**LAB: BASIC OF NUMPY**

**THEORY:**

**Introduction**

This report documents the use of NumPy to create and manipulate arrays, perform operations, and explore array properties. The exercises demonstrate NumPy's capabilities in handling numerical data efficiently.

**NumPy Array Creation and Properties**

NumPy's array object is a multidimensional container of items of the same type and size. The exercises involved creating arrays using functions like np.array, np.zeros, np.full\_like, and np.full. We examined array properties such as shape, size, data type, and memory consumption.

**Array Operations**

We performed a variety of operations on NumPy arrays, including element-wise addition, subtraction, and squaring. These operations showcased NumPy's broadcasting rules and vectorization capabilities, which allow for concise and efficient computations.

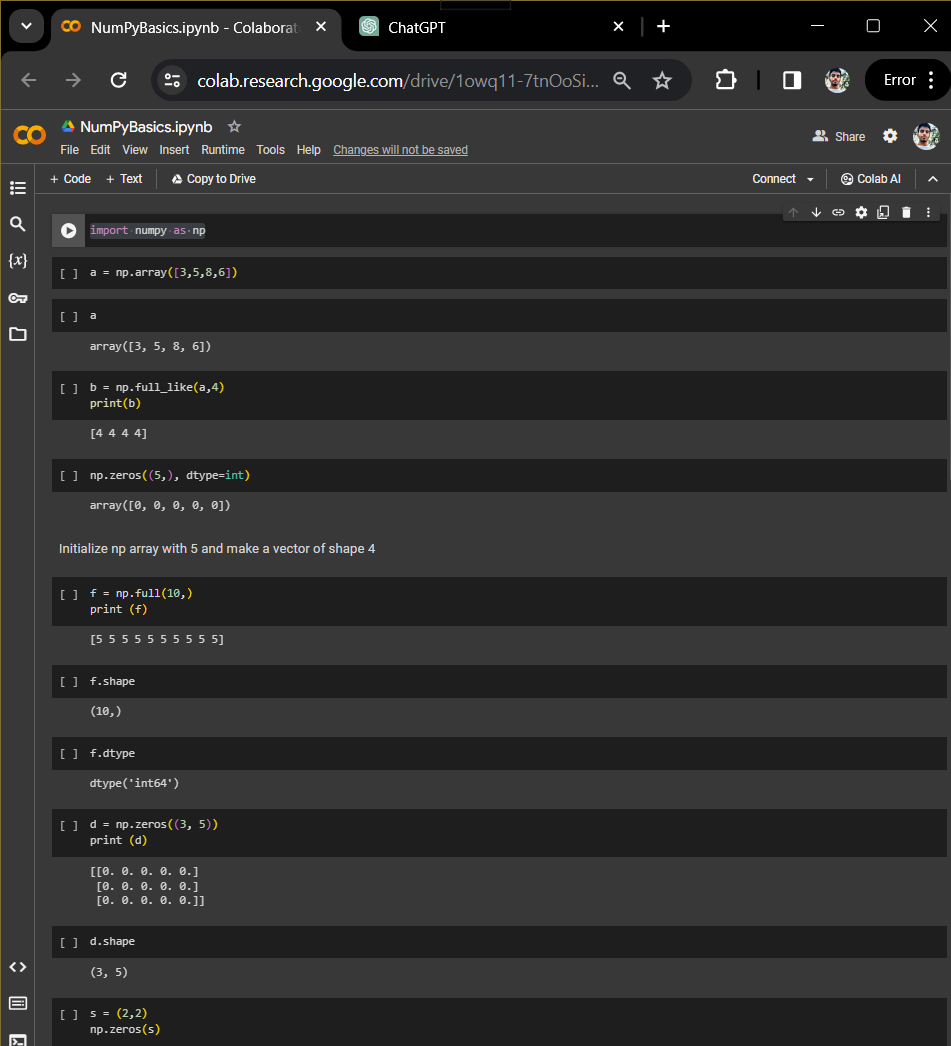
**Indexing and Slicing**

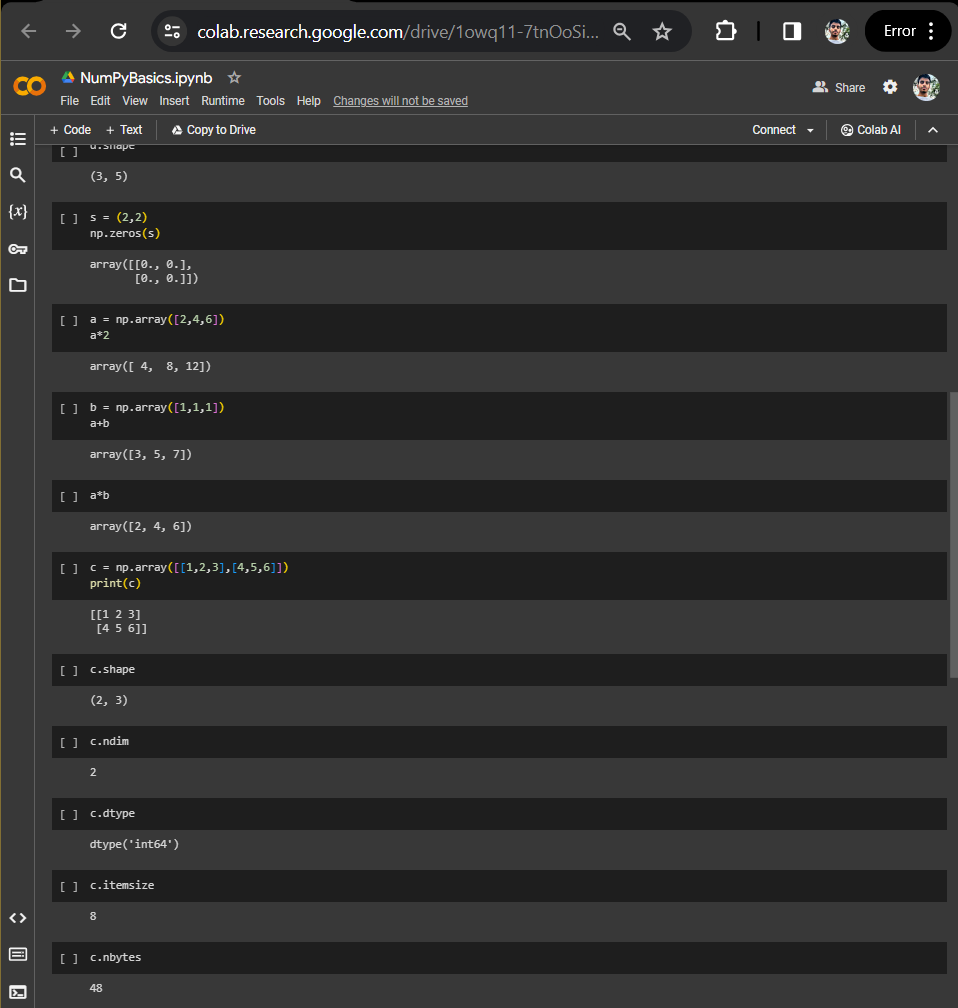
* Accessing Elements: Exercises included accessing single array elements using their indices, demonstrating that NumPy arrays are zero-indexed.
* Slicing: We explored slicing arrays to retrieve sub-arrays. Slicing syntax is similar to Python lists, but NumPy arrays can be sliced in multiple dimensions at once.

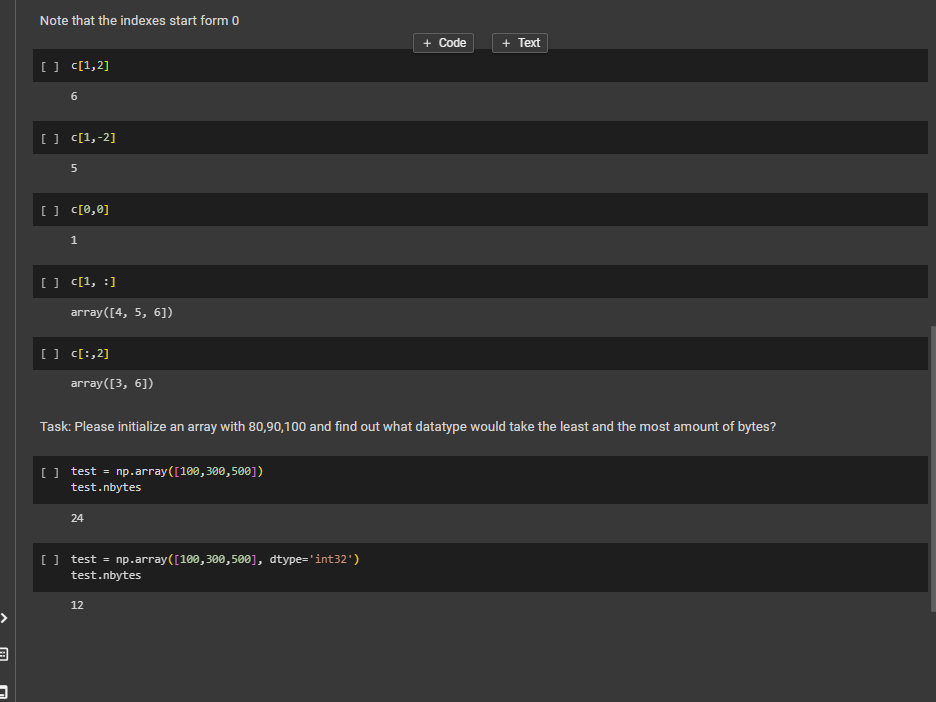
**Memory Management**

An important aspect of NumPy arrays is their memory usage. We compared the memory footprint of arrays with different data types, highlighting the importance of choosing the appropriate data type for optimal memory management.

**OUTPUT:**

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