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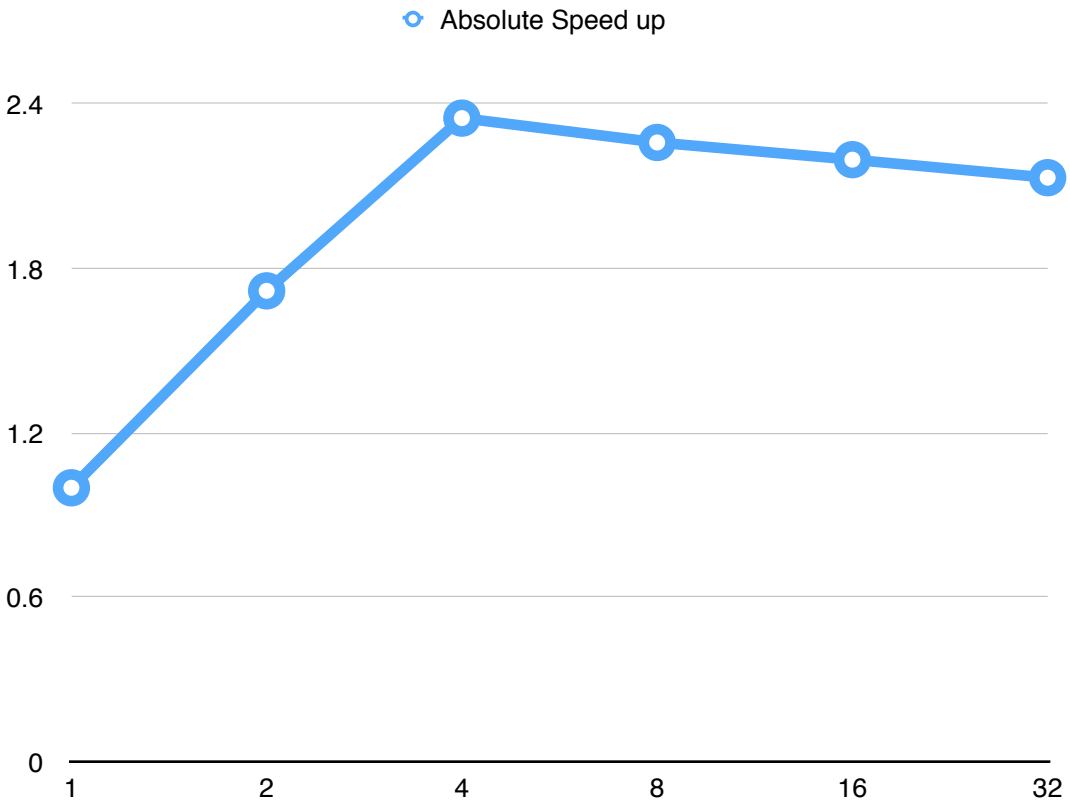
Comp 409 Assignment 2

Question 1

Code is in question1/Splitter.java

Here i have the main thread creating p threads. Each thread start in a waiting state. Now for each rounds of renaming the main thread is going to wake each threads they can start renaming. Each thread is going to try to request atomically the id at its current i,j position in the

Threads	Time	Relative Speed up	Absolute Speed up
1	94223	1	1
2	54813	1.71899002061	1.71899002061
4	40101	1.36687364404	2.34964215356
8	41678	0.96216229185	2.26073707951
16	42868	0.97224036577	2.19797984510
32	44191	0.97006177728	2.13217623497



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grid(Start at 0,0) using compareAndSet. If the thread doesn't get the requested id it will randomly try to go down or right and repeat until he get an id.

Question 2

Here we notice that we get a significant speed up when going from 1 to 2 threads and from 2 to 4 however the speed up lower when adding extra threads. This correspond to the fact that my computer is a 2 core with 4 virtual processor. Adding more thread give a higher concurrency cost that it can improve.

Question 3

At each tick each snake is going to have a list of the 3 position he can go shuffled (Supposing there is no other snakes). The snake thread is going to try to atomically request the first direction in the array. If the snake get the lock then it moves to that new position(Add new position to the queue and pop tail), if it doesn't try with the next position. If the snake failed to acquire a new position then it set a flag to show that the snake is locked and will try to move again at the next tick. The main thread is continuously checking if all snakes are locked.
The longer a snake is the more likely he is to lock himself which cannot be avoided using random directions. Here however a snake is requesting only 1 position atomically so there should not be any risk of deadlock(Just the snakes blocking each other that cannot be avoided using random position). However as each snake is fighting for its new position there can be some snake that are blocked longer that other.