

Final Project

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Server

Daemon created at the beginning of the program. I got help from the textbook when creating the Daemon. The number of edges is first read by the lines except comments in the file. Then I created graph and read the numbers in the file to fill the arr in the graph that holds the nodes, and find the number of nodes. The number that is in Arr is not put in arr again. Our graph is completed by sending the edges to the addedge function. Before and after the Graph was created, I used the gettimeofday function to calculate how long the graph was created. Then I allocated the arrays that hold the src and dest of the cache and cache. Threads that calculate the path for the Client and the thread that extends the thread pool are created. Using socket, bind, listen, I've got my sock ready to go. Then, in a while loop, the server receives a request and sends it to the threads that are waiting to create path. I did this send operation using condition variable. Client sent nodes, value array sent with threads. At the same time, the server calculates the number of threads that have received a request and sends a signal thread that will extend the thread pool if it is more than 75 percent (this is done with condition variable to send and wait for the thread.) and thread increases the number of threads. If the number of threads is not equal to max thread number, this is done. If all threads are busy, the server waits for a cond signal from the threads.

reSizeThreadPool

This thread waits for the signal from the server to work. After the signal is received, 25 percent of the thread number is taken and extra threads are created until the resulting result. If this number adds thread number, the result is greater than max thread number, then (maxthread number - thread number) threads are created. The Thread array is thrown into the temp array and is free and then allocated again.

Threads

They wait for a signal from the server. When reading Cache and writing cache, I used the reader and writer paradigm on the slide. The src and dest in the server that sent, if there's cache, the path is retrieved from the cache. If this node does not exist in the cache, it is sent to the BFS function and path is calculated. After the Path is calculated, the cache is discarded. If the cache size is equal to the cache capacity, the cache is expanded. It is then sent the path to client, which is received from the cache or found new.

Find a path

bfs ile dest node a ulaştıktan sonra oluşan path de gezilen diğer nodelarda olacağı için dest den başlayıp komşuluğa göre path de olmayan node ları çıkardım. Elde edilen path de thread tarafından client'e gönderilmek üzere kullanılır. The path that occurs after reaching the dest node with bfs will also be in other nodes that are navigated. I started from Dest, and according to the neighborhood, I removed the nodes that were not in the path. The resulting path is also used by thread to send to the client.

Cache

I did cache with 2 dimensional array. In time, the cache size is equal to the cache capacity when I grow the cache expands.

SIGINT Handler

the daemon is killed with the kill -2 id command so that CTRL C cannot be done from daemon on a terminal and Go to the SIGINT handler function. Files are done, files are closed and the program is finished.

Client

After connecting to the server, the nodes are sent to the server. It expects the path to be sent to it. If you are greater than 0, it will be expected to send in the path. It will be expected to send in this read operation is calculated using gettimeofday at the beginning and end of the read operation the path.

- include timestamp on each print line.

INPUT-OUTPUT

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zeynep@zeynep-VirtualBox: ~/Desktop$ ./client -a 127.0.0.1 -p 2057 -s 0 -d 154 && ./client -a 127.0.0.1 -p 2057 -s 0 -d 2
54 && ./client -a 127.0.0.1 -p 2057 -s 230 -d 154 && ./client -a 127.0.0.1 -p 2057 -s 5 -d 124 && ./client -a 127.0.0.1
-p 2057 -s 98 -d 657 && ./client -a 127.0.0.1 -p 2057 -s 52 -d 15454 && ./client -a 127.0.0.1 -p 2057 -s 0 -d 154
Sun Jun 28 22:11:10 2020 Client (12972) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12972) connected and requesting a path from node 0 to 154
Sun Jun 28 22:11:10 2020 Server's response to (12972): 0->4->1591->2690->178->154, arrived in 0.02 seconds.
Sun Jun 28 22:11:10 2020 Client (12973) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12973) connected and requesting a path from node 0 to 254
Sun Jun 28 22:11:10 2020 Server's response to (12973): 0->9->1394->1556->534->254, arrived in 0.02 seconds.
Sun Jun 28 22:11:10 2020 Client (12974) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12974) connected and requesting a path from node 230 to 154
Sun Jun 28 22:11:10 2020 Server's response (12974): NO PATH, arrived in 0.00 seconds, shutting down
Sun Jun 28 22:11:10 2020 Client (12975) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12975) connected and requesting a path from node 5 to 124
Sun Jun 28 22:11:10 2020 Server's response to (12975): 5->353->2194->124, arrived in 0.00 seconds.
Sun Jun 28 22:11:10 2020 Client (12977) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12977) connected and requesting a path from node 98 to 657
Sun Jun 28 22:11:10 2020 Server's response to (12977): 98->98->2038->265->2182->2646->4167->657, arrived in 0.08 seconds
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Sun Jun 28 22:11:10 2020 Client (12979) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12979) connected and requesting a path from node 52 to 15454
Sun Jun 28 22:11:10 2020 Server's response (12979): NO PATH, arrived in 0.00 seconds, shutting down
Sun Jun 28 22:11:10 2020 Client (12981) connecting to 127.0.0.1:2057
Sun Jun 28 22:11:10 2020 Client (12981) connected and requesting a path from node 0 to 154
Sun Jun 28 22:11:10 2020 Server's response to (12981): 0->4->1591->2690->178->154, arrived in 0.00 seconds.
zeynep@zeynep-VirtualBox: ~/Desktop$

