

# 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"{fibonacci_value}, Thread ID {thread_id} at {current_time}:␣
↵, 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

```
0, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
1, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
1, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
2, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
3, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
5, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
8, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
13, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
21, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
34, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
55, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
89, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
144, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
233, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
377, Thread ID 21104 at 2024-01-31 22:05:23: , Time Taken: 0.001002 seconds
```