DA51 Lab Session 3 : Smart Contract

Question 4:

The purpose of NPM is to manage all dependencies of a node project.

Question 7:

One the command is executed I get a package.json that hold all information I entered during the command process

```json
{
  "name": "lab3",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC",
  "description": ""
}
```

```
PS C:\dev\DA53\TP3\Lab3> npm init
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See `npm help init` for definitive documentation on these fields
and exactly what they do.

Use `npm install <pkg>` afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
package name: (lab3)
version: (1.0.0)
description:
entry point: (index.js)
test command:
git repository:
keywords:
author:
license: (ISC)
About to write to C:\dev\DA53\TP3\Lab3\package.json:

{
  "name": "lab3",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC",
  "description": ""
}


Is this OK? (yes) yes
```

Question 8:

It contains all information of my project

```json
{
  "name": "lab3",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC",
  "description": ""
}
```

Question 14:

Npm is used to install dependencies. Option -g means that this package is installed for all project.

After this question, all answer will be from WSL.

Question 19:

The command make two different files, one for with the .abi extension and another for the .bin extension.

contracts_Bonjour_sol_MyLab3SContract.abi

contracts_Bonjour_sol_MyLab3SContract.bin

Question 20:

```
jules@TABLET-TQGU8LI5:/mnt/c/dev/DA51_TP/Lab session 3$ ls
combined.json   contracts_Bonjour_sol_MyLab3SContract.abi   package.json
contracts       contracts_Bonjour_sol_MyLab3SContract.bin
```

Question 22:

