

# Introduction to Benchmark

Database Systems  
DataLab, CS, NTHU  
Spring, 2021

# Outline

- VanillaBench Project
  - Introduction to VanillaBench
  - Setting Benchmark Configurations
  - Starting Up Server for Benchmarking
  - Running Benchmark Client
  - Assignment 2

# Outline

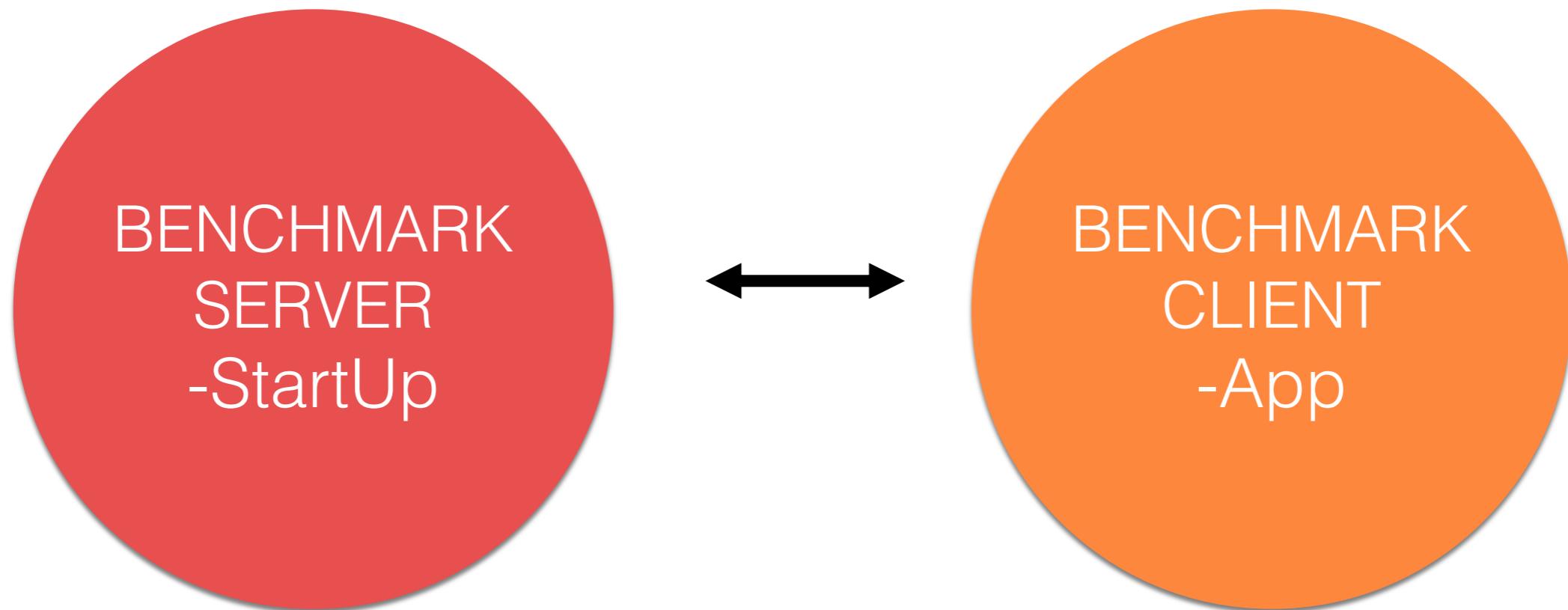
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# VanillaBench

