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CEG 4350 – OS Internals and Design

Question 2

For question 2, pertaining to the fairness between the arbitrator solution and the resource hierarchy solution, you could determine fairness by keeping a running total of the number of times each of the philosophers eat using both of the solutions. To show this I took two screenshots of the philosophers eating with each solution and show the results below.

Arbitrator Solution:

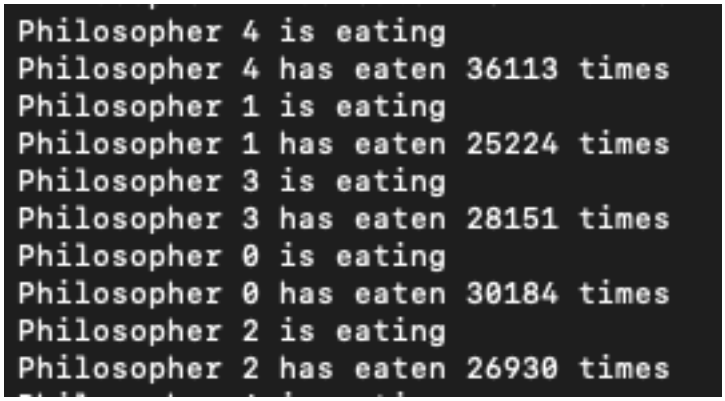
Philosophers	Number of times eating	Percentage of time eating
0	29148	21.2%
1	26678	19.5%
2	26101	19.1%
3	27914	20.4%
4	27037	19.8%
TOTAL:	136878	100%

(Below is the terminal results of running the good_philosophers1.c file)

Resource Hierarchy Solution:

Philosophers	Number of times eating	Percentage of time eating
0	30184	20.6%
1	25224	17.2%
2	26930	18.4%
3	28151	19.2%
4	36113	24.6%
TOTAL:	146602	100%

(Below is the terminal results of running the good_philosophers2.c file)



Based upon these results, it would appear that the Arbiter solution is the “fairest” of the solutions. The percentages for the arbiter solution are between 19.1-21.2%, while the percentages for the resource hierarchy solution are between 17.2-24.6%. Upon seeing these results, it is apparent that the philosophers eating distribution is more even with the arbiter solution. The reason for this is because of the waiter resource in the solution, that makes all of the philosophers wait while one of philosophers is picking up his chopsticks. This also allows time for the other philosophers to catch up and begin to wait to eat as well.