

Name - Sameeksha Bhatia (35243160)

Part 3.a

Stopping servers

```
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh stop servers/zoo1/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo1/zoo.cfg
Stopping zookeeper ... STOPPED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh stop servers/zoo5/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo5/zoo.cfg
Stopping zookeeper ... STOPPED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
```

When one or two servers crash, the operations continue to be successful

The image displays four terminal windows from a Mac OS X desktop environment, illustrating the resilience of a ZooKeeper cluster. The top-left window shows the start of three servers: zoo1, zoo2, and zoo3. The top-right window shows the start of three servers: zoo3, zoo4, and zoo5. The bottom-left window shows the start of two servers: zoo2 and zoo5. The bottom-right window shows a client session connected to localhost:2184, performing operations like creating and getting a node named /zk_test_1.

```
apache-zookeeper-3.8.5-bin -- zsh -- 103x18
zsh: no such file or directory: '/bin/zkServer.sh'
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo1/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo1/zoo.cfg
Starting zookeeper ... FAILED TO START
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo1/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo1/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:46:45 on ttys018
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo2/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo2/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:46:45 on ttys019
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo3/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo3/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:46:45 on ttys020
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo4/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo4/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:47:26 on ttys021
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo5/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo5/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
apache-zookeeper-3.8.5-bin -- zsh -- 111x18
Last login: Thu Nov 29 15:33:19 on ttys018
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo3/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo3/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:46:45 on ttys020
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo4/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo4/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
Last login: Thu Nov 29 15:46:45 on ttys021
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh start servers/zoo5/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo5/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
apache-zookeeper-3.8.5-bin -- zsh -- 101x20
Last login: Thu Nov 29 15:47:26 on ttys021
sameeksha@vl965-172-31-105-184 ~ % cd Downloads/apache-zookeeper-3.8.5-bin/
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkCli.sh -server localhost:2184
ZooKeeper JMX enabled by default
Using config: servers/zoo5/zoo.cfg
Starting zookeeper ... STARTED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
[zk: localhost:2184(CONNECTED) 6] create /zk_test_1 "hello"
Created /zk_test_1
[zk: localhost:2184(CONNECTED) 7] get /zk_test_1
[zk: localhost:2184(CONNECTED) 8] set /zk_test_1 "world"
[zk: localhost:2184(CONNECTED) 9]
```

Client

Part 3.b crash 3 or more servers

```
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin % bin/zkServer.sh stop servers/zoo2/zoo.cfg
ZooKeeper JMX enabled by default
Using config: servers/zoo2/zoo.cfg
Stopping zookeeper ... STOPPED
sameeksha@vl965-172-31-105-184 apache-zookeeper-3.8.5-bin %
```

```
whoami
Command not found: Command not found clear
[zk: localhost:2184(CONNECTED) 6] create /zk_test_1 "hello"
Created /zk_test_1
[zk: localhost:2184(CONNECTED) 7] get /zk_test_1
hel
[zk: localhost:2284(CONNECTED) 8] set /zk_test_1 "world"
[zk: localhost:2284(CONNECTED) 9] 2025-11-28 16:31:12,422 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/0:0:0:0:0:0:0:0:1:2184, Closing socket connection. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)

WATCHER::

WatchedEvent state:Disconnected type:None path:null
2025-11-28 16:31:13,938 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1177] - Opening socket connection to server localhost/0:0:0:0:0:0:0:0:1:2184.
2025-11-28 16:31:13,934 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1179] - SASL config status: Will not attempt to authenticate using SASL (unknown error)
2025-11-28 16:31:13,937 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Socket connection established, initiating session, client: /0:0:0:0:0:0:0:0:1:65324, server: localhost/0:0:0:0:0:0:0:0:1:2184
2025-11-28 16:31:13,940 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/0:0:0:0:0:0:0:0:1:2184, Closing socket connect
ion. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)

2025-11-28 16:31:15,487 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1177] - Opening socket connection to server localhost/0:0:0:0:0:0:0:0:1:2184.
2025-11-28 16:31:15,483 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1179] - SASL config status: Will not attempt to authenticate using SASL (unknown error)
2025-11-28 16:31:15,486 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1013] - Socket connection established, initiating session, client: /0:0:0:0:0:0:0:0:1:65331, server: localhost/0:0:0:0:0:0:0:0:1:2184
2025-11-28 16:31:15,489 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/0:0:0:0:0:0:0:0:1:2184, Closing socket connect
ion. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)

2025-11-28 16:31:17,051 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1177] - Opening socket connection to server localhost/0:0:0:0:0:0:0:0:1:2184.
2025-11-28 16:31:17,052 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1179] - SASL config status: Will not attempt to authenticate using SASL (unknown error)
2025-11-28 16:31:17,053 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1013] - Socket connection established, initiating session, client: /0:0:0:0:0:0:0:0:1:65333, server: localhost/0:0:0:0:0:0:0:0:1:2184
2025-11-28 16:31:17,054 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/0:0:0:0:0:0:0:0:1:2184, Closing socket connect
ion. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)

2025-11-28 16:31:18,192 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1177] - Opening socket connection to server localhost/127.0.0.1:2184.
2025-11-28 16:31:18,193 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1179] - SASL config status: Will not attempt to authenticate using SASL (unknown error)
2025-11-28 16:31:18,193 [myid:localhost:2184] - INFO [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1013] - Socket connection established, initiating session, client: /127.0.0.1:65334, server: localhost/127.0.0.1:2184
2025-11-28 16:31:18,194 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/127.0.0.1:2184, Closing socket connect
ion. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)

2025-11-28 16:31:19,639 [myid:localhost:2184] - WARN [main-SendThread(localhost:2184):o.a.z.ClientCnxn$SendThread@1300] - Session 0x4002ba87ecc0000 for server localhost/0:0:0:0:0:0:0:0:1:2184, Closing socket connect
ion. Attempting reconnect except it is a SessionExpiredException.
org.apache.zookeeper.ClientCnxn$SendStreamException: Unable to read additional data from server sessionid 0x4002ba87ecc0000, likely server has closed socket
    at org.apache.zookeeper.ClientCnxnSocketNIO.doIO(ClientCnxnSocketNIO.java:77)
    at org.apache.zookeeper.ClientCnxnSocketNIO.doTransport(ClientCnxnSocketNIO.java:350)
    at org.apache.zookeeper.ClientCnxn$SendThread.run(ClientCnxn.java:1289)
```

Part 6.a

- In two separate windows, run `Executor` respectively with the following arguments (assuming that you have previously created a znode called `/zk_test` in step 3 above). The first command below should print the value of `/zk_test` that will also be stored in the local file `myfile`, and the second will print nothing at this point.

```
java Executor host:port /zk_test myfile cat myfile
```