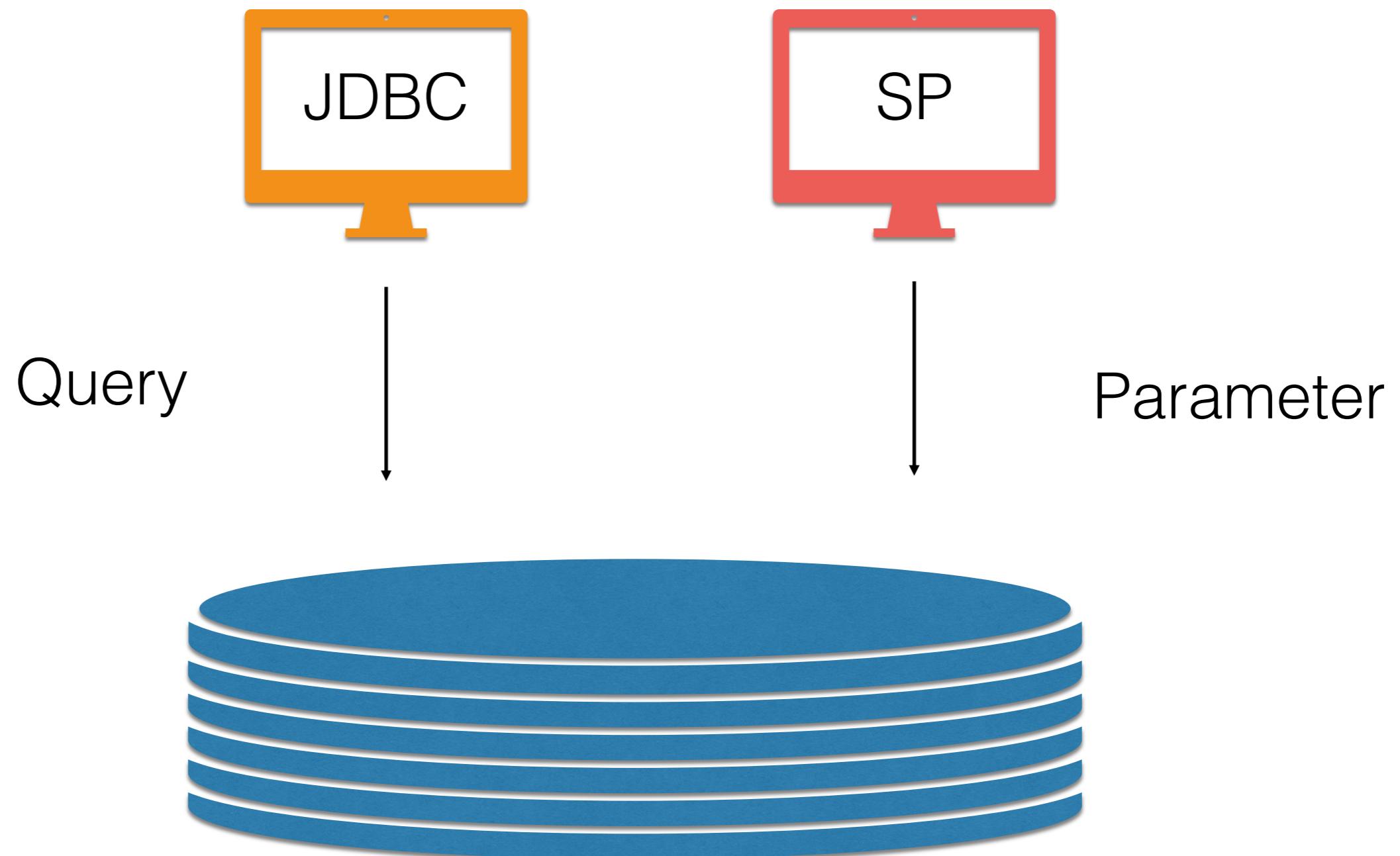


- VanillaBench is a project designed for automatically benchmarking VanillaCore
- It contains several benchmark procedures
- It also has a lot of adjustable testing parameters

# Two Main Methods



# JDBC / SP ?



# Create SP

```
-- Insert user
CREATE PROCEDURE insertuser(uname VARCHAR(50), ukarma INT)
LANGUAGE SQL
AS $$

    INSERT INTO users(name, karma) VALUES (uname, ukarma);

$$;

-- Insert post
CREATE PROCEDURE insertpost(uname VARCHAR(50), post TEXT)
LANGUAGE SQL
AS $$

    INSERT INTO posts(text, "authorId")
    VALUES (post, (SELECT id FROM users WHERE name = uname));

$$;
```

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# Clone the Project First

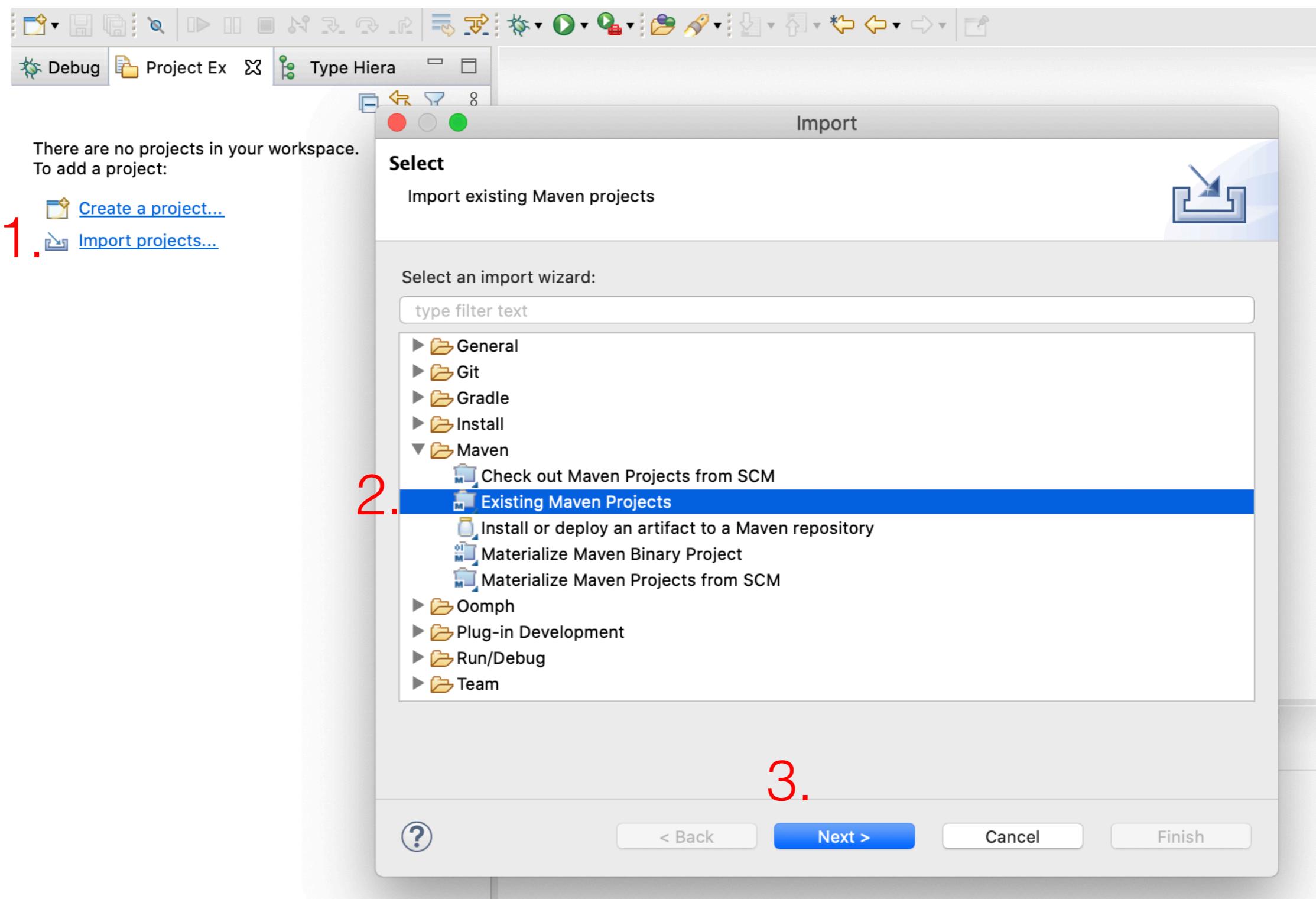
- The code of VanillaBench has been pushed to vanilladb repository
- All you need is to clone from the remote repository

```
> git clone
```

