1. **What is the difference between a list and a tuple?**

| List | Tuple |
|---|---|
| The main difference is, lists are modifiable. We can even add, update and delete the elements from the list. So, Lists are mutable. | Tuple are not modifiable, we cannot add, update and delete the items. Tuple is immutable. |
| If we are taking about the memory, so list is not as much memory efficient even if the number of elements is higher. | Tuple are more memory efficient and faster than the lists even the number of elements is higher. |
| Syntax difference, while creating list there should be a square bracket '[]' | While creating tuple there should be parentheses. |

2. **If I want to get a summary of categorical columns in a dataframe, how will I do that?**

```python
import pandas as pd

# lets me define some data

data = {
    "Subjects" : ["Maths", "AI", "Data Science", "Programming"],
    "Marks" : [95, 80, 90, 99]
}

df = pd.DataFrame(data)

# now for getting summary there are builtin functions so i'll use describe() function
categoricalSummary = df.describe(include='all')
print(categoricalSummary)
```

Output:

| | Subjects | Marks |
|---|---|---|
| count | 4 | 4.000000 |
| unique | 4 | NaN |
| top | Maths | NaN |
| freq | 1 | NaN |
| mean | NaN | 91.000000 |
| std | NaN | 8.205689 |
| min | NaN | 80.000000 |
| 25% | NaN | 87.500000 |
| 50% | NaN | 92.500000 |
| 75% | NaN | 96.000000 |
| max | NaN | 99.000000 |

3. **What is difference between a function and a method?**

The main difference between function and method is, method is associated with an object or class and function can be defined anywhere in the program it is not dependent with class or object just like method.

```python
# function
def print_name():
    print("United Future")

print_name()

# Method
class UnitedFuture:
    def print_name(self):
        print("United Future")

unitedFuture = UnitedFuture()
unitedFuture.print_name()
```

4. **Which is faster numpy array or list?**
   Nnmpy arrays are more faster than python list because it is memory efficient and also support vectorized operations. Numpy also provide some optimized algorithmns and function for array like sorting, stats computations etc. Another reason is, it is implemented in C so all operations are executed in pre-compiled C code.

5. **If I want to apply a condition on a column in the dataframe, is using a for loop a good idea?**
   Actually If you're working in pandas the using a loop to apply certain condition is not a good approach, because pandas give you a built-In methods to perform this type or operations like query, apply, loc , between etc.

6. Given a list of integers: [1,2,4,5,6,8], the task is to implement the find_missing_num() function to determine and return the missing numbers?

```python
# 6. Given a list of integers: [1,2,4,5,6,8], the task is to implement the find_missing_num()
#    function to determine and return the missing numbers?
# 1 : Pseudocode

"""
I'll use the list comprehension method because of memory efficent

Step 1 : First fine the mininmum and maximum number of the list
Step 2 : Iterate over the min and max using the range function
Step 3 : check in every iteration the number is present in th list or not if not it will append in the lis
Step 4 : return the missing numbers
"""

# define the function
def find_missing_numbers(nums):
    # Step 1
    minNumber, maxNumber = min(nums), max(nums)

    # step 2 and 3
    missingNumbers = [num for num in range(minNumber, maxNumber + 1) if num not in nums]

    # step 4
    return missingNumbers

# define the list
myList = [1,2,4,5,6,8]
missingNumbers = find_missing_numbers(myList)
print("Missing numbers are : " , missingNumbers)
```

Output:

```
(venv) D:\Test projects>py United_future_assesment.py
Missing numbers are :  [3, 7]
```