Get the value of zknode test

Output stored in myfile -

dc

hello

"myfile" [noeol] 1L, 5B

Part 6.b Create watch_node

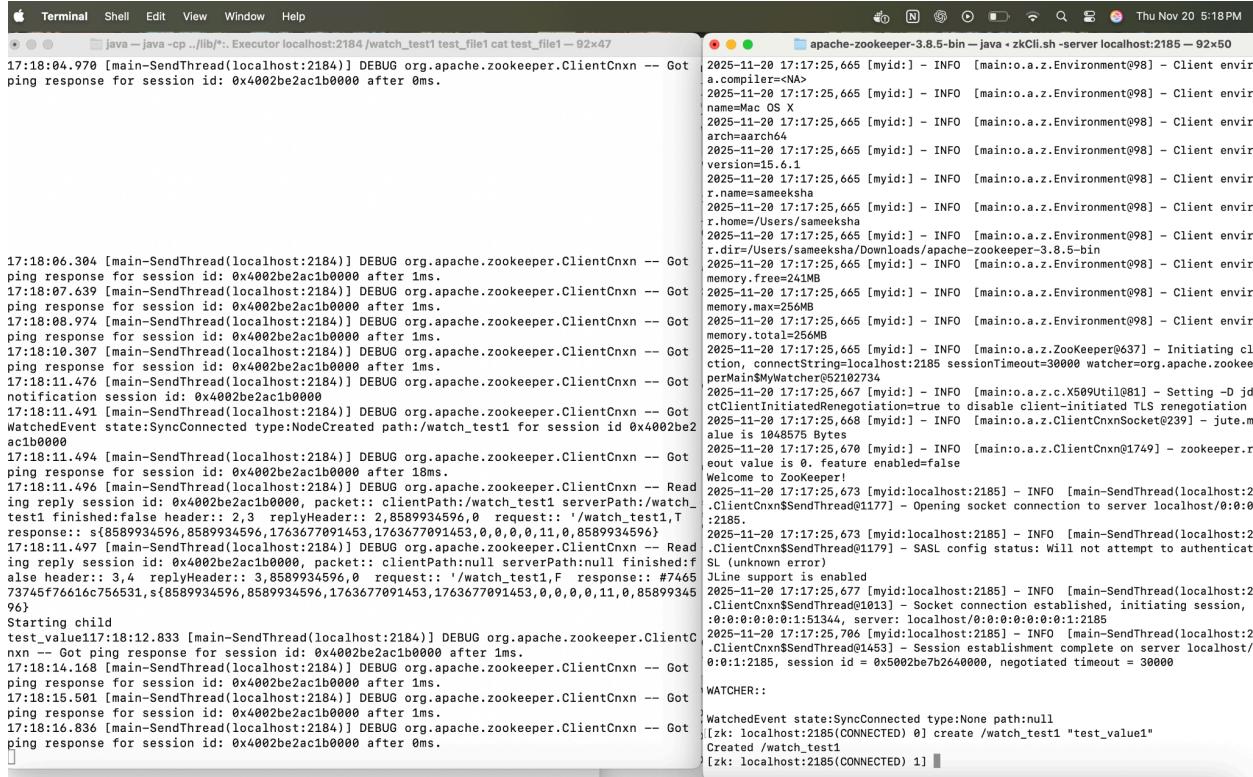
II.java Executor host:port /watch_test1 test_file1 cat test_file1

```
17:13:20.646 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:zookeeper.version=3.8.5-19f1842d4b6ee1f82cc8b05284959b26c6ae507d, built on 2025-09-03 21:35 UTC
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:host.name=v1965-172-31-105-184.wireless.umass.edu
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.version=11.0.28
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.vendor=Homebrew
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.home=/opt/homebrew/Cellar/openjdk@11/11.0.28/libexec/openjdk.jdk/Contents/Home
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.class.path=..;/lib/commons-io-2.17.0.jar:..;/lib/netty-handler-4.1.119.Final.jar:..;/lib/jetty-servlet-9.4.57.v20241219.jar:..;/lib/commons-clio-1.5.0.jar:..;/lib/zookeeper-jute-3.8.5.jar:..;/lib/zookeeper-3.8.5.jar:..;/lib/jackson-core-2.15.2.jar:..;/lib/javax.servlet-api-3.1.0.jar:..;/lib/jetty-http-9.4.57.v20241219.jar:..;/lib/jline-2.14.6.jar:..;/lib/netty-transport-classes-epoll-4.1.119.Final.jar:..;/lib/logback-classic-1.3.15.jar:..;/lib/netty-transport-4.1.119.Final.jar:..;/lib/simpleclient_common-0.9.0.jar:..;/lib/netty-buffer-4.1.119.Final.jar:..;/lib/netty-resolver-4.1.119.Final.jar:..;/lib/netty-transport-native-unix-common-4.1.119.Final.jar:..;/lib/audience-annotations-0.12.0.jar:..;/lib/netty-codec-4.1.119.Final.jar:..;/lib/simpleclient_servlet-0.9.0.jar:..;/lib/jetty-io-9.4.57.v20241219.jar:..;/lib/jetty-util-9.4.57.v20241219.jar:..;/lib/jetty-server-9.4.57.v20241219.jar:..;/lib/simpleclient_hotspot-0.9.0.jar:..;/lib/netty-transport-native-epoll-4.1.119.Final.jar:..;/lib/logback-core-1.3.15.jar:..
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.library.path=/Users/sameeksha/library/Java/Extensions:/Library/Java/Extensions:/Net work/Library/Java/Extensions:/System/Library/Java/Extensions:/usr/lib/java:.
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.tmpdir=/var/folders/q6/wm3sy1xx2tsgywtzp9lg3b6h000gn/T/
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:java.compiler=NA
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.name=Mac OS X
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.arch=aarch64
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.version=15.6.1
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:user.name=sameeksha
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:user.home=/Users/sameeksha
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:user.dir=/Users/sameeksha/Downloads/apache-zookeeper-3.8.5-bin/java
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.memory.free=249MB
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.memory.total=256MB
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Client environment:os.memory.max=4096MB
17:13:20.648 [main] INFO org.apache.zookeeper.ZooKeeper -- Initiating client connection, connectString=localhost:2184 sessionTimeout=3000 watcher=Executor@64485a47
17:13:20.650 [main] INFO org.apache.zookeeper.common.X509Util -- Setting -D jdk.tls.rejectClientInitiatedRenegotiation=true to disable client-initiated TLS renegotiation
17:13:20.652 [main] INFO org.apache.zookeeper.ClientCnxnSocket -- jute.maxbuffer value is 1048575 Bytes
17:13:20.655 [main] INFO org.apache.zookeeper.ClientCnxn -- zookeeper.request.timeout value is 0. feature.enabled=false
17:13:20.658 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.SaslServerPrincipal -- Canonicalized address to localhost
17:13:20.658 [main-SendThread(localhost:2184)] INFO org.apache.zookeeper.ClientCnxn -- Opening socket connection to server localhost/127.0.0.1:2184.
17:13:20.658 [main-SendThread(localhost:2184)] INFO org.apache.zookeeper.ClientCnxn -- SASL config status: Will not attempt to authenticate using SASL (unknown error)
17:13:20.663 [main-SendThread(localhost:2184)] INFO org.apache.zookeeper.ClientCnxn -- Socket connection established, initiating session, client: /127.0.0.1:51276, server: localhost/127.0.0.1:2184
17:13:20.664 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Session establishment request sent on localhost/127.0.0.1:2184
17:13:20.681 [main-SendThread(localhost:2184)] INFO org.apache.zookeeper.ClientCnxn -- Session establishment complete on server localhost/127.0.0.1:2184, session id = 0x4002be2ac1b0000, negotiated timeout = 4000
17:13:20.681 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Reading reply session id: 0x4002be2ac1b0000, packet:: clientPath:/watch_test1 serverPath:/watch_test1 finished:false header:: 1,3 replyHeader:: 1,8589934594,-101 request:: '/watch_test1,T response::
17:13:22.020 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 2ms.
17:13:23.354 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:13:24.688 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:13:26.923 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:13:27.358 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:13:28.693 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
```

