Parallel
Homework 7

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1 Implementation

My implemtation for this one was a little messier. I have each process first checking if they have received either a new token or a new task. If they have they received a new task they add it to their queue and then check if they have more than 16 tasks. If they do they send 2 tasks to someone else. They then remove a task from their queue and proceed to do work on it. If the rank is an even number, they then check if they can generate more tasks and then proceed to generate x more tasks. Once rank 0 runs out of tasks, it sends out a white token to rank + 1. Each process kept track whether or not it passed back a task and if it did it will change the token black when it receives it. If rank 0 receives a black token, it changes it to white, checks to see if it has any tasks, if it doesn't, it sends out the white token again. If rank 0 receives a white token, it passes a kill command to the next process and then exits. When a process receives a kill command, they all exit.

2 Compile and Run

The compile and run commands are the same they have always been. First you use

```
mpic++ loadBalancing.cpp
```

in order to compile the program. This creates an a.out files that you need to run. To run it you use the command

```
mpirun –oversubscribe -np ¡number-of-processes¿ a.out
```

and the program will run.

3 Desired Output

The output is going to be fairly hard to follow. Every loop, each process prints out how many tasks are in their queue and how many tasks they have generated out of how many they need to generate. They also print out when they are sending to a different process and when they send or receive a token. Once they are all done, they all exit at the same time while printing ”Finished”. Below is the output that I received.

```
5: received status -1
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: received status 1
6: 0
6: Sending white Token
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: 0
6: 1919/1917
6: received status -1
6: 0
6: 1919/1917
2: Finished
1: Finished
5: Finished
4: Finished
6: Finished
0: Finished
7: Finished
```

```
3: Finished
```