

**recursive\_replication\_engine.py**

```
class RecursiveReplicationEngine:
    def __init__(self, initial_nodes=1):
        self.generations = {}
        self.generations[0] = initial_nodes

    def replicate(self, generations):
        for g in range(1, generations + 1):
            self.generations[g] = self.generations[g - 1] * 2

    def display_replication(self):
        print("=== Recursive Replication Sequence ===")
        for g, count in self.generations.items():
            print(f"Generation {g}: {count} nodes")
        print("-" * 40)

def main():
    replication_engine = RecursiveReplicationEngine(initial_nodes=1)
    replication_engine.replicate(generations=10)
    replication_engine.display_replication()

if __name__ == "__main__":
    main()
```