III.

Part 7.a Create watch_test1

In another window, run the ZooKeeper client using `bin/zkCli.sh` and connect it to a server replica different from the server in step 5, and create a znode `/watch_test1` with the value "test_value1". At this point, the second command in step 6 above will print "test_value1" and this value will also be stored in the local file `test_file1`



The screenshot shows two terminal windows side-by-side. Both windows have tabs for Terminal, Shell, Edit, View, Window, Help, and a search bar. The right terminal window has a title bar with the date and time: Thu Nov 20 5:18PM.

Terminal 1 (Left):

```
java -cp ../*:. Executor localhost:2184 /watch_test1 test_file1 cat test_file1 - 92x47
17:18:04.970 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.

17:18:06.304 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:07.639 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:08.974 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:10.307 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:11.476 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got notification session id: 0x4002be2ac1b0000
17:18:11.493 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got WatchedEvent state:SyncConnected type:NodeCreated path:/watch_test1 for session id 0x4002be2ac1b0000
17:18:11.494 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 18ms.
17:18:11.496 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Reading reply session id: 0x4002be2ac1b0000, packet:: clientPath:/watch_test1 serverPath:/watch_
test1 finished:false header: 2, 3 replyHeader: 2, 3 replyHeader:: clientPath:/watch_test1,T response:: s{8589934596,8589934596,1763677891453,1763677891453,0,0,0,0,11,0,8589934596}
17:18:11.497 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Reading reply session id: 0x4002be2ac1b0000, packet:: clientPath:null serverPath:null finished:f
else header: 3, 4 replyHeader:: 3, 8589934596,0 request: '/watch_test1,F response: #74657345f76616c756531,s{8589934596,8589934596,1763677891453,1763677891453,0,0,0,11,0,8589934596}
96}
Starting child
test_value117:18:12.833 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:14.168 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:15.501 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:18:16.836 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
```

Terminal 2 (Right):

```
apache-zookeeper-3.8.5-bin - java -cp ../*:. apache-zookeeper-3.8.5-bin - java -cp ../*:. Executor localhost:2185 - zkCli.sh -server localhost:2185 - 92x50
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.name=<NA>
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.name=Mac OS X
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.name=aarch64
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.version=15.6.1
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.name=sameeksha
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.home=/Users/sameeksha
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.dir=/Users/sameeksha/Downloads/apache-zookeeper-3.8.5-bin
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.memory.free=241MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.memory.max=256MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client environment.memory.total=256MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.ZooKeeper@637] - Initiating connection, connectString=localhost:2185 sessionTimeout=30000 watcher=org.apache.zookeeper.MiniMkdirWatcher@52102734
2025-11-20 17:17:25,667 [myid:] - INFO [main:o.a.z.c.X509Util@911] - Setting -Djdk
clientInitiatedRenegotiation=true to disable client-initiated TLS renegotiation
2025-11-20 17:17:25,668 [myid:] - INFO [main:o.a.z.ClientCnxnSocket@239] - jute.m
alue is 1048575 Bytes
2025-11-20 17:17:25,670 [myid:] - INFO [main:o.a.z.ClientCnxn@1749] - zookeeper.r
eout value is 0, feature enabled=false
Welcome to ZooKeeper!
2025-11-20 17:17:25,673 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179)] - Opening socket connection to server localhost/0:0:0
:2185
2025-11-20 17:17:25,673 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179)] - Socket connection established, initiating session, c
:2185
2025-11-20 17:17:25,677 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179)] - Socket connection established, initiating session, c
:2185
2025-11-20 17:17:25,677 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179)] - Socket connection established, initiating session, c
:2185
2025-11-20 17:17:25,677 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179)] - Session establishment complete on server localhost/0
:0:1:2185, session id = 0x5002be7b2640000, negotiated timeout = 30000
WATCHER::
```

WatchedEvent state:SyncConnected type:None path:null

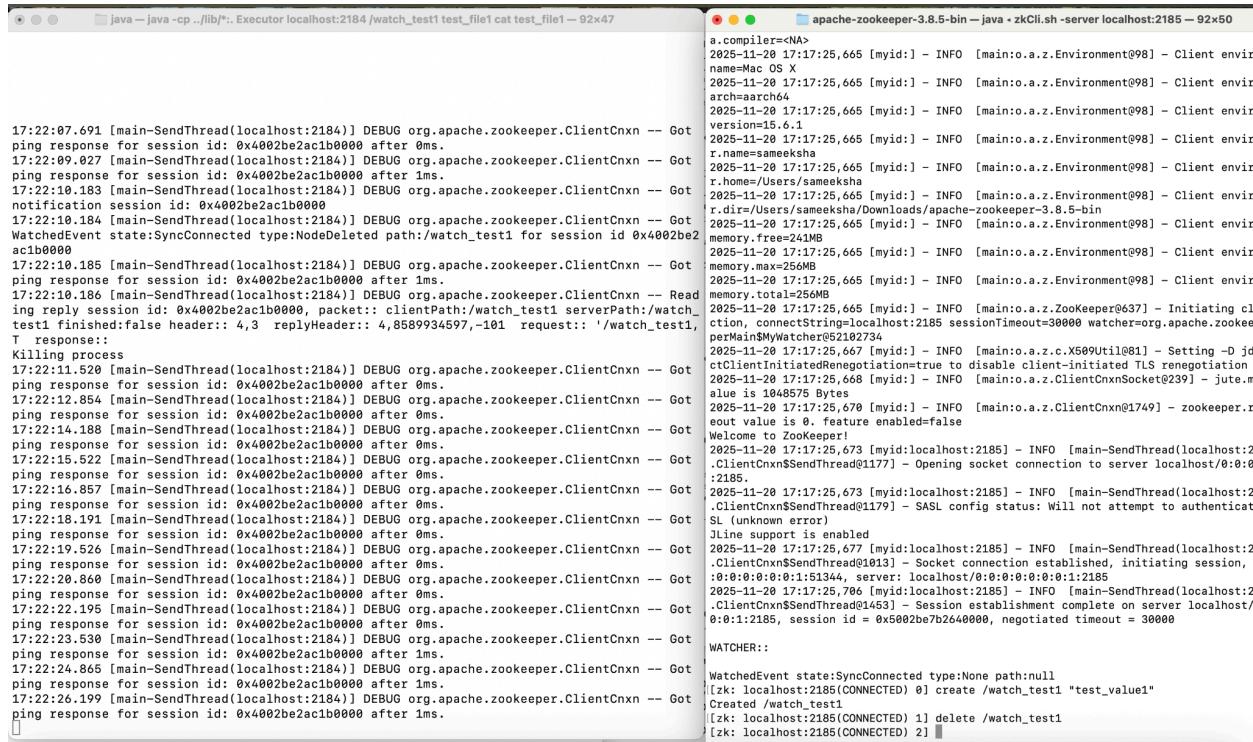
[zk: localhost:2185(CONNECTED) 0] create /watch_test1 "test_value1"

