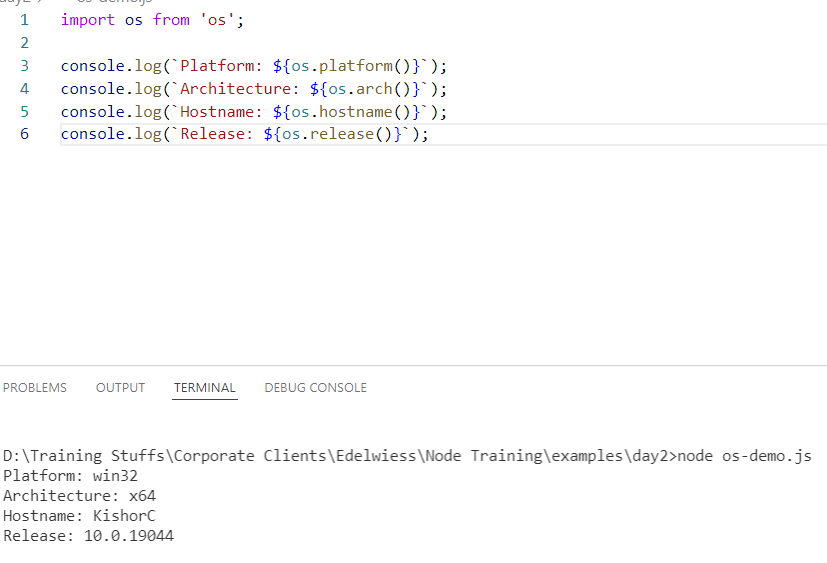
Core Module

These are inbuilt modules available in Node.js, most of them are having default exports it means you can import them using any name.

Ex: os, fs, http, url,

OS module

It helps you to get OS related information like architecture, platform, hostname and so on.



Third party module

These are the modules which are available in the internet that can be downloaded in your machine and use in the code.

npm install library-name

ex: readline-sync, express, cors, mongodb, body-parser, bootstrap

readline-sync: It is used to take input from the keyboard in the console, it gives functions that will have inbuilt feature to validate as well like questionPassword(“”) this function asks user to enter minimum 12 characters that must have digits, special characters & so on.

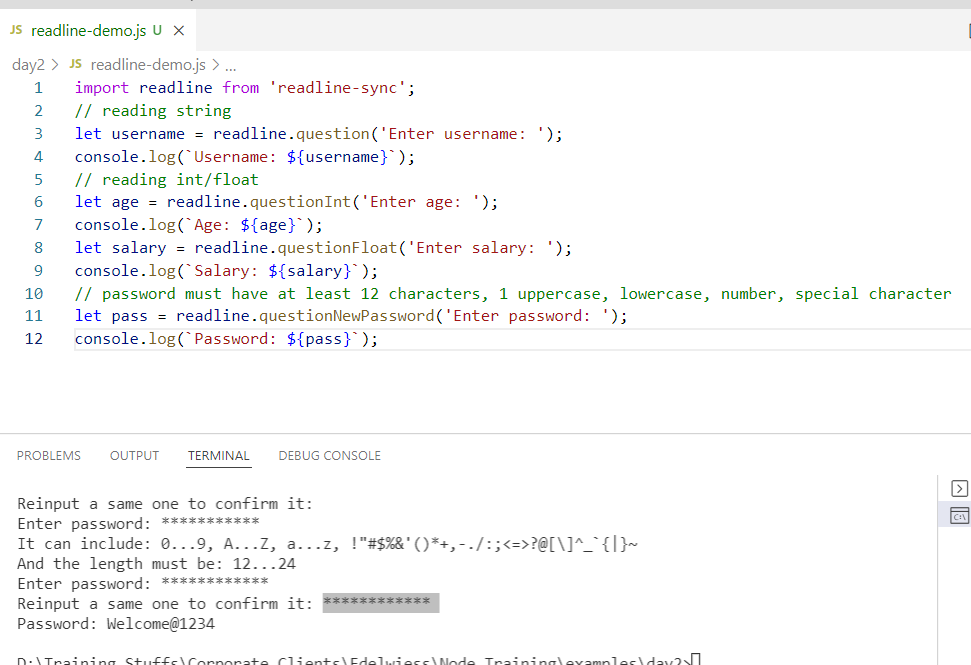
questionEmail(“”) this function asks user to enter valid email id

questionInt : to read number

questionFloat: to read floating point numbers

question: to read strings

To install: npm install readline-sync



FS Module

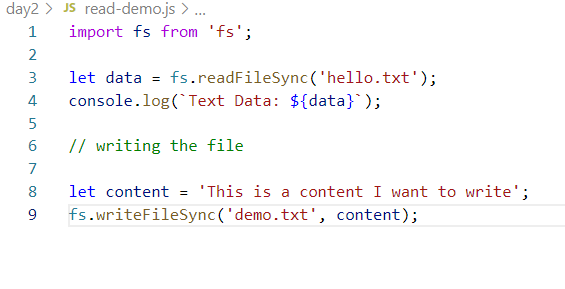
It is used to read & write files

Note: You can read the text file but you get binary data which you need to convert into string format

import fs from ‘fs’;

fs.readFileSync(filename);

fs.writeFileSync(filename, content);



Activity:

Take text from the keyboard and write the content to the file, but ensure that old content is not erased

Reading & Writing JSON data

JSON is commonly used format to exchange the data, when you want to write to JSON firstly you must a Javascript object which needs to be converted to JSON and write that JSON to the file, similarly when you read the JSON file you will get a JSON text which must be converted to Javascript object if you want to access any property of the JSON.

JSON.stringify(jsobject) converts Javascript to JSON

JSON.parse(json) converts JSON to Javascript



Take input from the keyboard repeatedly until you enter -1 to quit, ask user to enter id, name & salary and store those data in an object, then add that object to the array until you enter -1, once you enter -1 quit the loop and store that array in the JSON file so that you must see all the objects in a JSON file.