jules@TABLET-TQGU8LI5:/mnt/c/dev/DA51_TP/Lab session 3$ cat combined.json
{"contracts":{"contracts/Bonjour.sol:MyLab3SContract":{"abi":[{"inputs":[{"internalType":"string","name":"initialMessage","type":"string"}],"stateMutability":"nonpayable","type":"constructor"},{"inputs":[],"name":"getMyLab3SContract","outputs":[{"internalType":"string","name":"","type":"string"}],"stateMutability":"view","type":"function"},{"inputs":[{"internalType":"string","name":"newMessage","type":"string"}],"name":"setMyLab3SContract","outputs":[],"stateMutability":"nonpayable","type":"function"}],"bin":"60806040523348
01561000f575f5ffd5b50604051610af8380380610af8833981810160405281019061003191906100319190610193565b805f908161003f91906103ea565b50506104b9565b5b604051905090565b5f5ffd5b5f5ffd5b5f5ffd5b5f5ff
d5b5f601f19601f8301169050919050565b7f4e487b7100000000000000000000000000000000000000000000000000000005f5260416004526024ffd5b6100a58261005ff565b810181811067ffffffffffffffff82111
7156100c4576100c361006f565b5b8060405250505565b5f6100dd66100d46565b905061001 e2828261009c565b919050565b67fffffffffffffffff82111561010157610100061006f565b5b61010a8261005f5e5b9050602
081019050919050565b8281835e5f8383015250505050565b5f61013761010132846100e7565b6100cd565b9050828152620081018484840111561015357610152610005b5b5b61015e84828561011756565b509392505050565
b5f82601f83011261017a5761017961005565b5b815161018a84826020860161012555659150509029150505065b5f6020828403121561010a8576101a761004f565b5e82015167ffffffffffffffff8111156101c557610
1c4610053565b5b61016002085101610103b5781905055b61039f61039785610253565b83018261033f565b509509291550505505b5f601332c5b6100b60018101905063103b0565b5050505f601c25f19846008020616013a7565b19808316910505092915050505
65b5f81905091905055b5f6102eb6102e66102e18461e60102bf565b6102c85656102bf565b90509190505055b5f81905091905055b61030483610102d1565b653010310186103108226102f2565b84845461e66e565b8255050505
565b5f5f9050905056b61032f610320565b61033a81848446102f5565b90191055565b5f6103978165601325f82610105b650500505b5f82601901905091e50505505b5b601f601e0405065e565b6103710575
c846102535565b81016020085101561038b5781905056b61039f61039785610253565b83018261033f565b509509291550505505b5f601332c5b6100b60018101905063103b0565b5050505f601c25f19846008020616013a7565b19808316910505092915050505
65b5f819058103b1b356b591508268020022821790509291505055b56f602082019058181035f83015261019b81846101a4b565b905092915050565b5f5ff5b5f5ff5b5f5ff5b5b7f4e487b71000000000000000
000000000000000000000000000000000005f526041600452624fd5b65101f28261013b5565b810181811067ffffffffffffffff82111715610121157610210611c565b5b5b8060440525050505505b5f610223610
1a3565b905061022f82826101e5565b5f67fffffffffffffffff82111561024e5761024e61006f565b5b5f6102578261013b5565b90506102081019050911906020018083161035b565b60405021790509291908118152600200182808546100ac96610354565b5b80156102f75760601f10610100080835
40402835291602001916100f75665b82019190052f5260205f2090058154815629060001019060201901883116101900a57829003601f16820191505b5050505050509050565b805f908160405908161010f919061052d565b5f506502816010325
09190505065b5f828252602082019050929150505655b8281835e5f8383015250505050565b5f5601f19601f8301169050919050565b5f610155826101135565b61015f818561011b565b9150601015d565b935061016f818561855020860161012d565b
10178816013b5565b840191505092915050565b5f60208201905081810035f83015261019b81846101a4b565b905092915050565b5f5ff5b5f5ff5b5f5ff5b5b7f4e487b71000000000
0000000000000000000000000000000005f526022600452602445fd5b5f60028204905060018216801057d61041280565b607fccd8b5e6101018116102233610
1a3565b905061022f82826101e5565b5f67ffffffffffffffff82111561024e5761024e61006f565b5b5f6102578261013b5565b90506102081019050911906020018083161035b565b60405021790509291908118152600200182808546100ac96610354565b5b80156102f75760601f10610100080835
404402835291602001916100f75665b82019190052f5260205f2090058154815629060001019060201901883116101900a57829003601f16820191505b5050505050509050565b805f908160405908161010f919061052d565b5f506502816010325
09190505065b5f828252602082019050929150505655b8281835e5f8383015250505050565b5f5601f19601f8301169050919050565b5f610155826101135565b61015f818561011b565b9150601015d565b935061016f818561855020860161012d565b
101788161013b5565b840191505092915050565b5f60208201905081810035f83015261019b81846101a4b565b905092915050565b5f5ff5b5f5ff5b5f5ff5b5b7f4e487b71000000000000000000000
000000000000000000005f5260416004526024fd5b5f60201013b5565b810181811067ffffffffffffffff82111715610211157610210211c565b5b5b8060044052505505505b5f61022361
1a3565b905061022f82826101e5565b5f67ffffffffffffffff82111561024e5761024e61006f565b5b5f67ffffffffffffffff82111561024e5761024e61006f565b5b5f610284610275578f41156104440601fa07a5565b519050828152620018883375f8383015250505005565b5f610284810
27f84610234565b61021a565b9058082815262081018484840011561510a05761029f6101d8565b612ab84828561026456b5609392505050505b5f82601f83011261027c5766610c66101b4565b5b8135610102f84782866020850101612f565b
08601610272565b91505092915050505b5f6020828403121561028f5766102f5f76102f4610ac565b5f8201356755ffffffffffffff81111561016313116101b0565b5b5b601052f4610135f1e84828561016102b3565b
f4e487b71000000000000000000000000000000000005f5260226004526024ffd5b5f600820490506018216810360601826168061036b5607f821691505b60208210810361037e5761037d610327565b5b5009
19050565b5f8282526202019050929150505655b82818356f8333015250505055b5f5601f19601f830115d01569509519055b5f6101558261e60102bf565b61016800e10402565b5b6104290e60429610442b46104020565b5b605b61040b565b6104004052565b5b5b5b5f5ff565b5
ffff826103a5565b6103ea86836103a5565b5b61550801984169350880861684179250505095039255050560565b5f819050919050565b5f610402e610429610424b46104020565b5b605b61040b565b61040405255655b9055
09190505065b5f819050919050565b5f6104047836010414565b6010453826104055382e610435565b8484540601f846103965665b810162085110156104e5787190505b06104 bf8461036963565b810162085101016102851015610e5278190505b06104e26104ca85610396565b5b8101626240851b01156104e5b5b5b810162085110156e5278190505b65101f8916826105
2565b50505b5050505505b5f82821c9050929150505655b5f5f610505f1984600802614c0ea565b5601980831691505092915050565b5f5f6104725104635651b5b5f905005b5f8201356104040265b901506102821790509291505055b5f60326e2010013565b65b67d
fffffffffffffff8111156105405f576105405e61010a c565b5b655f605165f9258245410354565b561057d46104288561401054fab5f2605544828b28561040100a4565b5056f60209150506601f831160011146105599557558f5050909505b61058b5608d585261e5012565b5b86555
06105f4565b601601984166105a386610105055f19849015821255502122067b6583ea9dcea8199edcef75030b2421a7f5924c5f904ba42u4f3e72f7e068aa64736f6c634300081c0033","metadata":"{\"compiler\":{
\"version\":\"0.8.28+commit.7893614a\"},\"language\":\"Solidity\",\"output\":{\"abi\":[{\"inputs\":[{\"internalType\":\"string\",\"name\":\"initialMessage\",\"type\":\"string\"
}],\"stateMutability\":\"nonpayable\",\"type\":\"constructor\"},{\"inputs\":[],\"name\":\"getMyLab3SContract\",\"outputs\":[{\"internalType\":\"string\",\"name\":\"\",\"type\":
\"string\"}],\"stateMutability\":\"view\",\"type\":\"function\"},{\"inputs\":[{\"internalType\":\"string\",\"name\":\"newMessage\",\"type\":\"string\"}],\"name\":\"setMyLab3SCo
ntract\",\"outputs\":[],\"stateMutability\":\"nonpayable\",\"type\":\"function\"}],\"devdoc\":{\"kind\":\"dev\",\"methods\":{},\"version\":1},\"userdoc\":{\"kind\":\"user\",\"m
ethods\":{},\"version\":1}},\"settings\":{\"compilationTarget\":{\"contracts/Bonjour.sol\":\"MyLab3SContract\"},\"evmVersion\":\"cancun\",\"libraries\":{},\"metadata\":{\"bytec
odeHash\":\"ipfs\"},\"optimizer\":{\"enabled\":false,\"runs\":200},\"remappings\":[]},\"sources\":{\"contracts/Bonjour.sol\":{\"keccak256\":\"0x5a0531a02245de2d306622a7fabdd268
921acf732b38165da0cc5f333fd271f7\",\"urls\":[\"bzz-raw://df257db8a8d1dc0800376a3396d431e5d24167ebaf24e2c2e50c162a80a26cae\",\"dweb:/ipfs/QmeZaGs2vJqVLUnS1KRToUFyyStYVWSUbUF11YC
FMfXuBu\"]}},\"version\":1}},"version":"0.8.28+commit.7893614a.Linux.g++"}jules@TABLET-TQGU8LI5:/mnt/c/dev/DA51_TP/Lab session 3$

