## Lesson: Interview Questions - Data Structures in Python

1. What are the different types of data structures in Python? 1

Python has several built-in data structures:

- Lists: Ordered, mutable collections.

- Tuples: Ordered, immutable collections.

- Sets: Unordered collections of unique elements.

- Dictionaries: Key-value pairs.

Other data structures like stacks, queues, heaps, etc., can be implemented using classes or collections module.

2. What is recursion? How to implement Fibonacci series?

[Flipkart, Oyo, TCS], 3

Recursion is a function calling itself to solve smaller instances of a problem.

Example for Fibonacci:

```python
def fibonacci(n):
    if n <= 1:
        return n
    return fibonacci(n-1) + fibonacci(n-2)
print([fibonacci(i) for i in range(10)])
```

3. Find the factorial of a no using Python? 3

Using recursion:

```python
def factorial(n):
    return 1 if n == 0 else n * factorial(n-1)
```

```
print(factorial(5))  # Output: 120
```

4. What is disadvantage of nested if-else? How can we remove it? Show with Python code and example?

[3]

Nested if-else reduces readability.

Instead, use elif or dictionaries.

Example:

```python
def grade(score):
    if score > 90:
        return 'A'
    elif score > 75:
        return 'B'
    elif score > 60:
        return 'C'
    else:
        return 'D'
```

5. How would you reverse a string in Python without using built-in functions?

[Data Science, Business Analyst], [Wipro, TCS], 2

```python
def reverse_string(s):
    reversed_str = ''
    for char in s:
        reversed_str = char + reversed_str
    return reversed_str

print(reverse_string("hello"))  # Output: "olleh"
```

6. Explain string immutability in Python.

[Machine Learning Engineer, Data Science], [Infosys, Cognizant], 2

In Python, strings are immutable, meaning they cannot be changed after creation.

Any operation that modifies a string actually creates a new one.

7. What are the advantages of using lists in Python?

- Lists are dynamic (can grow or shrink).

- Can store heterogeneous data types.

- Support many built-in methods (append, remove, sort, etc.).

8. How are Python sets different from lists and tuples?

[Data Analytics], [PayPal, IBM], 2

- Sets are unordered and contain only unique elements.

- Lists are ordered and allow duplicates.

- Tuples are ordered and immutable.

9. What is the difference between a shallow copy and a deep copy in lists?

[Machine Learning Engineer, Data Science], [Google, Cognizant], 3

- Shallow copy copies outer list, but inner objects are referenced.

- Deep copy creates independent copies of all nested elements.

Use `copy` and `deepcopy` from `copy` module.

10. When would you use a dictionary over a list? 3

Use dictionaries when:

- You need to associate keys with values.

- Fast lookups by key are required.

- Unordered collection is acceptable.

11. How do you merge two dictionaries in Python?

[Data Science, Data Analytics], [TCS, Cognizant], 2

```python
dict1 = {'a': 1}
dict2 = {'b': 2}
merged = {**dict1, **dict2}
# Or in Python 3.9+: merged = dict1 | dict2
```