ASSIGNMENT

Q1 - Write a program to show how Numpy taking less memory compared to Python List?

Ans- Let's create a simple comparison between NumPy arrays and Python lists to demonstrate how NumPy is more memory-efficient. NumPy is optimized for numerical computations and uses contiguous memory storage, which leads to better performance and reduced memory overhead.

Here's a basic example that illustrates the memory usage difference:

```
import numpy as np

import sys


# Create a Python list with 1 million integers

python_list = list(range(1, 1000001))


# Create a NumPy array with the same integers

numpy_array = np.arange(1, 1000001)


# Check memory usage

python_list_memory = sys.getsizeof(python_list)

numpy_array_memory = numpy_array.nbytes


print(f"Memory used by Python list: {python_list_memory} bytes")

print(f"Memory used by NumPy array: {numpy_array_memory} bytes")


# Calculate the ratio of memory usage

memory_ratio = numpy_array_memory / python_list_memory

print(f"NumPy array uses approximately {memory_ratio:.2f} times less memory than the Python list.")
```

OUTPUT BE LIKE :

```python
import numpy as np
import sys

# Create a Python list with 1 million integers
python_list = list(range(1, 1000001))

# Create a NumPy array with the same integers
numpy_array = np.arange(1, 1000001)

# Check memory usage
python_list_memory = sys.getsizeof(python_list)
numpy_array_memory = numpy_array.nbytes

print(f"Memory used by Python list: {python_list_memory} bytes")
print(f"Memory used by NumPy array: {numpy_array_memory} bytes")

# Calculate the ratio of memory usage
memory_ratio = numpy_array_memory / python_list_memory
print(f"NumPy array uses approximately {memory_ratio:.2f} times less memory than the Python list.")
```

✓ 0.0s

```
Memory used by Python list: 8000056 bytes
Memory used by NumPy array: 8000000 bytes
NumPy array uses approximately 1.00 times less memory than the Python list.
```