[zk: localhost:2185(CONNECTED) 1]

Output inside test_file1

docker

Part 7.b Delete watch_test node



The screenshot shows two terminal windows side-by-side. Both windows have a title bar indicating they are running 'java - java - cp ..\lib*.jar Executor localhost:2184 /watch_test1 test_file1 cat test_file1'.

Left Terminal Log:

```
17:22:07.691 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:09.027 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:22:10.183 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got notification session id: 0x4002be2ac1b0000
17:22:10.184 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got WatchedEvent state:SyncConnected type:NodeDeleted path:/watch_test1 for session id 0x4002be2ac1b0000
17:22:10.185 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:22:10.185 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Read ing reply session id: 0x4002be2ac1b0000, packet: clientPath:/watch_test1 serverPath:/watch_ test1 finished:false header:: 4,3 replyHeader:: 4,8589934597,-101 request:: '/watch_test1, T response:: Killing process
17:22:11.520 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:12.854 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:14.188 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:15.522 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:16.857 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:18.191 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:19.526 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:20.860 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:22.195 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 0ms.
17:22:23.530 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:22:24.865 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
17:22:26.199 [main-SendThread(localhost:2184)] DEBUG org.apache.zookeeper.ClientCnxn -- Got ping response for session id: 0x4002be2ac1b0000 after 1ms.
```

Right Terminal Log:

```
a.compiler=<NA>
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
name=Mac OS X
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
arch=aarch64
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
version=15.6.1
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
r.name=sameeksha
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
r.home=/Users/sameeksha
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
r.dir=/Users/sameeksha/Downloads/apache-zookeeper-3.8.5-bin
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
memory.free=241MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
memory.max=256MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.Environment@98] - Client envir
memory.total=256MB
2025-11-20 17:17:25,665 [myid:] - INFO [main:o.a.z.ZooKeeper@637] - Initiating cl
ient, connectString=localhost:2185 sessionTimeout=30000 watcher=org.apache.zooke
perMain$MyWatcher@52102734
2025-11-20 17:17:25,667 [myid:] - INFO [main:o.a.z.c.X509Util@81] - Setting -D jd
ctClientInitiatedRenegotiation=true to disable client-initiated TLS renegotiation
2025-11-20 17:17:25,668 [myid:] - INFO [main:o.a.z.ClientCnxnSocket@239] - jute.m
alue is 1048575 Bytes
2025-11-20 17:17:25,670 [myid:] - INFO [main:o.a.z.ClientCnxn@1749] - zookeeper.r
eout value is 0. feature enabled=false
Welcome to ZooKeeper!
2025-11-20 17:17:25,673 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1177] - Opening socket connection to server localhost/0:0:0
:2185.
2025-11-20 17:17:25,673 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1179] - SASL config status: Will not attempt to authenticat
SL (unknown error)
JLine support is enabled
2025-11-20 17:17:25,677 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1013] - Socket connection established, initiating session, '
:0:0:0:0:0:0:1:51344, server: localhost/0:0:0:0:0:0:1:2185
2025-11-20 17:17:25,786 [myid:localhost:2185] - INFO [main-SendThread(localhost:2
:ClientCnxn$SendThread@1453] - Session establishment complete on server localhost/
:0:0:1:2185, session id = 0x5002be7b2640000, negotiated timeout = 30000
WATCHER:
```

WatchedEvent state:SyncConnected type:None path:null
[zk: localhost:2185(CONNECTED) 0] create /watch_test1 "test_value1"
Created /watch_test1
[zk: localhost:2185(CONNECTED) 1] delete /watch_test1
[zk: localhost:2185(CONNECTED) 2]

Activity 2

Tutorial 1

1. Normal working

```
sameeksha@vl965-172-31-105-184 gigapaxos % bin/gpClient.sh
java -Djavax.net.ssl.keyStorePassword=qwerty -Djavax.net.ssl.keyStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/keyStore.jks -Djavax.net.ssl.trustStorePassword=qwerty -Djavax.net.ssl.trustStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/trustStore.jks -ea -cp :/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-android-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-nio-src.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/nio-1.2.1.jar -Djava.util.logging.config.file=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/logging.properties -Dlog4j.configuration=log4j.properties -BgigapaxosConfig=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/gigapaxos.properties edu.umass.cs.reconfiguration.examples.NoopAppClient
Creating name some_name1781684782
Creating name some_name582315108
Creating name some_name2094852195
Creating name some_name1530921535
Creating name some_name1595272682
Creating name some_name1921813414
Creating name some_name465812533
Creating name some_name1626076488
Creating name some_name1984636396
Creating name some_name1104735552
Created some_name1781684782 and beginning to send test requests
Created some_name1595272682 and beginning to send test requests
Created some_name1984636396 and beginning to send test requests
Created some_name1921813414 and beginning to send test requests
Created some_name1530921535 and beginning to send test requests
Created some_name2094852195 and beginning to send test requests
Created some_name1626076488 and beginning to send test requests
Created some_name465812533 and beginning to send test requests
Created some_name582315108 and beginning to send test requests
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":1203988072,"NAME":"some_name1984636396"} [50ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":773699942,"NAME":"some_name465812533"} [25ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":853297391,"NAME":"some_name1921813414"} [48ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":37214831,"NAME":"some_name1530921535"} [45ms]
Created some_name1104735552 and beginning to send test requests
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":833135741,"NAME":"some_name1984636396"} [11ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":1485612880,"NAME":"some_name1781684782"} [37ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":945552183,"NAME":"some_name1626076488"} [39ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":1868294289,"NAME":"some_name1530921535"} [11ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 10","EPOCH":0,"type":401,"QID":528032309,"NAME":"some_name465812533"} [3ms]
```