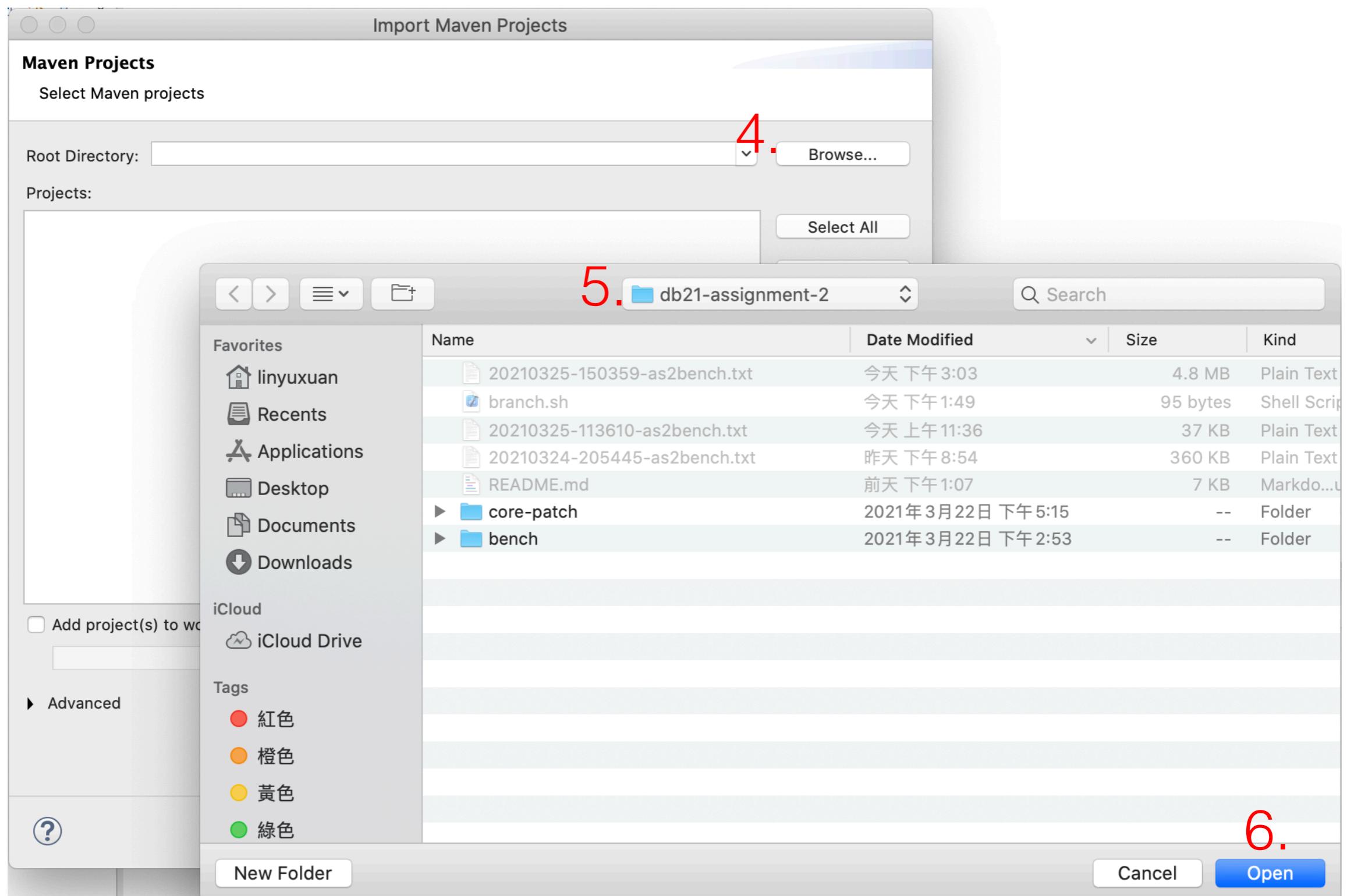
- You can clone from here:

- <https://shwu10.cs.nthu.edu.tw/courses/databases/2021-spring/db21-assignment-2>

