

Assignment 5

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Subject: LP-V (Distributed System)

Code: Token

```
1. import threading
2. import time
3.
4. class TokenRing:
5.     def __init__(self, numProcesses):
6.         self.num_processes = numProcesses
7.         self.threads = []
8.         self.mutex = threading.Semaphore(1)
9.         self.tokens = [threading.Event() for _ in range(numProcesses)]
10.        self.current_token = 0
11.
12.        for i in range(numProcesses):
13.            t = threading.Thread(target=self.process, args=(i,))
14.            self.threads.append(t)
15.
16.    def start(self):
17.        for thread in self.threads:
18.            thread.start()
19.
20.    def process(self, process_id):
21.        while True:
22.            self.tokens[process_id].wait()
23.
24.            self.mutex.acquire()
25.            print("Process id: ", process_id, " is in critical section." )
26.            time.sleep(2)
27.
28.            self.mutex.release()
29.            print("Process id: ", process_id, " is released")
30.
31.
32.            next_process_id = (process_id + 1)%self.num_processes
33.            self.tokens[next_process_id].set()
34.
35.            self.tokens[process_id].clear()
36.
37.    def initialize_token_ring(self):
38.        self.tokens[0].set()
39.
40. if __name__ == "__main__":
41.     num_processes = 4
42.     tokenRing = TokenRing(num_processes)
43.     tokenRing.start()
44.     tokenRing.initialize_token_ring()
45.
```

Output:

```
Command Prompt - python token.py
Microsoft Windows [Version 10.0.19045.2965]
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C:\Users\hp>cd C:\Users\hp\Desktop\ds lab\Assignment No.5

C:\Users\hp\Desktop\ds lab\Assignment No.5>python token.py
Process id: 0 is in critical section.
Process id: 0 is released
Process id: 1 is in critical section.
Process id: 1 is released
Process id: 2 is in critical section.
Process id: 2 is released
Process id: 3 is in critical section.
Process id: 3 is released
Process id: 0 is in critical section.
```