2. When out of 5, 2 servers are stopped

```
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":15996753,"NAME":"some_name246494435"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1686324335,"NAME":"some_name793816574"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":215213185,"NAME":"some_name1868660004"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":443128265,"NAME":"some_name158304905"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":849114504,"NAME":"some_name55003790"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":669155264,"NAME":"some_name696684253"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":2061569813,"NAME":"some_name1983035874"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1058252227,"NAME":"some_name512362719"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1618426050,"NAME":"some_name793816574"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1586726572,"NAME":"some_name246494435"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1971864080,"NAME":"some_name1868660004"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":684342709,"NAME":"some_name29388035"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":156840612,"NAME":"some_name1983035874"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":932315215,"NAME":"some_name1901587845"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":187623604,"NAME":"some_name512362719"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1393488933,"NAME":"some_name246494435"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":762026025,"NAME":"some_name1868660004"} [3ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1218090012,"NAME":"some_name29388035"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1765164969,"NAME":"some_name55003790"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":518292772,"NAME":"some_name696684253"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":2125517940,"NAME":"some_name1983035874"} [1ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":1906018738,"NAME":"some_name1901587845"} [2ms]
Received response: {"COORD":true,"STOP":false,"QVAL":"ACK 20","EPOCH":0,"type":401,"QID":824336719,"NAME":"some_name793816574"} [2ms]
```

NoopAppClient53613 successfully created 10 names, sent 200 requests, and received 117 responses.

sameeksha@vl965-172-31-105-184 gigapaxos %

3. When 3 servers are stopped

```
sameeksha@vl965-172-31-105-184 gigapaxos % bin/gpClient.sh
java -Djavax.net.ssl.keyStorePassword=qwerty -Djavax.net.ssl.keyStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/keyStore.jks -Djavax.net.ssl.trustStorePassword=qwerty -Djavax.net.ssl.trustStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/trustStore.jks -ea
cp :/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/test/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jar/gigapaxos-android-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-nio-src.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/nio-1.2.1.jar -Djava.util.logging.config.file=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/logging.properties -Dlog4j.configuration=log4j.properties -DgigaConfig=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/A3-gigapaxos/gigapaxos/conf/gigapaxos.properties edu.umass.cs.reconfiguration.examples.NoopAppClient
Creating name some_name167046982
Creating name some_name488416388
Creating name some_name1511628034
Creating name some_name133764639
Creating name some_name1826919710
Creating name some_name1215164199
Creating name some_name938912075
Creating name some_name1122728956
Creating name some_name2093035099
Creating name some_name1668891261

NoopAppClient53880 successfully created 10 names, sent 200 requests, and received 0 responses.
sameeksha@vl965-172-31-105-184 gigapaxos %
```

Tutorial 2

Part 2.a

```
/127.0.0.1:7002 AdderRC3:/127.0.0.1:7003 Initializing gigapaxos server [ AdderRC0:/127.0.0.1:7000 Initializing gigapaxos server [ AdderRC1:/127.0.0.1:7001 AdderRC4:/127.0.0.1:7004 ]; server[AdderAR0] ready
]; server[AdderAR1] ready
]; server[AdderAR4] ready
]; server[AdderAR2] ready
]; server[AdderAR3] ready
]; server[AdderRC3] ready
]; server[AdderRC2] ready
]; server[AdderRC0] ready
]; server[AdderRC1] ready
]; server[AdderRC4] ready
RC.AdderRC3:HTTP:/127.0.0.1:7303 ready
RC.AdderRC2:HTTP:/127.0.0.1:7302 ready
RC.AdderRC0:HTTP:/127.0.0.1:7300 ready
RC.AdderRC1:HTTP:/127.0.0.1:7301 ready
RC.AdderRC4:HTTP:/127.0.0.1:7304 ready
```

- 1.
2. When client is started and sending request to only AR0 and in between a servers is stopped .

```
sameeksha@vl965-172-31-105-184 gigapaxos % bin/gpServer.sh stop AR4
killing AR4(93021 15082 4710)
sameeksha@vl965-172-31-105-184 gigapaxos %
```

3. Client response

```
43: Response for request [1803238627] = total=-860427673 received in 4ms
46: Response for request [17722004] = total=-842705669 received in 4ms
47: Response for request [805644742] = total=-37060927 received in 4ms
50: Response for request [990109917] = total=953048990 received in 4ms
51: Response for request [485187793] = total=1438236783 received in 5ms
53: Response for request [1418752675] = total=-1437977838 received in 2ms
57: Response for request [197426473] = total=-1240551365 received in 3ms
58: Response for request [1521309242] = total=280757877 received in 3ms
61: Response for request [696340651] = total=977098528 received in 1ms
62: Response for request [1305470440] = total=-2012398328 received in 2ms
66: Response for request [1390976162] = total=-621422166 received in 5ms
67: Response for request [125930234] = total=-495491932 received in 5ms
69: Response for request [1757994260] = total=1262502328 received in 4ms
70: Response for request [1320551087] = total=-1711913881 received in 3ms
72: Response for request [2057692651] = total=345778770 received in 5ms
73: Response for request [475288533] = total=821067303 received in 3ms
74: Response for request [1705335386] = total=-1768564607 received in 5ms
75: Response for request [1185171907] = total=-583392700 received in 4ms
76: Response for request [773908300] = total=190515600 received in 3ms
77: Response for request [1268746716] = total=1459262316 received in 3ms
78: Response for request [733454299] = total=-2102250681 received in 3ms
79: Response for request [390437846] = total=-1711812835 received in 1ms
81: Response for request [206147374] = total=-1505665461 received in 3ms
83: Response for request [209920723] = total=-1295744738 received in 5ms
84: Response for request [981926654] = total=-313818084 received in 2ms
85: Response for request [536472963] = total=222654879 received in 5ms
86: Response for request [624623] = total=223279502 received in 5ms
88: Response for request [351944129] = total=575223631 received in 2ms
90: Response for request [1312474404] = total=1887698035 received in 3ms
91: Response for request [1101620417] = total=-1305648844 received in 5ms
96: Response for request [1001722435] = total=-303926409 received in 3ms
98: Response for request [324814768] = total=20888359 received in 6ms
99: Response for request [614596188] = total=635484547 received in 5ms
○ sameeksha@v1965-172-31-105-184 gigapaxos %
```

Part 2. B - Restart stopped server and its total value should match what was last written .