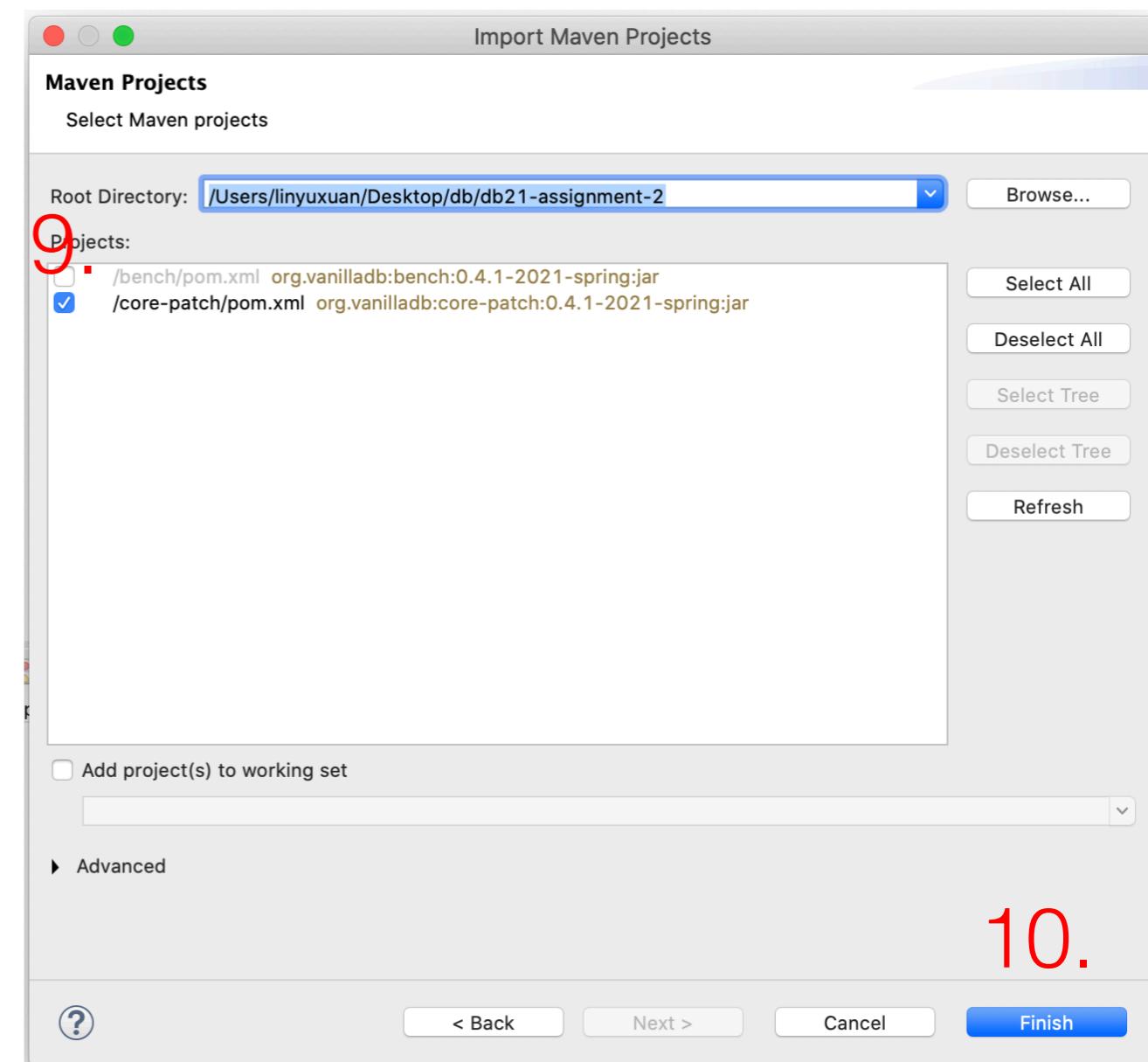
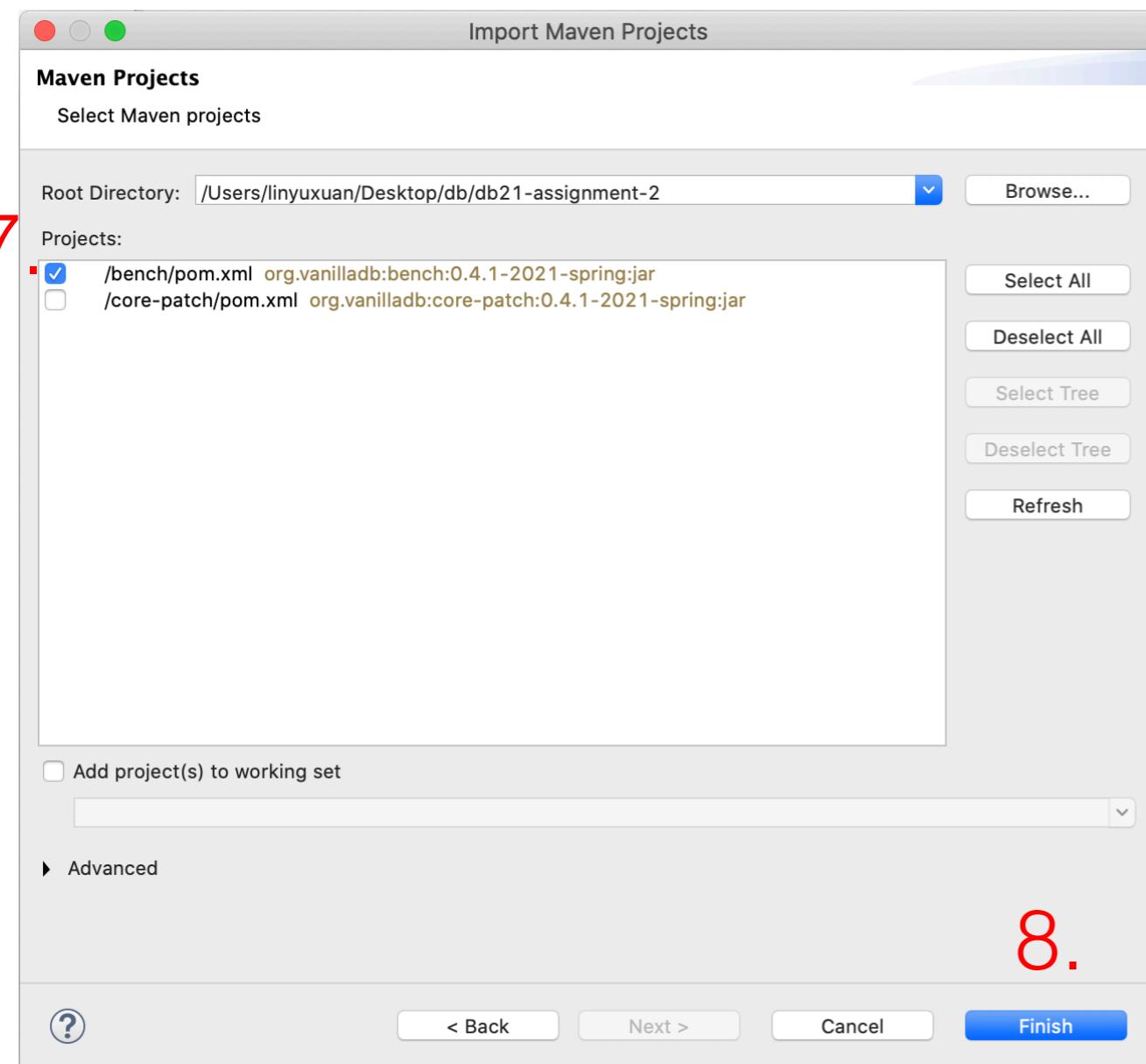
# Import Project(1/3)



