

# Fibonacci

January 31, 2024

## 1 Assignment 4

Write a program to generate and print Fibonacci series, one thread must generate the series upto number and other thread must print them. Ensure proper synchronization.

```
[1]: import threading
import time
```

```
[2]: def generate_fibonacci(n, fib_list, lock, start_time):
    a, b = 0, 1
    for _ in range(n):
        with lock:
            fib_list.append((a, time.time() - start_time))
        a, b = b, a + b
```

```
[3]: def print_fibonacci(fib_list, lock):
    with lock:
        for entry in fib_list:
            thread_id = threading.current_thread().ident
            current_time = time.strftime("%Y-%m-%d %H:%M:%S", time.localtime())
            fibonacci_value, time_taken = entry
            print(f"Thread ID {thread_id} at {current_time}: Fibonacci_
↪{fibonacci_value}, Time Taken: {time_taken:.6f} seconds")
```

```
[4]: def main():
    n = int(input("Enter the number of Fibonacci numbers to generate: "))

    fib_list = []
    lock = threading.Lock()
    start_time = time.time()

    # Create two threads
    generate_thread = threading.Thread(target=generate_fibonacci, args=(n,
↪fib_list, lock, start_time))
    print_thread = threading.Thread(target=print_fibonacci, args=(fib_list,
↪lock))

    # Start the threads
```

```
generate_thread.start()
print_thread.start()

# Wait for both threads to finish
generate_thread.join()
print_thread.join()

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

```
Enter the number of Fibonacci numbers to generate: 15
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 0, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 1, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 1, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 2, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 3, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 5, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 8, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 13, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 21, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 34, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 55, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 89, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 144, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 233, Time Taken: 0.000180
seconds
Thread ID 21996 at 2024-01-31 21:38:28: Fibonacci 377, Time Taken: 0.000180
seconds
```