Assignment # 8

Python Packages & Python Modules

1. **Sorting Module Implementation:**
    - Implement the following sorting algorithms in a Python module named **sorting**:
        - Bubble Sort
        - Selection Sort
        - Insertion Sort
        - Merge Sort
        - Quick Sort
    - Provide clear and concise documentation for each sorting function, including parameter descriptions and return value explanations.
    - Test each sorting function with sample input data to ensure correctness.

2. **Searching Module Implementation:**
    - Implement the following searching techniques in a Python module named **searching**:
        - Linear Search
        - Binary Search
        - Interpolation Search
        - Exponential Search
        - Jump Search
    - Document each searching function with usage examples and expected output.
    - Validate the correctness of each searching algorithm by performing unit tests with different input data.

3. **Module Organization and Packaging:**
    - Organize the sorting and searching modules into a Python package named **algorithms**.
    - Ensure that the package structure follows best practices, with separate directories for sorting and searching modules.
    - Create an **__init__.py** file in the **algorithms** package to make it importable as a module.

4. **Algorithm Comparison and Analysis:**
    - Compare the performance of different sorting algorithms (e.g., bubble sort vs. merge sort) on arrays of varying sizes. (up to 5 million elements)
    - Conduct a similar analysis for the searching algorithms, comparing their performance on sorted and unsorted arrays.

Note: Develop these sorting and searching algorithms from scratch, without relying on built-in sorting or searching functions provided by Python or any external libraries.