**Python Advanced Assignment 22**

Q1. What are the benefits of the built-in array package, if any?

Ans-) The built-in array package provides a more efficient way of storing homogeneous data compared to lists. It uses less memory and provides faster access to elements due to its contiguous memory layout.

Q2. What are some of the array package’s limitations?

Ans-) The array package is limited in its functionality and can only store homogeneous data types. It also lacks the ability to perform advanced mathematical operations that the numpy package provides.

Q3. Describe the main differences between the array and numpy packages.

Ans-) The array package is a built-in Python package for storing homogeneous data types in a contiguous block of memory. The numpy package is an external library that provides advanced mathematical operations and the ability to store and manipulate multidimensional arrays of different data types.

Q4. Explain the distinctions between the empty, ones, and zeros functions.

Ans-) The empty function creates an array without initializing any of its values, the ones function creates an array initialized with all ones, and the zeros function creates an array initialized with all zeros.

Q5. In the fromfunction function, which is used to construct new arrays, what is the role of the callable argument?

Ans-) The callable argument in the fromfunction function is a function that maps an element's coordinates to the value that should be in that element's position in the new array.

Q6. What happens when a numpy array is combined with a single-value operand (a scalar, such as

an int or a floating-point value) through addition, as in the expression A + n?

Ans-) When a numpy array is combined with a single-value operand through addition, the scalar value is added to each element in the array.

Q7. Can array-to-scalar operations use combined operation-assign operators (such as += or \*=)?

What is the outcome?

Ans-) Yes, array-to-scalar operations can use combined operation-assign operators. The outcome is the same as if the operation and assignment were performed separately.

Q8. Does a numpy array contain fixed-length strings? What happens if you allocate a longer string to

one of these arrays?

Ans-) Yes, numpy arrays can contain fixed-length strings. If a longer string is allocated to the array, the string is truncated to fit the array's fixed length.

Q9. What happens when you combine two numpy arrays using an operation like addition (+) or

multiplication (\*)? What are the conditions for combining two numpy arrays?

Ans-) When two numpy arrays are combined using an operation like addition or multiplication, the operation is performed element-wise on each corresponding pair of elements. The arrays must have the same shape or be broadcastable to the same shape to be combined.

Q10. What is the best way to use a Boolean array to mask another array?

Ans-) A Boolean array can be used to mask another array by indexing the array with the Boolean array. The resulting array will only contain elements where the Boolean array has a value of True.

Q11. What are three different ways to get the standard deviation of a wide collection of data using

both standard Python and its packages? Sort the three of them by how quickly they execute.

Ans-) Three different ways to get the standard deviation of a wide collection of data are:

* Using the statistics package's pstdev function
* Using numpy's std function
* Using a loop to manually calculate the standard deviation by first finding the mean and then finding the sum of the squared differences from the mean, divided by the number of elements minus one, and then taking the square root of this value.

The fastest method is likely to be numpy's std function due to its optimized C implementation.

12. What is the dimensionality of a Boolean mask-generated array?

Ans-) The dimensionality of a Boolean mask-generated array is the same as the dimensionality of the original array, but only the elements that correspond to True in the mask will be present in the resulting array.