PYTHON

Assignment

1. **Write a generator function that yields the Fibonacci sequence up to a given number n. Test the generator by printing the first 10 numbers in the sequence.**
2. **Create a generator that yields an infinite sequence of natural numbers starting from 1. Use next() to print the first 20 numbers.**
3. **Write a generator that yields prime numbers up to a given limit. Implement the Sieve of Eratosthenes algorithm to optimize the generator.**
4. **Write a generator that reads a text file line by line, yielding each line. Use this generator to print all lines from a file.**
5. **Implement a generator function that mimics the behavior of Python's built-in range() function. Test it with different start, stop, and step values.**
6. **Write a generator that yields the factorial of numbers starting from 1 up to n. Test the generator by printing the factorials of the first 10 numbers.**
7. **Create a generator that counts down from a given number to 0, yielding each number. Test it by counting down from 10.**
8. **Write a generator that takes a list and yields its elements in a circular manner (i.e., it should loop over the list indefinitely). Test it by printing the first 15 elements from a list of 5 items.**
9. **Create a generator that yields powers of two (e.g., 1, 2, 4, 8, 16, …) up to a certain number n. Use this generator to print powers of two up to**

2^10.

10. Write a generator function that yields all permutations of a given list. Test it with a list of 3 elements.
11. Implement a custom iterator class that iterates over a list and yields only even numbers. Test it with a list containing both even and odd numbers.
12. Create a custom iterator that iterates over a list in reverse order. Test it with a list of 5 elements.
13. Write an iterator class that generates the square of numbers from 1 to n. Test the iterator by printing the squares of numbers from 1 to 10.
14. Implement a custom iterator that takes a list and iterates over its elements indefinitely in a cyclic manner. Test it by printing the first 20 elements from a list of 4 items.
15. Create an iterator class that reads a text file word by word. Use this iterator to count the number of words in a given file.