# Lambda Functions and Arrays in Python

## Understanding Lambda Functions

A lambda function in Python is a small anonymous function that can have any number of arguments but only one expression. It is defined using the `lambda` keyword.

\*\*Syntax:\*\*  
```python  
lambda arguments: expression  
```

The result of the expression is automatically returned. Use lambda functions for small tasks where you don’t need a full function definition (e.g., within functions like `map()`, `filter()`, and `reduce()`).

### Examples for Lambda Functions

#### Square a Number

```python  
square = lambda x: x \*\* 2  
print(square(5)) # Output: 25  
```

#### Add Two Numbers

```python  
add = lambda a, b: a + b  
print(add(10, 20)) # Output: 30  
```

#### Check if a Number is Even

```python  
is\_even = lambda x: x % 2 == 0  
print(is\_even(4)) # Output: True  
print(is\_even(5)) # Output: False  
```

#### Sort a List of Tuples by the Second Element

```python  
data = [(1, 3), (4, 2), (7, 5)]  
sorted\_data = sorted(data, key=lambda x: x[1])  
print(sorted\_data) # Output: [(4, 2), (1, 3), (7, 5)]  
```

#### Filter Even Numbers from a List

```python  
nums = [1, 2, 3, 4, 5, 6]  
even\_nums = list(filter(lambda x: x % 2 == 0, nums))  
print(even\_nums) # Output: [2, 4, 6]  
```

## Understanding Arrays

In Python, an array is a collection of items that are of the same type. Arrays are useful when you need a list-like structure with constraints or optimized performance.  
To use arrays, import the `array` module:  
```python  
from array import array  
```

### Examples for Arrays

#### Create an Array

```python  
from array import array  
nums = array('i', [1, 2, 3, 4, 5]) # 'i' means integers  
print(nums) # Output: array('i', [1, 2, 3, 4, 5])  
```

#### Access Elements in an Array

```python  
print(nums[0]) # Output: 1  
print(nums[-1]) # Output: 5  
```

#### Add and Remove Elements

```python  
nums.append(6) # Add an element  
print(nums) # Output: array('i', [1, 2, 3, 4, 5, 6])  
  
nums.pop() # Remove the last element  
print(nums) # Output: array('i', [1, 2, 3, 4, 5])  
```

#### Iterate Through an Array

```python  
for num in nums:  
 print(num, end=" ") # Output: 1 2 3 4 5  
```

#### Array Operations

```python  
nums.reverse() # Reverse the array  
print(nums) # Output: array('i', [5, 4, 3, 2, 1])  
  
print(len(nums)) # Length of the array: 5  
```