Exercise 9 - Dining philosopher using semaphore and Reader writer problem with some constraints:

1. **Code:**

```
#include<stdio.h>
#include<stdlib.h>
#include<pthread.h>
#include<semaphore.h>
#include<unistd.h>
#define rep(i,k,n) for(int i=k;i<n;i++)
sem_t chps[5];
void * philos(void * n)
{
    int p=*(int *)n;
    sem_wait(&chps[p]);
    printf("Philosopher %d picks left chopsticks\n",p);
    sem_wait(&chps[(p+1)%5]);
    printf("Philosopher %d picks the right chopsticks\n",p);
    printf("Philosopher %d starts eating\n",p);
    sleep(1);
    printf("Philosopher %d done with eating\n",p);
    sem_post(&chps[(p+1)%5]);
    sem_post(&chps[p]);
}
int main()
 {
         int a[5];
         pthread_t t[5];
         rep(i,0,5)
         sem_init(&chps[i],0,1);
         rep(i,0,5){
                 a[i]=i;
                 pthread_create(&t[i],NULL,philos,(void *)&a[i]);
            }
         rep(i,0,5)
            pthread_join(t[i],NULL);
 }
```

Output:

```
shubhangi@Shubhi:/mnt/e/VIT/4thsem/OS/lab/linuxpractice/20bce1161/lab9$
shubhangi@Shubhi:/mnt/e/VIT/4thsem/OS/lab/linuxpractice/20bce1161/lab9$
Philosopher 0 picks left chopsticks
Philosopher 1 picks left chopsticks
Philosopher 1 picks the right chopsticks
Philosopher 1 starts eating
Philosopher 3 picks left chopsticks
Philosopher 3 picks the right chopsticks
Philosopher 3 starts eating
Philosopher 1 done with eating
Philosopher 2 picks left chopsticks
Philosopher 0 picks the right chopsticks
Philosopher 0 starts eating
Philosopher 3 done with eating
Philosopher 4 picks left chopsticks
Philosopher 2 picks the right chopsticks
Philosopher 2 starts eating
Philosopher 0 done with eating
Philosopher 4 picks the right chopsticks
Philosopher 4 starts eating
Philosopher 2 done with eating
Philosopher 4 done with eating
```

2.