Code change - `final String requestValue = "0";`

```
sameeksha@v1965-172-31-105-184 gigapaxos % bin/gpClient.sh -DgigapaxosConfig=conf/examples/adder.properties edu.umass.cs.gigapaxos.examples.adder.StatefulAdderAppClient
java -Djavax.net.ssl.keyStorePassword=qwerty -Djavax.net.ssl.keyStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/keyStore.jks -Djavax.net.ssl.trustStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/trustStore.jks -ea -cp :/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/test/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-android-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-nio-1.2.1.jar -Djava.util.logging.config.file=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/nio-1.2.1.jar -Dlog4j.configuration=log4j.properties -DgigapaxosConfig=conf/examples/adder.properties -DgigapaxosConfig=conf/examples/adder.properties edu.umass.cs.gigapaxos.examples.adder.StatefulAdderAppClient
0: Response for request [0] = total=635484547 received in 41ms
1: Response for request [0] = total=635484547 received in 4ms
2: Response for request [0] = total=635484547 received in 6ms
3: Response for request [0] = total=635484547 received in 5ms
4: Response for request [0] = total=635484547 received in 10ms
5: Response for request [0] = total=635484547 received in 8ms
6: Response for request [0] = total=635484547 received in 8ms
7: Response for request [0] = total=635484547 received in 7ms
8: Response for request [0] = total=635484547 received in 4ms
9: Response for request [0] = total=635484547 received in 8ms
10: Response for request [0] = total=635484547 received in 9ms
11: Response for request [0] = total=635484547 received in 4ms
12: Response for request [0] = total=635484547 received in 3ms
```

Tutorial 3

1. Verify first that local reads above are faster than coordinated writes

Reads are taking ~2ms whereas writes are taking roughly 6-9ms

```
sameeksha@vl965-172-31-105-184 gigapaxos % bin/gpClient.sh -DgigapaxosConfig=conf/examples/linwrites.properties edu.umass.cs.reconfiguration.examples.LinWritesLocReadsAppClient
54: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2046698311027743744] = total=-1580071109 received in 2ms
55: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6347939420844598272] = total=86888463 received in 9ms
56: Response for request [LOCAL_READ:LinWritesLocReadsApp@:4863211071659811840] = total=86888463 received in 2ms
57: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:207630029529310208] = total=1450851323 received in 7ms
58: Response for request [LOCAL_READ:LinWritesLocReadsApp@:4599649482910832640] = total=1450851323 received in 2ms
59: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:116939016423256064] = total=2123808018 received in 8ms
60: Response for request [LOCAL_READ:LinWritesLocReadsApp@:6204598133868742656] = total=2123808018 received in 1ms
61: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:4670038491377364992] = total=-1547471576 received in 5ms
62: Response for request [LOCAL_READ:LinWritesLocReadsApp@:8057063882901715968] = total=-1547471576 received in 2ms
63: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:33033229924048896] = total=-136096698 received in 6ms
64: Response for request [LOCAL_READ:LinWritesLocReadsApp@:1261350263144453120] = total=-136096698 received in 2ms
65: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1937135271423371264] = total=1958814075 received in 6ms
66: Response for request [LOCAL_READ:LinWritesLocReadsApp@:996454194295048192] = total=1958814075 received in 3ms
67: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:3900280413945982976] = total=-643287363 received in 7ms
68: Response for request [LOCAL_READ:LinWritesLocReadsApp@:3489505080213985280] = total=643287363 received in 3ms
69: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:7657062124290463744] = total=133478310 received in 6ms
70: Response for request [LOCAL_READ:LinWritesLocReadsApp@:7836125745269139456] = total=133478310 received in 2ms
71: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1937135271423371264] = total=1353845295 received in 6ms
72: Response for request [LOCAL_READ:LinWritesLocReadsApp@:8793269453641650176] = total=1353845295 received in 2ms
73: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6617267772373071872] = total=-806266090 received in 9ms
74: Response for request [LOCAL_READ:LinWritesLocReadsApp@:3372363404530674688] = total=-806266090 received in 2ms
75: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:5284033933509512192] = total=-13306787 received in 6ms
76: Response for request [LOCAL_READ:LinWritesLocReadsApp@:7160095600255459328] = total=-13306787 received in 2ms
77: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:495783723132271104] = total=589311794 received in 5ms
78: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2588271232850462720] = total=589311794 received in 2ms
79: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1824828481070831616] = total=-1920022577 received in 8ms
80: Response for request [LOCAL_READ:LinWritesLocReadsApp@:574339018394277888] = total=-1920022577 received in 2ms
81: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:3149497724505415680] = total=-934716246 received in 6ms
82: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2159639420983696384] = total=-934716246 received in 2ms
83: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1904791866496727040] = total=163569666 received in 6ms
84: Response for request [LOCAL_READ:LinWritesLocReadsApp@:91590066918258549760] = total=163569666 received in 0ms
85: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:3199544865449434112] = total=1082508466 received in 4ms
86: Response for request [LOCAL_READ:LinWritesLocReadsApp@:5791377612133413888] = total=1082508466 received in 2ms
87: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:4084655005337513984] = total=2008984892 received in 6ms
88: Response for request [LOCAL_READ:LinWritesLocReadsApp@:3684579118307485696] = total=2008984892 received in 2ms
89: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:7247450105367785472] = total=-1036163597 received in 6ms
90: Response for request [LOCAL_READ:LinWritesLocReadsApp@:8112388275425704960] = total=-1036163597 received in 2ms
91: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1466681803744585728] = total=667545976 received in 17ms
92: Response for request [LOCAL_READ:LinWritesLocReadsApp@:35939642382869504] = total=667545976 received in 2ms
93: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:3911239846457219072] = total=735473791 received in 5ms
94: Response for request [LOCAL_READ:LinWritesLocReadsApp@:7853406590731963392] = total=735473791 received in 2ms
95: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:2777593680474566656] = total=1524476928 received in 7ms
96: Response for request [LOCAL_READ:LinWritesLocReadsApp@:135346468302734336] = total=1524476928 received in 2ms
97: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:5615184610962110464] = total=-944174524 received in 7ms
98: Response for request [LOCAL_READ:LinWritesLocReadsApp@:3434343030730745856] = total=-944174524 received in 1ms
99: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:5479712801035583488] = total=-261179765 received in 4ms
sameeksha@vl965-172-31-105-184 gigapaxos %
```

