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

Arrays can handle very large datasets efficiently.

Computationally-memory efficient.

Faster calculations and analysis than lists.

Diverse functionality (many functions in Python packages). With several Python packages that make trend modeling, statistics, and visualization easier.

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

An array which is formed will be homogeneous. ...

While declaring an array, passing size of an array is compulsory, and the size must be a constant. ...

Shifting is required for insertion or deletion of elements in an array.

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

There are several important differences between NumPy arrays and the standard Python sequences: NumPy arrays have a fixed size at creation, unlike Python lists (which can grow dynamically). Changing the size of an ndarray will create a new array and delete the original.

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

empty, unlike zeros, does not set the array values to zero, and may therefore be marginally faster. On the other hand, it requires the user to manually set all the values in the array, and should be used with caution. Return a new array setting values to zero.

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

numpy.fromfunction() function construct an array by executing a function over each coordinate and the resulting array, therefore, has a value fn(x, y, z) at coordinate (x, y, z).

The function is called with N parameters, where N is the rank of shape. Each parameter represents the coordinates of the array varying along a specific axis.

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?

ndarray, a fast and space-efficient multidimensional array providing vectorized arithmetic operations and sophisticated broadcasting capabilities

Standard mathematical functions for fast operations on entire arrays of data without having to write loops

Tools for reading / writing array data to disk and working with memory-mapped files

Linear algebra, random number generation, and Fourier transform capabilities

Tools for integrating code written in C, C++, and Fortran

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

Array functions and operators act on entire arrays. Some return a list, which can then either be used as a value for another array function, or assigned into an array variable

So far, we've been treating the array as a whole, adding and removing values by doing array assignments. Many useful programs are constructed using arrays without ever accessing any specific array element. However, Perl provides a traditional subscripting function to access an array element by numeric index.

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

NumPy builds on (and is a successor to) the successful Numeric array object. Its goal is to create the corner-stone for a useful environment for scientific computing. NumPy provides two fundamental objects: an N-dimensional array object (ndarray) and a universal function object (ufunc).

The dtype of any numpy array containing string values is the maximum length of any string present in the array. Once set, it will only be able to store new string having length not more than the maximum length at the time of the creation. If we try to reassign some another string value having length greater than the maximum length of the existing elements, it simply discards all the values beyond the maximum 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?

Common operations include given two 2d-arrays, how can we concatenate them row wise or column wise. NumPy’s concatenate function allows you to concatenate two arrays either by rows or by columns.

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

To create a boolean mask from an array, use the ma. make\_mask() method in Python Numpy. The function can accept any sequence that is convertible to integers, or nomask. Does not require that contents must be 0s and 1s, values of 0 are interpreted as False, everything else as 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.

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

Boolean Arrays as Masks

What is returned is a one-dimensional array filled with all the values that meet this condition; in other words, all the values in positions at which the mask array is True