1. What is the relationship between def statements and lambda expressions ?

Ans - Both **def** statements and lambda expressions define functions in Python, but def statements are used for named functions with multiple statements, while lambda expressions create anonymous functions typically for short, one-line operations.

1. What is the benefit of lambda?

Ans - The benefit of lambda expressions is their ability to create anonymous functions quickly and concisely, especially for short, one-off operations.

1. Compare and contrast map, filter, and reduce.

Ans-

Map: Applies a function to each element of an iterable and returns an iterator of the results.

Filter: Applies a function to each element of an iterable and returns an iterator containing only the elements for which the function returns True.

Reduce: Applies a function of two arguments cumulatively to the elements of an iterable, reducing it to a single value.

While map and filter both produce iterables as output, reduce produces a single value. Additionally, map applies a function to each element, filter selects elements based on a condition, and reduce combines elements using a cumulative function.

1. What are function annotations, and how are they used?

Ans - Function annotations are metadata attached to parameters and return values, providing additional information about their types or meanings. They're specified using colons (:) after parameters and -> before the return type. They're primarily used for documentation and type hinting.

1. What are recursive functions, and how are they used?

Ans - Recursive functions call themselves within their own definition and are used to solve problems by breaking them down into smaller, similar subproblems. They're suitable for problems that can be divided into smaller instances of the same problem.

1. What are some general design guidelines for coding functions?

Ans-

* Single Responsibility Principle (SRP)
* Descriptive Names
* Modularity
* Limited Scope
* Input Validation
* Error Handling
* Comments and Documentation
* Testing
* Performance
* Consistency

1. Name three or more ways that functions can communicate results to a caller.

Ans - Functions can communicate results to a caller through **return values, side effects, or exceptions.**