2. Making reads also coordinated

@Override

```
3.     public boolean needsCoordination() {
4.
5.         // return this.getRequestType().equals
6.
7.         //      (PacketType.LOCAL_READ) ? false : true;
8.
9.         return true;
10.    }
```

```

98: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5227844831962531840] = total=1134107859 received in 9ms
99: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8041974139069143040] = total=1876501791 received in 5ms
100: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5131342615681498112] = total=1876501791 received in 6ms
101: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:5241161251380055040] = total=1980104630 received in 6ms
102: Response for request [LOCAL_READ:LinWritesLocReadsApp0:4371691177877786624] = total=1980104630 received in 4ms
103: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:9003182788536219648] = total=-958588091 received in 3ms
104: Response for request [LOCAL_READ:LinWritesLocReadsApp0:3084048648678287360] = total=-958588091 received in 3ms
105: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:5500386405193313280] = total=89054099 received in 5ms
106: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5364321539297133568] = total=89054099 received in 3ms
107: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7234298806541172736] = total=2111122348 received in 6ms
108: Response for request [LOCAL_READ:LinWritesLocReadsApp0:3689510995075247104] = total=2111122348 received in 6ms
109: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:1768434767136065536] = total=-1754428819 received in 5ms
110: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5817418639088463872] = total=-1754428819 received in 6ms
111: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:2738465961029521408] = total=227273469 received in 6ms
112: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1021510697455240192] = total=227273469 received in 6ms
113: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7600948730822158336] = total=1211131967 received in 10ms
114: Response for request [LOCAL_READ:LinWritesLocReadsApp0:8192380984066297856] = total=1211131967 received in 6ms
115: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:663864167403060224] = total=1498117871 received in 6ms
116: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5540546818305866752] = total=1498117871 received in 5ms
117: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:6899766738197920768] = total=-1185842559 received in 5ms
118: Response for request [LOCAL_READ:LinWritesLocReadsApp0:3000027214214680576] = total=-1185842559 received in 5ms
119: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:720636464198995584] = total=879937433 received in 5ms
120: Response for request [LOCAL_READ:LinWritesLocReadsApp0:6893178155568782336] = total=879937433 received in 9ms
121: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8199039403015678976] = total=1713586403 received in 7ms
122: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2971642419864173568] = total=1713586403 received in 7ms
123: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7224013159278441472] = total=-1521660492 received in 4ms
124: Response for request [LOCAL_READ:LinWritesLocReadsApp0:8919471523858850816] = total=-1521660492 received in 6ms
125: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:3291786514090633216] = total=-847541344 received in 8ms
126: Response for request [LOCAL_READ:LinWritesLocReadsApp0:4322876075522356224] = total=-847541344 received in 5ms
127: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8609284963620987904] = total=832949366 received in 12ms
128: Response for request [LOCAL_READ:LinWritesLocReadsApp0:3119038619141030912] = total=832949366 received in 6ms
129: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7344984544229430272] = total=1018947797 received in 7ms
130: Response for request [LOCAL_READ:LinWritesLocReadsApp0:6210790802725559296] = total=1018947797 received in 5ms
131: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:1848636225926075392] = total=-1471336009 received in 6ms
132: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1340216331727568896] = total=-1471336009 received in 4ms
133: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7239314379015886848] = total=-266556675 received in 4ms
134: Response for request [LOCAL_READ:LinWritesLocReadsApp0:8917607354216845312] = total=-266556675 received in 6ms
135: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:3259466900301131776] = total=842940584 received in 6ms
136: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1653386706785116160] = total=842940584 received in 6ms
137: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:5991006697523801088] = total=1351041813 received in 6ms
138: Response for request [LOCAL_READ:LinWritesLocReadsApp0:8189253858172405760] = total=1351041813 received in 5ms
139: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7242169948014601216] = total=-845464481 received in 5ms
140: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2211699953505464320] = total=-845464481 received in 2ms
141: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:4206189362489669632] = total=543856708 received in 5ms
142: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5836639569642096640] = total=543856708 received in 4ms
143: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:1647599050146387968] = total=2117029155 received in 7ms
144: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2401028385838477312] = total=2117029155 received in 5ms
145: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7212916674196592640] = total=-178503643 received in 5ms

```

a.

153: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6694775288761320448] = total=-878247343 received in 5ms
154: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2969241670520475648] = total=-878247343 received in 6ms
155: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:8028861051031069696] = total=1013157771 received in 13ms
156: Response for request [LOCAL_READ:LinWritesLocReadsApp@:3129294152337386496] = total=1013157771 received in 5ms
157: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6161698728970910720] = total=-1202088349 received in 4ms
158: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2421815331868369920] = total=-1202088349 received in 3ms
159: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6426743927969462176] = total=413187521 received in 5ms
160: Response for request [LOCAL_READ:LinWritesLocReadsApp@:68705151306230040576] = total=413187521 received in 10ms
161: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1434953094039737344] = total=1590859074 received in 5ms
162: Response for request [LOCAL_READ:LinWritesLocReadsApp@:4601820286748084224] = total=1590859074 received in 3ms
163: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:365313498432321408] = total=1725189756 received in 6ms
164: Response for request [LOCAL_READ:LinWritesLocReadsApp@:6952267322138705920] = total=1725189756 received in 4ms
165: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:60033534637932176128] = total=-1228855897 received in 6ms
166: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2491021003226562560] = total=-1228855897 received in 5ms
167: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:8865423767317515264] = total=-243385414 received in 5ms
168: Response for request [LOCAL_READ:LinWritesLocReadsApp@:8814258655085766656] = total=-243385414 received in 5ms
169: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:8207098270645900288] = total=1034574814 received in 5ms
170: Response for request [LOCAL_READ:LinWritesLocReadsApp@:7795620675088202752] = total=1034574814 received in 4ms
171: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1151322153213797376] = total=1349591687 received in 5ms
172: Response for request [LOCAL_READ:LinWritesLocReadsApp@:5766340545005896704] = total=1349591687 received in 6ms
173: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:9079032703682872320] = total=-1796824441 received in 5ms
174: Response for request [LOCAL_READ:LinWritesLocReadsApp@:1078413594869827584] = total=-1796824441 received in 6ms
175: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:4565929434915645440] = total=249048491 received in 5ms
176: Response for request [LOCAL_READ:LinWritesLocReadsApp@:5094799234025458688] = total=249048491 received in 5ms
177: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:6973519500804598784] = total=1388335958 received in 5ms
178: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2723131861771127880] = total=1388335958 received in 12ms
179: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:5044486907377203200] = total=-1627672353 received in 6ms
180: Response for request [LOCAL_READ:LinWritesLocReadsApp@:2005253930219602944] = total=-1627672353 received in 5ms
181: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:1510643594775303168] = total=136410517 received in 4ms
182: Response for request [LOCAL_READ:LinWritesLocReadsApp@:5207105177744323584] = total=136410517 received in 3ms
183: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:685358297724556288] = total=1116847035 received in 6ms
184: Response for request [LOCAL_READ:LinWritesLocReadsApp@:4245057291899597824] = total=1116847035 received in 8ms
185: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:50860363242506783744] = total=1620658772 received in 6ms
186: Response for request [LOCAL_READ:LinWritesLocReadsApp@:623110460908249298] = total=1620658772 received in 2ms
187: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:2138894149179214848] = total=-2079900396 received in 2ms
188: Response for request [LOCAL_READ:LinWritesLocReadsApp@:6033123642000072704] = total=-2079900396 received in 3ms
189: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:7395078364383806464] = total=-1203551708 received in 6ms
190: Response for request [LOCAL_READ:LinWritesLocReadsApp@:6549387133713056768] = total=-1203551708 received in 6ms
191: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:8775477579256815616] = total=-661264827 received in 11ms
192: Response for request [LOCAL_READ:LinWritesLocReadsApp@:580628520569132032] = total=-661264827 received in 10ms
193: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:2235960660578439168] = total=596913418 received in 5ms
194: Response for request [LOCAL_READ:LinWritesLocReadsApp@:1907261364583156736] = total=596913418 received in 3ms
195: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:26725510179959808] = total=-1893806067 received in 11ms
196: Response for request [LOCAL_READ:LinWritesLocReadsApp@:864034971334564864] = total=-1893806067 received in 4ms
197: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:4558188660775006208] = total=-1310987937 received in 2ms
198: Response for request [LOCAL_READ:LinWritesLocReadsApp@:1298303143004368896] = total=-1310987937 received in 6ms
199: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp@:4774356628431113216] = total=836106130 received in 4ms

b.