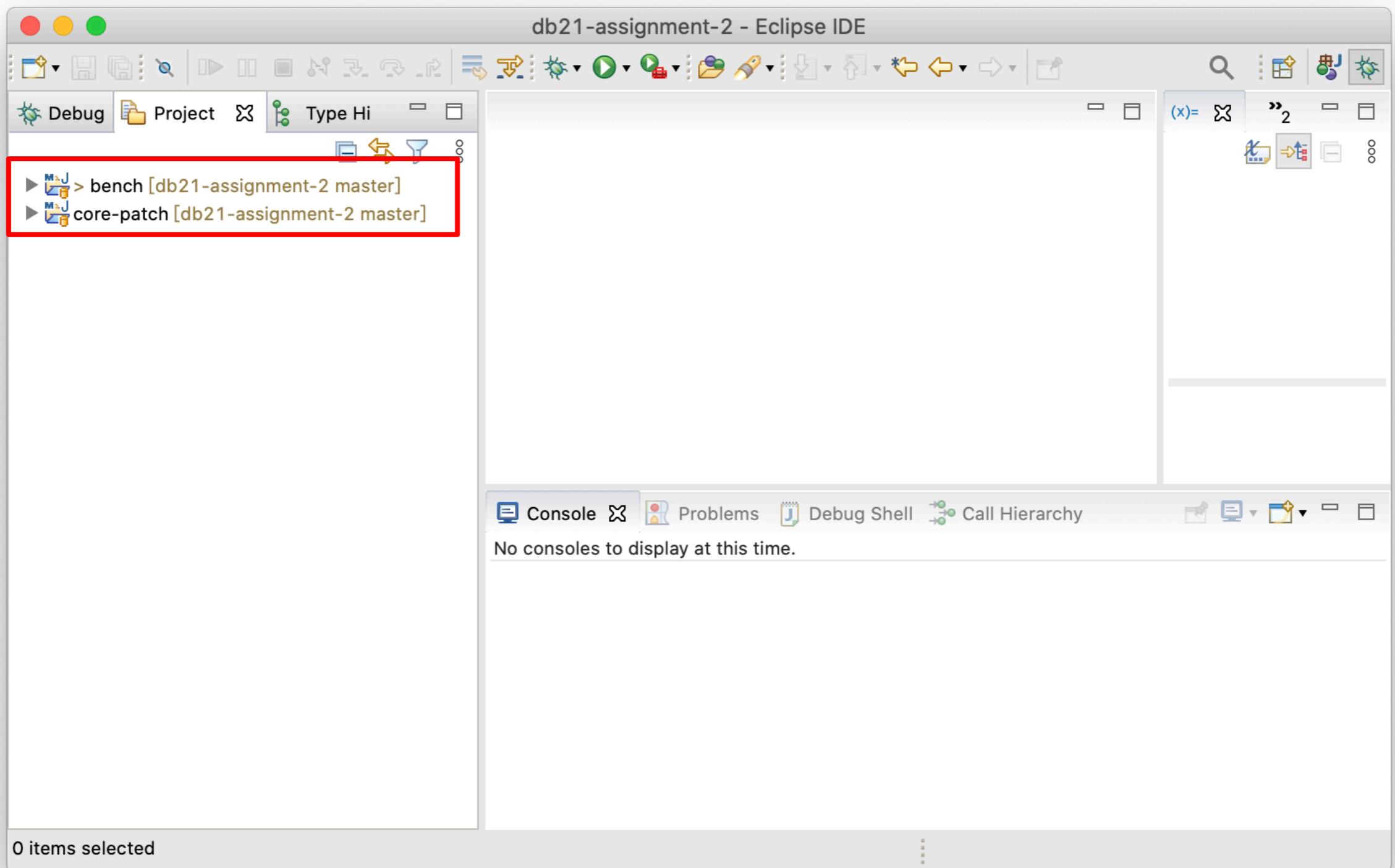
# Import Project(2/3)



