Write a C-program to simulate the concept of Dinning philosophers problem.

```
#include <pthread.h>
#include <semaphore.h>
#include <stdio.h>
#define N 5
#define Thinking 2
#define Hungry 1
#define Eating 0
#define left (phnum+4)%N
#define Right (phnum+1)%N
int state[N];
int phil[N] = {0, 1, 2, 3, 4};
sem_t mutex;
sem_t s[N];
void test (int phnum)
{
if (state[phnum] == Hungry && state[left] != Eating && state[Right] != Eating) {
state[phnum] = Eating;
sleep(2);
Printf ("Philosopher %d takes fork %d and %d\n",
phnum+1, left+1, phnum+1);
Printf ("Philosopher %d is Eating \n", phnum+1);
sem_post (&s[phnum]);
}
}
void take_fork (int phnum)
{
sem_wait (&mutex);
state[phnum] = Hungry;
Printf ("Philosopher %d is Hungry \n", phnum+1);
test (phnum);
sem_post (&mutex);
```

Dinning

```
sem_wait(&s[phnum]);
sleep(1);
}
void put_fork(int phnum)
{
sem_wait(&mutex);
state[phnum] = Thinking;
Printf("Philosopher %d putting fork %d and %d
down\n", phnum+1, left+1, phnum+1);
Printf("Philosopher %d is thinking\n", phnum+1);
test(left);
test(Right);
sem_post(&mutex);
}
void * philosopher(void *num)
{
while(1){
int *i = num;
sleep(1);
take_fork(*i);
sleep(0);
put_fork(*i);
}
}
int main()
{
int i;
Pthread_t thread_id[N];
sem_init(&mutex, 0, 1);
for(i=0; i<N; i++)
sem_init(&s[i], 0, 0);
for(i=0; i<N; i++){
pthread_create(&thread_id[i], NULL, philosopher
&phil[i]);
```

printf ("Philosopher %d is thinking \n", i+1);
}
for (i=0; i<N; i++)
pthread_join (thread_id [i], NULL);
}.

output

philosopher 1 is thinking
philosopher 2 is thinking
philosopher 3 is thinking
philosopher 4 is thinking
philosopher 5 is thinking
philosopher 2 is hungry.
philosopher 1 is hungry
philosopher 5 is hungry
philosopher 3 is hungry
philosopher 4 is hungry
philosopher 1 takes fork 3 and 4
philosopher 4 is Eating.
philosopher 4 putting down fork 3 and 4 down.
philosopher 4 is thinking.
philosopher 3 takes fork 2 and 3
philosopher 3 is eating.
philosopher 5 takes fork 4 and 5
philosopher 5 is eating.
philosopher 3 putting down fork 2 and 3.
philosopher 3 is thinking.
philosopher 2 takes fork 1 and 2.
philosopher 2 is eating.
philosopher 5 putting fork 4 and 5 down.
philosopher 5 is thinking.
philosopher 4 is hungry.
philosopher 4 takes fork 3 and 4.
philosopher 4 is eating.
philosopher 2 putting down fork 1 and 2.

C:\Users\STUDENT\Desktop\dinning.exe

```
Philosopher 1 is thinking
Philosopher 2 is thinking
Philosopher 3 is thinking
Philosopher 4 is thinking
Philosopher 5 is thinking
Philosopher 2 is Hungry
Philosopher 1 is Hungry
Philosopher 5 is Hungry
Philosopher 3 is Hungry
Philosopher 4 is Hungry
Philosopher 4 takes fork 3 and 4
Philosopher 4 is Eating
Philosopher 4 putting fork 3 and 4 down
Philosopher 4 is thinking
Philosopher 3 takes fork 2 and 3
Philosopher 3 is Eating
Philosopher 5 takes fork 4 and 5
Philosopher 5 is Eating
Philosopher 3 putting fork 2 and 3 down
Philosopher 3 is thinking
Philosopher 2 takes fork 1 and 2
Philosopher 2 is Eating
Philosopher 5 putting fork 4 and 5 down
Philosopher 5 is thinking
Philosopher 4 is Hungry
Philosopher 4 takes fork 3 and 4
Philosopher 4 is Eating
Philosopher 2 putting fork 1 and 2 down
Philosopher 2 is thinking
Philosopher 1 takes fork 5 and 1
Philosopher 1 is Eating
Philosopher 5 is Hungry
Philosopher 3 is Hungry
Philosopher 4 putting fork 3 and 4 down
Philosopher 4 is thinking
Philosopher 3 takes fork 2 and 3
Philosopher 3 is Eating
Philosopher 2 is Hungry
Philosopher 1 putting fork 5 and 1 down
Philosopher 1 is thinking
Philosopher 5 takes fork 4 and 5
Philosopher 5 is Eating
Philosopher 4 is Hungry
Philosopher 3 putting fork 2 and 3 down
Philosopher 3 is thinking
Philosopher 2 takes fork 1 and 2
Philosopher 2 is Eating
Philosopher 1 is Hungry
Philosopher 5 putting fork 4 and 5 down
Philosopher 5 is thinking
Philosopher 4 takes fork 3 and 4
Philosopher 4 is Eating
Philosopher 2 putting fork 1 and 2 down
Philosopher 2 is thinking
Philosopher 1 takes fork 5 and 1
Philosopher 1 is Eating
Philosopher 3 is Hungry
Philosopher 5 is Hungry
Philosopher 4 putting fork 3 and 4 down
Philosopher 4 is thinking
Philosopher 3 takes fork 2 and 3
Philosopher 3 is Eating
```