c. After stopping server 1 , requests are working fine

```

PROBLEMS 167 OUTPUT DEBUG CONSOLE TERMINAL PORTS
sameeksha@v1965-172-31-105-184 gigapaxos % bin/gpClient.sh -DgigapaxosConfig=conf/examples/linwrites.properties edu.umass.cs.reconfiguration.examples.linwrites.LinWritesLocReadsAppClient
160: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2927490974674306048] = total=-654038517 received in 3ms
161: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:6424429781734438912] = total=-388190994 received in 6ms
162: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1515698161317953536] = total=-388190994 received in 5ms
163: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8344611408680611840] = total=1647529450 received in 4ms
164: Response for request [LOCAL_READ:LinWritesLocReadsApp0:7102797046556497920] = total=1647529450 received in 7ms
165: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:499276883293906432] = total=2034625051 received in 5ms
166: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1273810761784511488] = total=2034625051 received in 5ms
167: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:2821510509555462144] = total=-1604600698 received in 5ms
168: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2486546305589771264] = total=-1604600698 received in 5ms
169: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:253828124803525632] = total=-644561963 received in 5ms
170: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1359995039998573568] = total=-644561963 received in 5ms
171: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8822922716540267520] = total=-120829732 received in 5ms
172: Response for request [LOCAL_READ:LinWritesLocReadsApp0:12753185464954776] = total=-120829732 received in 65ms
173: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7407142009987363072] = total=1111170698 received in 5ms
174: Response for request [LOCAL_READ:LinWritesLocReadsApp0:7129078953142878208] = total=1111170698 received in 4ms
175: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:3937240842376950784] = total=-1657981471 received in 2ms
176: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5715198783677491200] = total=-1657981471 received in 3ms
177: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:3329307506960286720] = total=-1414989951 received in 4ms
178: Response for request [LOCAL_READ:LinWritesLocReadsApp0:9440683231630515200] = total=-1414989951 received in 6ms
179: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7953895300104390656] = total=-1293989976 received in 5ms
180: Response for request [LOCAL_READ:LinWritesLocReadsApp0:2769223427988695040] = total=-1293989976 received in 3ms
181: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:5507155681525082112] = total=-475192718 received in 7ms
182: Response for request [LOCAL_READ:LinWritesLocReadsApp0:1410447758709984256] = total=-475192718 received in 4ms
183: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:3798048642233827328] = total=1039186592 received in 6ms
184: Response for request [LOCAL_READ:LinWritesLocReadsApp0:7032370133184927744] = total=1039186592 received in 5ms
185: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:2717444994520787968] = total=-2031356488 received in 5ms
186: Response for request [LOCAL_READ:LinWritesLocReadsApp0:4473206977689563136] = total=-2031356488 received in 3ms
187: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:6937989795594088448] = total=-513083998 received in 4ms
188: Response for request [LOCAL_READ:LinWritesLocReadsApp0:31100805605779642368] = total=513083998 received in 4ms
189: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8075458823079219200] = total=-492294742 received in 4ms
190: Response for request [LOCAL_READ:LinWritesLocReadsApp0:662104484456214184] = total=-492294742 received in 3ms
191: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:4489971802047050752] = total=1039385977 received in 5ms
192: Response for request [LOCAL_READ:LinWritesLocReadsApp0:879092504492035072] = total=1039385977 received in 2ms
193: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:8373400580940436480] = total=1391519575 received in 1ms
194: Response for request [LOCAL_READ:LinWritesLocReadsApp0:3731159574367606784] = total=1391519575 received in 3ms
195: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:4691713949243037696] = total=-2124471821 received in 2ms
196: Response for request [LOCAL_READ:LinWritesLocReadsApp0:7571874767966987264] = total=-2124471821 received in 3ms
197: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:2333450916498579456] = total=-1693818103 received in 2ms
198: Response for request [LOCAL_READ:LinWritesLocReadsApp0:5603117206332125184] = total=-1693818103 received in 1ms
199: Response for request [COORDINATED_WRITE:LinWritesLocReadsApp0:7747228127314308096] = total=107933534 received in 1ms
○ sameeksha@v1965-172-31-105-184 gigapaxos %

```

d. The stopped server was started again and it read the most recent coordinated write

```

sameeksha@v1965-172-31-105-184 gigapaxos % bin/gpClient.sh -DgigapaxosConfig=conf/examples/linwrites.properties edu.umass.cs.reconfiguration.examples.linwrites.LinWritesLocReadsAppClient
java -Djavax.net.ssl.keyStorePassword=qwerty -Djavax.net.ssl.keyStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/keyStore.jks -Djavax.net.ssl.trustStorePassword=qwerty -Djavax.net.ssl.trustStore=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/trustStore.jks -ea -cp :/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/build/test/classes:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/gigapaxos-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos-android-1.0.10.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/nio-src.jar:/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/jars/nio-1.2.1.jar -Djava.util.logging.config.file=/Users/sameeksha/Documents/umass/courses/fall_2025/compsci_578_Distributed-systems/PA3-gigapaxos/gigapaxos/conf/logging.properties -Dlog4j.configuration=log4j.properties -DgigapaxosConfig=conf/examples/linwrites.properties -DgigapaxosConfig=conf/examples/linwrites.properties.edu.umass.cs.reconfiguration.examples.linwrites.LinWritesLocReadsAppClient
Response from LWAR1 for request [LOCAL_READ:LinWritesLocReadsApp0:4880160660598219776] = total=107933534 received in 47ms
○ sameeksha@v1965-172-31-105-184 gigapaxos %

```

- During the downtime of AR1, coordinated write requests continued to be processed by the remaining active replicas. Upon restarting AR1, any read request issued to it returned the most recent value committed while it was offline. This behavior occurs because GigaPaxos implements **replicated state machine consistency with state transfer**: when a previously offline replica rejoins, it synchronizes its state by replaying or applying all missed committed operations from the log. Consequently, even a single read from AR1 after recovery reflects the

latest committed write, demonstrating **linearizability** and the system's ability to maintain **strong consistency** despite partial failures.

f.