

**INSTITUTO SUPERIOR DE ECONOMIA E GESTÃO**

Name: \_\_\_\_\_ Number: \_\_\_\_\_

**Part I (40 points)**  
**Select the correct option for each question.**

1. What is the output of the following lines of code:

```
x=1
if(x==1):
    print('Hello')
else:
    print('Hi')
    print('Mike')
```

<input type="checkbox"/>	Hello Mike
<input type="checkbox"/>	Mike
<input type="checkbox"/>	Hello
<input type="checkbox"/>	Hi Mike

2. What is the output of the following few lines of code?

```
A=['1', '2']
for a in A:
    print(2*A)
```

<input type="checkbox"/>	'2' '4'
<input type="checkbox"/>	['1', '2', '1', '2'] ['1', '2', '1', '2']
<input type="checkbox"/>	'11' '22'
<input type="checkbox"/>	['1', '2'] ['1', '2']

3. Consider the function Teste, when will the function return a value of 1?

```
def Teste(x=0):
    if x==0:
        y=1
    else:
        y=0
    return(y)
```

<input type="checkbox"/>	When the input is 0 or nothing
<input type="checkbox"/>	Never
<input type="checkbox"/>	When the input in 1
<input type="checkbox"/>	When the input is anything but 0

4. What will be the output of the following Python code?

```
t=32.00
[round((x-32)*5/9) for x in t]
```

<input type="checkbox"/>	[0]
<input type="checkbox"/>	0
<input type="checkbox"/>	[0.00]
<input type="checkbox"/>	Error

**INSTITUTO SUPERIOR DE ECONOMIA E GESTÃO**

5. What is the output of the following program :  
Print(0.1 + 0.2 == 0.3)

<input type="checkbox"/>	True
<input type="checkbox"/>	False
<input type="checkbox"/>	Machine dependent
<input type="checkbox"/>	Error

6. What will be the output of the following Python list comprehension?  
[j for i in range(2,8) for j in range(i\*2, 50, i)]

- a) A list of prime numbers up to 50
- b) A list of numbers divisible by 2, up to 50
- c) A list of non prime numbers, up to 50
- d) Error

<input type="checkbox"/>	A list of prime numbers up to 50
<input type="checkbox"/>	A list of numbers divisible by 2, up to 50
<input type="checkbox"/>	A list of non prime numbers, up to 50
<input type="checkbox"/>	Error

7. what is the result of the following lines of code:

```
a=np.array([0,1])
b=np.array([1,0])
np.dot(a,b)
```

<input type="checkbox"/>	array([1,1])
<input type="checkbox"/>	0
<input type="checkbox"/>	1
<input type="checkbox"/>	array([0,0])

8. what is the result of the following lines of code:

```
a=np.array([1,1,1,1,1])
a**10
```

<input type="checkbox"/>	array([10,10,10,10,10])
<input type="checkbox"/>	array([11, 11, 11, 11, 11])
<input type="checkbox"/>	array([0,0, 0, 0, 0])
<input type="checkbox"/>	array([1,1,1,1,1])

9. What is the output of the following code snippet?

```
func = lambda x: return x
print(func(2))
```

<input type="checkbox"/>	2
<input type="checkbox"/>	SyntaxError
<input type="checkbox"/>	2.0
<input type="checkbox"/>	0

**INSTITUTO SUPERIOR DE ECONOMIA E GESTÃO**

10. What is the output of the following code snippet?

`(lambda x: (x + 3) * 5 / 2)(3)`

<input type="checkbox"/>	30.0
<input type="checkbox"/>	0
<input type="checkbox"/>	syntaxError
<input type="checkbox"/>	15.0

11. How many duplicate elements can you have in a set?

<input type="checkbox"/>	1
<input type="checkbox"/>	100
<input type="checkbox"/>	0, you can only have one unique element in a set
<input type="checkbox"/>	depends on the number of elements in your set.

12. What is the output of the following program :

`print("Hello World"[::-1])`

<input type="checkbox"/>	dlroW olleH
<input type="checkbox"/>	Hello Worl
<input type="checkbox"/>	error
<input type="checkbox"/>	d

13. Which of the following is not a complex number?

<input type="checkbox"/>	<code>k = 2 + 3j</code>
<input type="checkbox"/>	<code>k = complex(2, 3)</code>
<input type="checkbox"/>	<code>k = 2 + 3i</code>
<input type="checkbox"/>	<code>k = 2 + 3J</code>

14. When you encounter an error in Python, what should you do?

<input type="checkbox"/>	Search the course discussion forum and post a question if yours hasn't been asked.
<input type="checkbox"/>	Read the error message.
<input type="checkbox"/>	Try <code>help()</code> or <code>dir()</code> .
<input type="checkbox"/>	Use Google or StackOverflow to find an answer.
<input type="checkbox"/>	All of the above.

15.

```
def changing(mylist):
    mylist[0] = 10/10-10
    return(mylist)
L = [1, 3, 5, 7, 9]
M = changing(L)
M is L
```

What is the value of the final line?

<input type="checkbox"/>	False
<input type="checkbox"/>	SyntaxError.
<input type="checkbox"/>	True
<input type="checkbox"/>	ZeroDivisionError: division by zero

**INSTITUTO SUPERIOR DE ECONOMIA E GESTÃO**

16. Consider the following dataframe:

	name	age	city
0	John	23	Lisbon
1	Ann	26	Coimbra
2	Mary	27	Porto

What is the result of `df.iloc[1:2,1:2]`?

	John
	26
	Ann
	23

17. . What is the output of the following code snippet?

```
import networkx as nx
G = nx.Graph()
G.add_edges_from([(1,2), (2,4)])
G.number_of_nodes(), G.number_of_edges()
```

	2, 2
	3, 0
	1, 0
	3, 2
	This code contains an error.

18. What is the output of the following code snippet?

```
my_list = [1, 2, 3, 4]
a = (x**2 for x in my_list)
print(next(a), next(a))
```

	1 4
	4 9
	9 16
	1 4 9 16

19. For a given network `G`, what does `len(G)` return?

	The number of nodes
	The length of the longest path
	The size of the largest component
	The number of edges
	A list of nodes in each component

20. How to convert a list called `student` into a `df` dataframe using `pandas`?

	<code>df=pd.read_xls(student)</code>
	<code>df=pd.import_csv(student)</code>
	<code>df=pd.dataframe(student)</code>
	<code>df=pd.series(student)</code>

Part II (60 points)

1. Calculate IRR (Internal Rate of Return) without using NumPy package. Remember that the IRR formula is the following:

$$\sum_{n=0}^N \frac{C_n}{(1+r)^n} = 0$$

C - are cashflow  
n - number of periods  
r - rate (IRR)

2. Create a list with all prime numbers until 100. The correct solution must be efficient.

3. Create a function called `profitLossAccount` that has as inputs the following parameters: `num`, `q`, `r`, `p`, `pr`, `c`.

Where:

- `num` is the number of years
- `q` is the quantity sold in the first year
- `p` is the price in the first year
- `c` is the unit cost that is constant over the period
- Quantity growth rate is `r` per year
- price growth rate is `pr` per year

The result will be a vector with all the profits.

4. Create an object called `bestStudent`. This is an instance of a class called `student`, that extends another class called `person`. A `person` has a name, age, and address. A `student` has a graduation year and grade.