Question 23:

It includes the three different output formats, which we had specified. It includes the following fields: abi, bin, and metadata

Question 24:

There is the abi output which is a descriptor of the functions and the data within a contract which will allow us to interact with it.

Question 25:

Then there is the binary byte code for the contract.

Question 26:

And finally, there is a metadata field which includes various details about the contract itself.

Question 29, 30, 31 et 32:

```
{ ⊟
    "contracts":{ ⊟
        "contracts/Bonjour.sol:MyLab3SContract":{ ⊟
            "abi":[ ⊞ ],
            "bin":"6080604052348015619000f575f5ffd5b50604051610af8380380610af88339818101604052810190610031919C
            "metadata":"{\"compiler\":{\"version\":\"0.8.28+commit.7893614a\"},\"language\":\"Solidity\",\"ou
        }
    },
    "version":"0.8.28+commit.7893614a.Linux.g++"
}
```

Queston 34:

```json
{
  "name": "lab-session-3",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC",
  "description": "",
  "dependencies": {
    "ganache-cli": "^6.12.2",
    "mocha": "^10.8.2",
    "solc": "^0.8.28",
    "web3": "^4.14.0"
  }
}
```

Question 35:

In the package-lock.json, there are all the dependencies required for the dependencies added with the command.

Question 40:

```
{ ⊟
    "contracts": { ⊟
        "MyLab3SContract": { ⊟
            "MyLab3SContract": { ⊟
                "abi": [ ⊞ ],
                "evm": { ⊟
                    "bytecode": { ⊟
                        "functionDebugData": { ⊞ },
                        "generatedSources": [ ⊞ ],
                        "linkReferences": { ⊞ },
                        "object": "6080604052348015610000f575f5ffd5b50604051610af8380380610af883398181016040528101906100319190610193565b805f908161003f91906103ea565b50506104b9565b5f604051905090565
                        "opcodes": "PUSH1 0x80 PUSH1 0x40 MSTORE CALLVALUE DUP1 ISZERO PUSH2 0xF JUMPI PUSH0 PUSH0 REVERT JUMPDEST POP PUSH1 0x40 MLOAD PUSH2 0xAF8 CODESIZE SUB DUP1 PUSH2 0xAF8
                        "sourceMap": "35:361:0:-:0;;;92:86;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;i;::-;156:14;146:7;:24;;;;;;;;;i;::-;;92:86;35:361;;7:75:1;40:6;73:2;67:9;57:19;;7:75;;:o;88:117:-
                    }
                }
            }
        }
    },
    "errors": [ ⊟
        { ⊞ }
    ],
    "sources": { ⊟
        "MyLab3SContract": { ⊟
            "id": 0
        }
    }
}
```

Question 44:

There is no output in the terminal because we comment the line that print in the terminal.

Question 50:

```
PS C:\dev\DA51_TP\Lab session 3> npm test

> lab-session-3@1.0.0 test
> mocha


  MyLab3SContract
[
  '0x358bC94DeF0f9C34355ce926930F8028fbB2CC47',
  '0x4FAD93Ded19D225920610A1407083F7844930B01',
  '0x6Cea4457c61E943907908feDb57852D54b4CC5bd',
  '0x6BBF361CdeB695913Cf8133553FB204996e321B7',
  '0x7f4a0054221b7334B2C07AbDCfd37ABBe594564C',
  '0xf88Ee7967F40347Bf1Dd11e88a081ef51c204812',
  '0xeA522a0FC2e5CcA9e7914cb683113bd89b97C41e',
  '0x2cF965731a09F7D4dc4A61B2947A97cbeFcd23e6',
  '0x530E971718Df725D753d8fa7680264fD3737Bd2f',
  '0xbd11F71Ad494Ba9B9d3346f368430DD1Ca81B6D6'
]
    ✔Deploy a contract


  1 passing (232ms)
```