# Import Project(3/3)

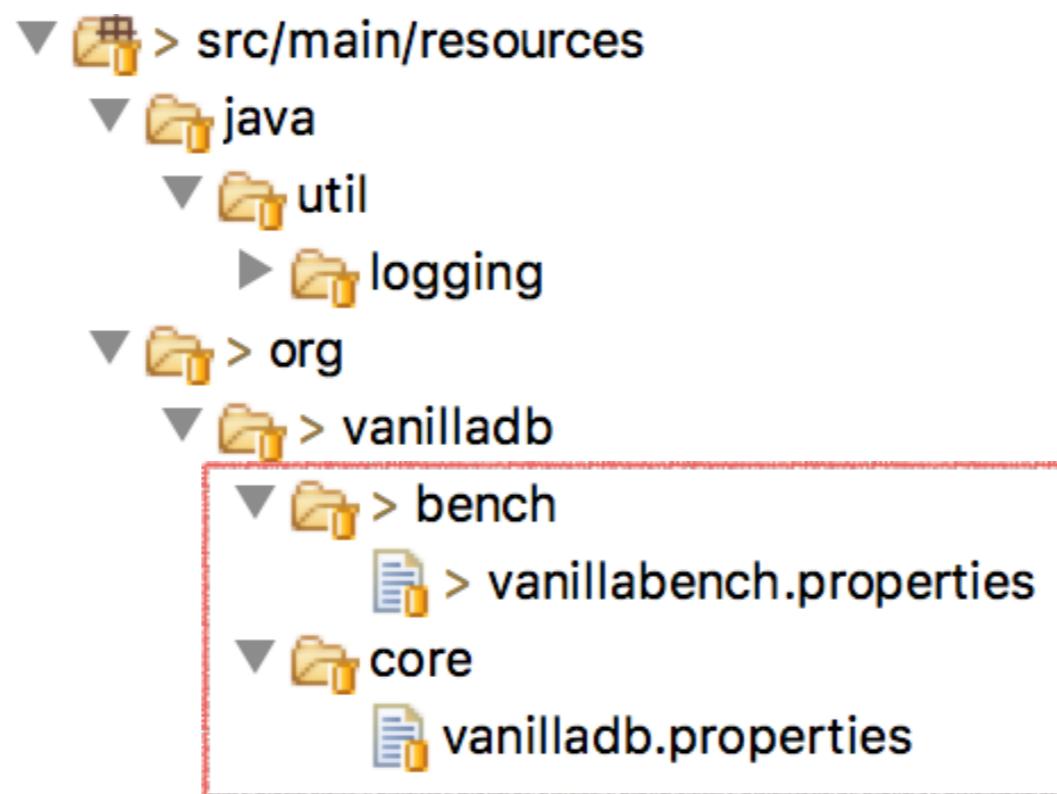


# Finish Import Projects



# Setting Benchmark

- Benchmark project also has its own set of properties files



```
2 #
3 # Basic Parameters
4 #
5
6 # The running time for warming up before benchmarking
7 org.vanilladb.bench.BenchmarkerParameters.WARM_UP_INTERVAL=60000
8 # The running time for benchmarking
9 org.vanilladb.bench.BenchmarkerParameters.BENCHMARK_INTERVAL=60000
10 # The number of remote terminal executors for benchmarking
11 org.vanilladb.bench.BenchmarkerParameters.NUM_RTES=2
12 # The sleeping time (in milliseconds) between transactions for each RTE
13 # 0 = no sleeping, 100 is a generally good number for under-loaded workloads
14 org.vanilladb.bench.BenchmarkerParameters.RTE_SLEEP_TIME=0
15 # The IP of the target database server
16 org.vanilladb.bench.BenchmarkerParameters.SERVER_IP=127.0.0.1
17 # 1 = JDBC, 2 = Stored Procedures
18 org.vanilladb.bench.BenchmarkerParameters.CONNECTION_MODE=2
19 # 1 = as2
20 org.vanilladb.bench.BenchmarkerParameters.BENCH_TYPE=1
21 # Whether it enables the built-in profiler on the server
22 org.vanilladb.bench.BenchmarkerParameters.PROFILING_ON_SERVER=false
23 # The path to the generated reports
24 org.vanilladb.bench.StatisticMgr.OUTPUT_DIR=
25 # The granularity for summarizing the performance of benchmarking
26 org.vanilladb.bench.StatisticMgr.GRANULARITY=1000
27 # Whether the RTEs display the results of each transaction
28 org.vanilladb.bench.rte.TransactionExecutor.DISPLAY_RESULT=false
29 # The number of items in the testing data set
30 org.vanilladb.bench.benchmarks.as2.As2BenchConstants.NUM_ITEMS=100000
31 # Read count
32 org.vanilladb.bench.benchmarks.as2.rte.As2ReadItemParamGen.TOTAL_READ_COUNT=10
33
```