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Sun Jun 28 22:10:06 2020 Executing with parameters:
Sun Jun 28 22:10:06 2020 -i p2p-Gnutella08.txt
Sun Jun 28 22:10:06 2020 -p 2057
Sun Jun 28 22:10:06 2020 -o pathToLogFile
Sun Jun 28 22:10:06 2020 -s 4
Sun Jun 28 22:10:06 2020 -x 14
Sun Jun 28 22:10:06 2020 Loading graph...
Sun Jun 28 22:10:07 2020 Graph loaded in 0.59 seconds with 6301 nodes and 20777 edges.
Sun Jun 28 22:10:07 2020 A pool of 4 threads has been created
Sun Jun 28 22:10:07 2020 Thread #0: waiting for connection
Sun Jun 28 22:10:07 2020 Thread #1: waiting for connection
Sun Jun 28 22:10:07 2020 Thread #2: waiting for connection
Sun Jun 28 22:10:07 2020 Thread #3: waiting for connection
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #0, system load 25.0%
Sun Jun 28 22:11:10 2020 Thread #0: searching database for a path from node 0 to node 154
Sun Jun 28 22:11:10 2020 Thread #0: no path in database, calculating 0->154
Sun Jun 28 22:11:10 2020 Thread #0: path calculated: 0->4->1591->2690->178->154
Sun Jun 28 22:11:10 2020 Thread #0: responding to client and adding path to database
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #1, system load 50.0%
Sun Jun 28 22:11:10 2020 Thread #1: searching database for a path from node 0 to node 254
Sun Jun 28 22:11:10 2020 Thread #1: no path in database, calculating 0->254
Sun Jun 28 22:11:10 2020 Thread #1: path calculated: 0->9->1394->1556->534->254
Sun Jun 28 22:11:10 2020 Thread #1: responding to client and adding path to database
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #2, system load 75.0%
Sun Jun 28 22:11:10 2020 Thread #2: searching database for a path from node 230 to node 154
Sun Jun 28 22:11:10 2020 Thread #2: no path in database, calculating 230->154
Sun Jun 28 22:11:10 2020 Thread #2: path not possible from node 230 to 154
Sun Jun 28 22:11:10 2020 System load 75.0 %, pool extended to 5 threads
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #3, system load 80.0%
Sun Jun 28 22:11:10 2020 Thread #3: searching database for a path from node 5 to node 124
Sun Jun 28 22:11:10 2020 Thread #3: no path in database, calculating 5->124
Sun Jun 28 22:11:10 2020 Thread #4: waiting for connection
Sun Jun 28 22:11:10 2020 Thread #3: path calculated: 5->353->2194->124
Sun Jun 28 22:11:10 2020 Thread #3: responding to client and adding path to database
Sun Jun 28 22:11:10 2020 System load 80.0 %, pool extended to 6 threads
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #4, system load 83.3%
Sun Jun 28 22:11:10 2020 Thread #4: searching database for a path from node 98 to node 657
Sun Jun 28 22:11:10 2020 Thread #4: no path in database, calculating 98->657
Sun Jun 28 22:11:10 2020 Thread #5: waiting for connection
Sun Jun 28 22:11:10 2020 Thread #4: path calculated: 98->98->2038->265->2182->2646->4167->657
Sun Jun 28 22:11:10 2020 Thread #4: responding to client and adding path to database

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Sun Jun 28 22:11:10 2020 System load 83.3 %, pool extended to 7 threads
Sun Jun 28 22:11:10 2020 Thread #6: waiting for connection
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #5, system load 85.7%
Sun Jun 28 22:11:10 2020 Thread #5: searching database for a path from node 52 to node 15454
Sun Jun 28 22:11:10 2020 Thread #5: no path in database, calculating 52->15454
Sun Jun 28 22:11:10 2020 Thread #5: path not possible from node 52 to 15454
Sun Jun 28 22:11:10 2020 System load 85.7 %, pool extended to 8 threads
Sun Jun 28 22:11:10 2020 Thread #7: waiting for connection
Sun Jun 28 22:11:10 2020 A connection has been delegated to thread id #6, system load 87.5%
Sun Jun 28 22:11:10 2020 Thread #6: searching database for a path from node 0 to node 154
Sun Jun 28 22:11:10 2020 Thread #6: path found in database: 0->4->1591->2690->178->154
Sun Jun 28 22:11:20 2020 Thread #0: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #1: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #2: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #3: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #4: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #5: waiting for connection
Sun Jun 28 22:11:20 2020 Thread #6: waiting for connection
Sun Jun 28 22:11:45 2020 Termination signal received, waiting for ongoing threads to complete.
Sun Jun 28 22:11:45 2020 All threads have terminated, server shutting down.
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