# Basic Programming Concepts

**1- Run Jupyter lab in the environment we created - verify that the folder in use is the correct one**

conda —version

cd

conda activate DrillingAnalytics

jupyter-lab



**2-Launch a Notebook Python 3**

**3- Code to print: “Hello”**

print(“Hello”)

**4- Compute 2+2**

2+2

**5- Declare two variables called a and b, and assign the values 2 and 3 respectively, then add those values**

a=2

b=3

a+b

**6- Swap the values between variables - classic method**

a=10

b=30

temp=a

a=b

b=temp

print(a,b)

**7- I Swap the values between variables - python method**

a=10

b=30

a,b = b,a

print(a,b)

**8- Assigning values by reference**

a=10

b=30

c=a

print(a,b,c)

a=20

print(a,b,c)

**9- Declare an array with values 1,2,3,4,5 and print the third element**

c=[1,2,3,4,5]

print(c[2])

**10- Declare a list with values 1,2,3,4,”apple”,”lemon” and print the fifth element**

d=[1,2,3,4,"apple","lemon"]

print(d[4])

**11. Add the element “orange” at the end of the list and print the entire list**

d.append("orange")

print(d)

**12. Add the value of a variable and print the list**

d.append(a)

print(d)

**13. Add the variable, not the value, to the list and print the entire list**

a=30

print(d)

a=10

a=[a]

d.append(a)

print(d)

**14. Change the value of the variable and print the list**

a[0]=30

print(d)

**15. Reexamine the assignment of values in variables, assignment by reference. This is a pythonic concept not available natively in other languages.**

a=[10]

b=[30]

c=a

print(a,b,c)

a[0]=20

print(a,b,c)

**16\*. Hard exercise: create a matrix with the values for: Depth, Gamma Ray, Resistivity, Density, Porosity.**

This exorcice introduces a lot of new concepts such as libraries, loops and dictionaries.

import random

random.seed(42)

sample\_data = [

{

'depth': 500 + i,

'Gamma': random.uniform(10, 100),

'Resistivity': random.uniform(1, 2000),

'Density': random.uniform(1, 2),

‘Porosity’: random.uniform(0,0.6)

}

for i in range(10)

]

print("Sample Data:")

for row in sample\_data:

print(row)

**17. Code to print the values in the list**

parameters = ['Gamma', ‘Resistivity', ‘Density’,’Porosity']

for parameter in parameters:

print(parameter)

**18. Code to unpack the variables**

seq = [(1, 2, 3), (4, 5, 6), (7, 8, 9)]

print(seq)

for a,b,c in seq:

print(a,b,c)

**19. Code to iterate and print the elements of a list including the index**

parameters = ['Gamma', ‘Resistivity', ‘Density’,’Porosity']

for index, parameter in enumerate(parameters):

print(f"Parameter at index {index}: {parameter}")

How can we do this without using enumerate?

parameters = ['Gamma', ‘Resistivity', ‘Density’,’Porosity']

i=0

for parameter in parameters:

print(f"Parameter at index {i}: {parameter}")

I+=1

Note: this code is not efficient, but helps understand the concept of For Loops

**20. Code to print depth from 1000 to 1010 in increments of 1 meter**

for number in range(1000, 1011, 1):

print(number)

**21. Code to print depth from 1000 to 1010 in increments of half a meter**

for number in range(2000, 2011):

print(number / 2)

**22. Code to detect high values of ROP in a list. When high ROP is detected, an alert is printed indicating the value of ROP and the index. Generate random values of ROP.**

import random

rop\_values = [random.randint(1, 100) for \_ in range(50)]

print(rop\_values)

print(len(rop\_values))

for index, rop\_value in enumerate(rop\_values):

if rop\_value > 50:

print(f"High ROP: {rop\_value}, at index {index}")

**23. Order elements in a sequence**

a=[1,2,3,4,5]

print(a)

a.sort(reverse=True)

print(a)

a.sort(reverse=False)

print(a)

**24. Cut the elements in a sequence**

a=[1,2,3,4,5,6,7,8,9]

print(a)

b=a[5:8]

print(b)

b=a[5:]

print(b)

b=a[:5]

print(b)

b=a[:-2]

print(b)

b=a[-2:]

print(b)

**25. Declare a dictionary with drilling parameters**

parameters={}

parameters={"depth":[1000,1001,1002,10003],"rop":[10,11,12,10]}

print(parameters)

print(parameters["depth"])

print(parameters[“rop"])

**26. Complete step 16 explaining all the steps**

import random

random.seed(42)

sample\_data = [

{

'depth': 500 + i,

'Gamma': random.uniform(10, 100),

'Resistivity': random.uniform(1, 2000),

'Density': random.uniform(1, 2),

‘Porosity’: random.uniform(0,0.6)

}

for i in range(10)

]

print("Sample Data:")

for row in sample\_data:

print(row)