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17 # 1 = JDBC, 2 = Stored Procedures
18 org.vanilladb.bench.BenchmarkerParameters CONNECTION_MODE=2 Use JDBC or stored procedures
19 # 1 = as2
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22 org.vanilladb.bench.BenchmarkerParameters.PROFILING_ON_SERVER=false
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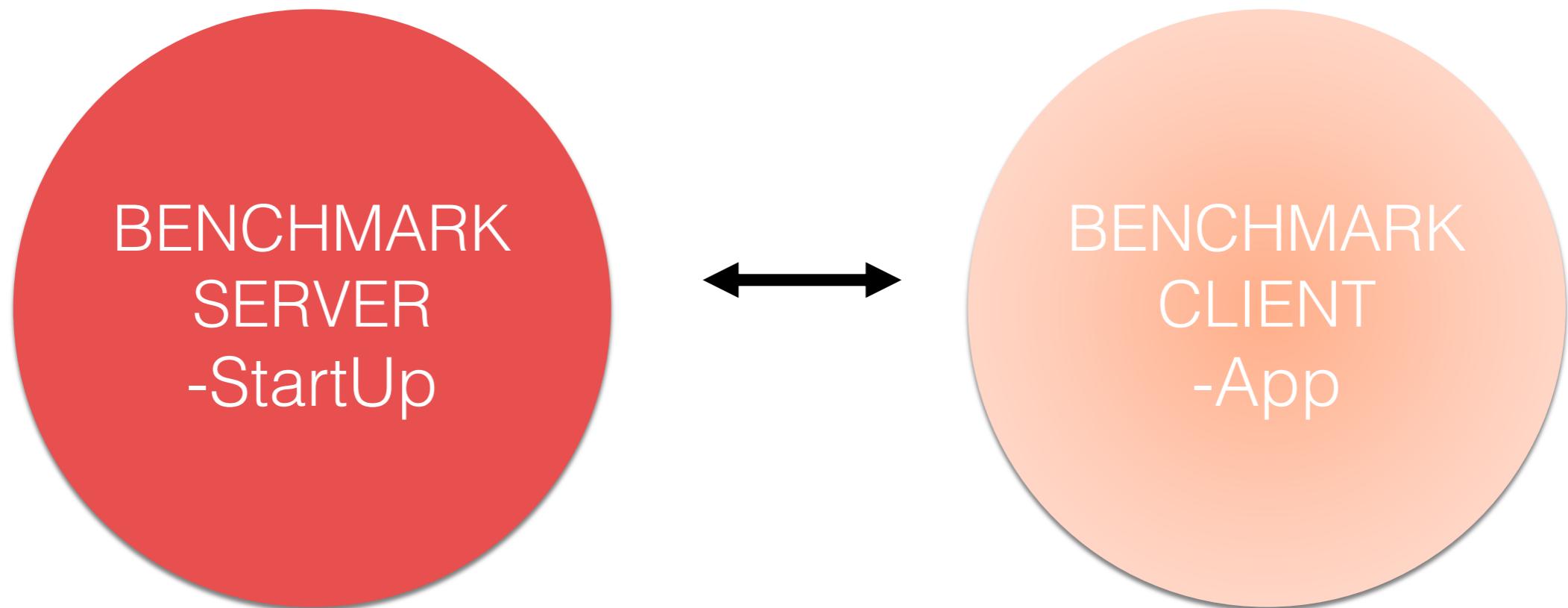
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20 org.vanilladb.bench.BenchmarkerParameters.BENCH_TYPE=1
21 # Whether it enables the built-in profiler on the server
22 org.vanilladb.bench.BenchmarkerParameters.PROFILING_ON_SERVER=false
23 # The path to the generated reports
24 org.vanilladb.bench.StatisticMgr OUTPUT_DIR= Decide the output directory path
25 # The granularity for summarizing the performance of benchmarking
26 org.vanilladb.bench.StatisticMgr.GRANULARITY=1000
27 # Whether the RTEs display the results of each transaction
28 org.vanilladb.bench.rte.TransactionExecutor.DISPLAY_RESULT=false
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```

Decide the output directory path

# Outline

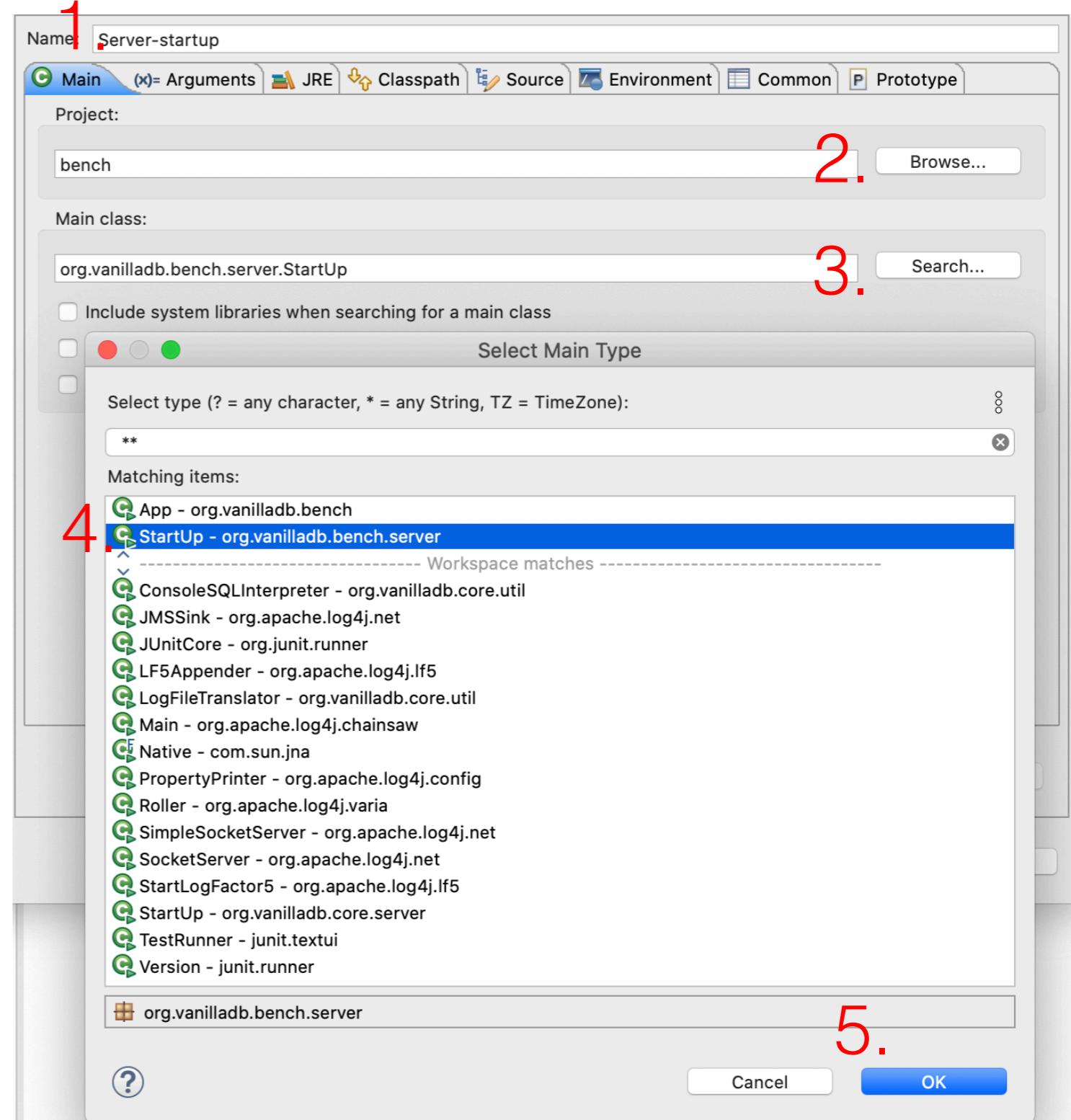
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# Two Main Methods



