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SE-Comps B/Batch C

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OS Experiment 7 : Dining Philosophers Problem

(All source code files are submitted on moodle)

Problem statement: C program implementing the solution to the Dining Philosopher Problem. The Dining Philosopher Problem states that there are five philosophers which do two thinks: think and eat. They share a table having a chair for each one of them. In the center of the table there is a bowl of rice and the table is laid with 5 single chopsticks .
When a philosopher thinks, he does not interact with others. When he gets hungry, he tries to pick up the two chopsticks that are near to him. For example, philosopher 1 will try to pick chopsticks 1 and 2. But the philosopher can pickup only one chopstick at a time. He can not take a chopstick that is already in the hands of his neighbour. The philosopher stars to eat when he has both his chopsticks in his hand. After eating the philosopher puts down both the chopsticks and starts to think again.

Files used: *dining_philosophers.c*

Output:

(We take random amounts of time for the time a philosopher will eat/think)

```
shubhan@Shubhan:~/programs/OS$ gcc -o dph dining_philosophers.c -lpthread -lrt
shubhan@Shubhan:~/programs/OS$ ./dph
Enter maximum time a philosopher can think/eat: 4
time: 0 | Philosopher 1 will think for 1 seconds
time: 0 | Philosopher 2 will think for 4 seconds
time: 0 | Philosopher 3 will think for 4 seconds
time: 0 | Philosopher 4 will think for 1 seconds
time: 0 | Philosopher 5 will think for 4 seconds
time: 1 | Philosopher 1 has become hungry, will attempt to eat
time: 1 | Philosopher 1 has started eating for 2 seconds
time: 1 | Philosopher 4 has become hungry, will attempt to eat
time: 1 | Philosopher 4 has started eating for 1 seconds
time: 2 | Philosopher 4 has finished eating
time: 2 | Philosopher 4 will think for 3 seconds
time: 3 | Philosopher 1 has finished eating
time: 3 | Philosopher 1 will think for 1 seconds
time: 4 | Philosopher 3 has become hungry, will attempt to eat
time: 4 | Philosopher 3 has started eating for 2 seconds
time: 4 | Philosopher 2 has become hungry, will attempt to eat
time: 4 | Philosopher 5 has become hungry, will attempt to eat
time: 4 | Philosopher 5 has started eating for 1 seconds
time: 4 | Philosopher 1 has become hungry, will attempt to eat
time: 5 | Philosopher 5 has finished eating
time: 5 | Philosopher 5 will think for 4 seconds
time: 5 | Philosopher 4 has become hungry, will attempt to eat
time: 6 | Philosopher 3 has finished eating
time: 6 | Philosopher 2 has started eating for 1 seconds
time: 6 | Philosopher 3 will think for 4 seconds
time: 6 | Philosopher 4 has started eating for 3 seconds
time: 7 | Philosopher 2 has finished eating
time: 7 | Philosopher 2 will think for 3 seconds
time: 7 | Philosopher 1 has started eating for 1 seconds
time: 8 | Philosopher 1 has finished eating
time: 8 | Philosopher 1 will think for 3 seconds
time: 9 | Philosopher 5 has become hungry, will attempt to eat
```

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time: 9 | Philosopher 5 has become hungry, will attempt to eat
time: 9 | Philosopher 4 has finished eating
time: 9 | Philosopher 4 will think for 3 seconds
time: 9 | Philosopher 5 has started eating for 2 seconds
time: 10 | Philosopher 3 has become hungry, will attempt to eat
time: 10 | Philosopher 3 has started eating for 2 seconds
time: 10 | Philosopher 2 has become hungry, will attempt to eat
time: 11 | Philosopher 1 has become hungry, will attempt to eat
time: 11 | Philosopher 5 has finished eating
time: 11 | Philosopher 5 will think for 1 seconds
time: 12 | Philosopher 3 has finished eating
time: 12 | Philosopher 3 will think for 3 seconds
time: 12 | Philosopher 2 has started eating for 1 seconds
time: 12 | Philosopher 4 has become hungry, will attempt to eat
time: 12 | Philosopher 4 has started eating for 4 seconds
time: 12 | Philosopher 5 has become hungry, will attempt to eat
time: 13 | Philosopher 2 has finished eating
time: 13 | Philosopher 2 will think for 1 seconds
time: 13 | Philosopher 1 has started eating for 1 seconds
time: 14 | Philosopher 1 has finished eating
time: 14 | Philosopher 1 will think for 3 seconds
time: 14 | Philosopher 2 has become hungry, will attempt to eat
time: 14 | Philosopher 2 has started eating for 1 seconds
time: 15 | Philosopher 3 has become hungry, will attempt to eat
time: 15 | Philosopher 2 has finished eating
time: 15 | Philosopher 2 will think for 3 seconds
time: 16 | Philosopher 4 has finished eating
time: 16 | Philosopher 5 has started eating for 2 seconds
time: 16 | Philosopher 3 has started eating for 4 seconds
time: 16 | Philosopher 4 will think for 1 seconds
time: 17 | Philosopher 1 has become hungry, will attempt to eat
time: 17 | Philosopher 4 has become hungry, will attempt to eat
time: 18 | Philosopher 1 has started eating for 3 seconds
time: 18 | Philosopher 5 has finished eating
time: 18 | Philosopher 5 will think for 4 seconds
```

```
time: 20 | Philosopher 3 has finished eating
time: 20 | Philosopher 3 will think for 4 seconds
time: 20 | Philosopher 4 has started eating for 3 seconds
time: 21 | Philosopher 1 has finished eating
time: 21 | Philosopher 1 will think for 2 seconds
time: 21 | Philosopher 2 has started eating for 4 seconds
time: 22 | Philosopher 5 has become hungry, will attempt to eat
time: 23 | Philosopher 4 has finished eating
time: 23 | Philosopher 4 will think for 1 seconds
time: 23 | Philosopher 5 has started eating for 1 seconds
time: 23 | Philosopher 1 has become hungry, will attempt to eat
time: 24 | Philosopher 3 has become hungry, will attempt to eat
time: 24 | Philosopher 4 has become hungry, will attempt to eat
time: 24 | Philosopher 5 has finished eating
time: 24 | Philosopher 5 will think for 1 seconds
time: 25 | Philosopher 5 has become hungry, will attempt to eat
time: 25 | Philosopher 1 has started eating for 2 seconds
time: 25 | Philosopher 3 has started eating for 1 seconds
time: 25 | Philosopher 2 has finished eating
time: 25 | Philosopher 2 will think for 4 seconds
time: 26 | Philosopher 3 has finished eating
time: 26 | Philosopher 3 will think for 3 seconds
time: 26 | Philosopher 4 has started eating for 1 seconds
time: 27 | Philosopher 1 has finished eating
time: 27 | Philosopher 1 will think for 2 seconds
time: 27 | Philosopher 4 has finished eating
time: 27 | Philosopher 4 will think for 1 seconds
time: 27 | Philosopher 5 has started eating for 4 seconds
time: 28 | Philosopher 4 has become hungry, will attempt to eat
time: 29 | Philosopher 1 has become hungry, will attempt to eat
time: 29 | Philosopher 2 has become hungry, will attempt to eat
time: 29 | Philosopher 3 has become hungry, will attempt to eat
time: 31 | Philosopher 5 has finished eating
time: 31 | Philosopher 5 will think for 3 seconds
time: 31 | Philosopher 1 has started eating for 3 seconds
```

The code runs until we terminate it using ^C.