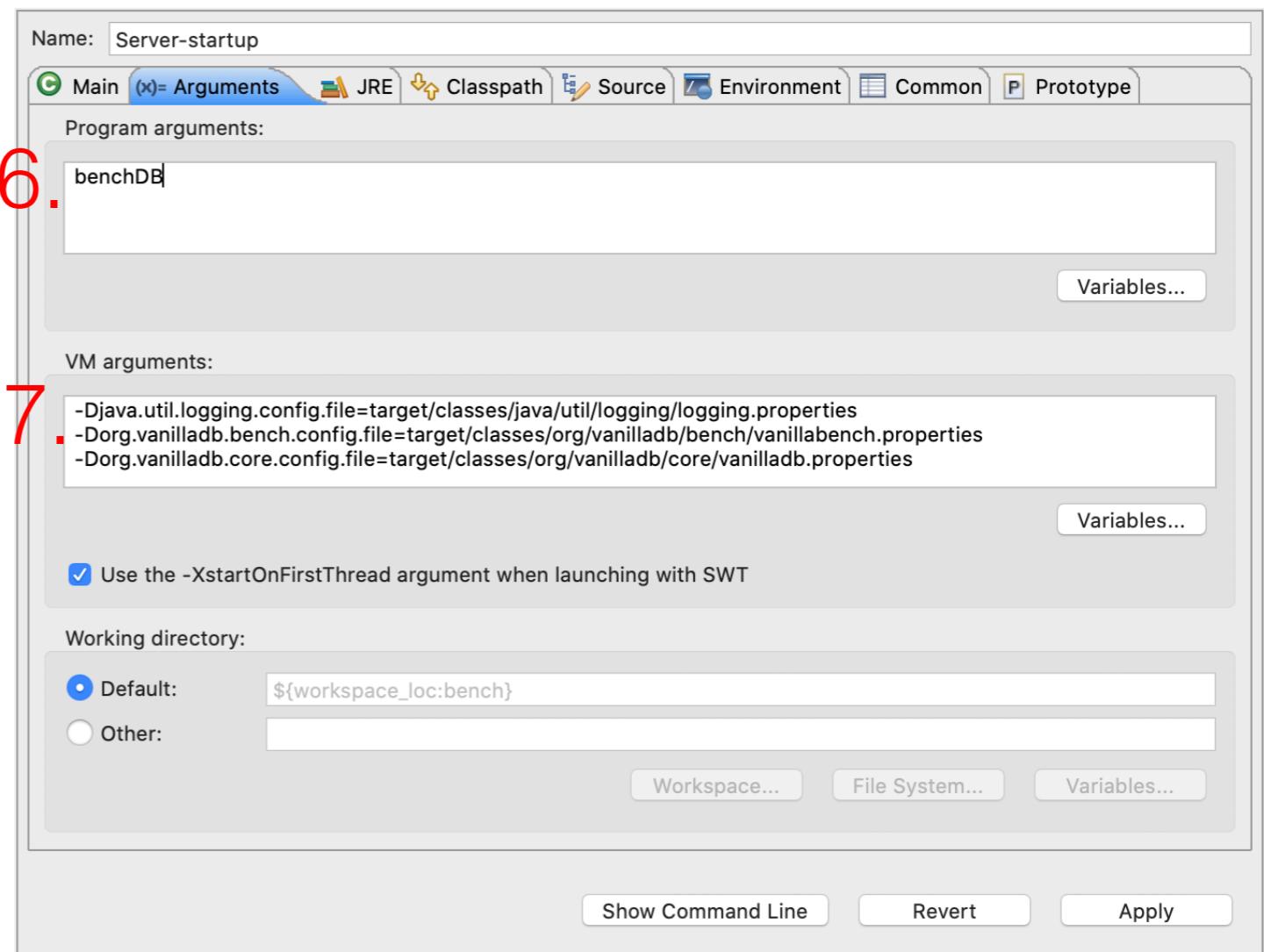
# Starting Up Server (1/2)

- To benchmark a VanillaDB server, you need to start up the server in another entry point



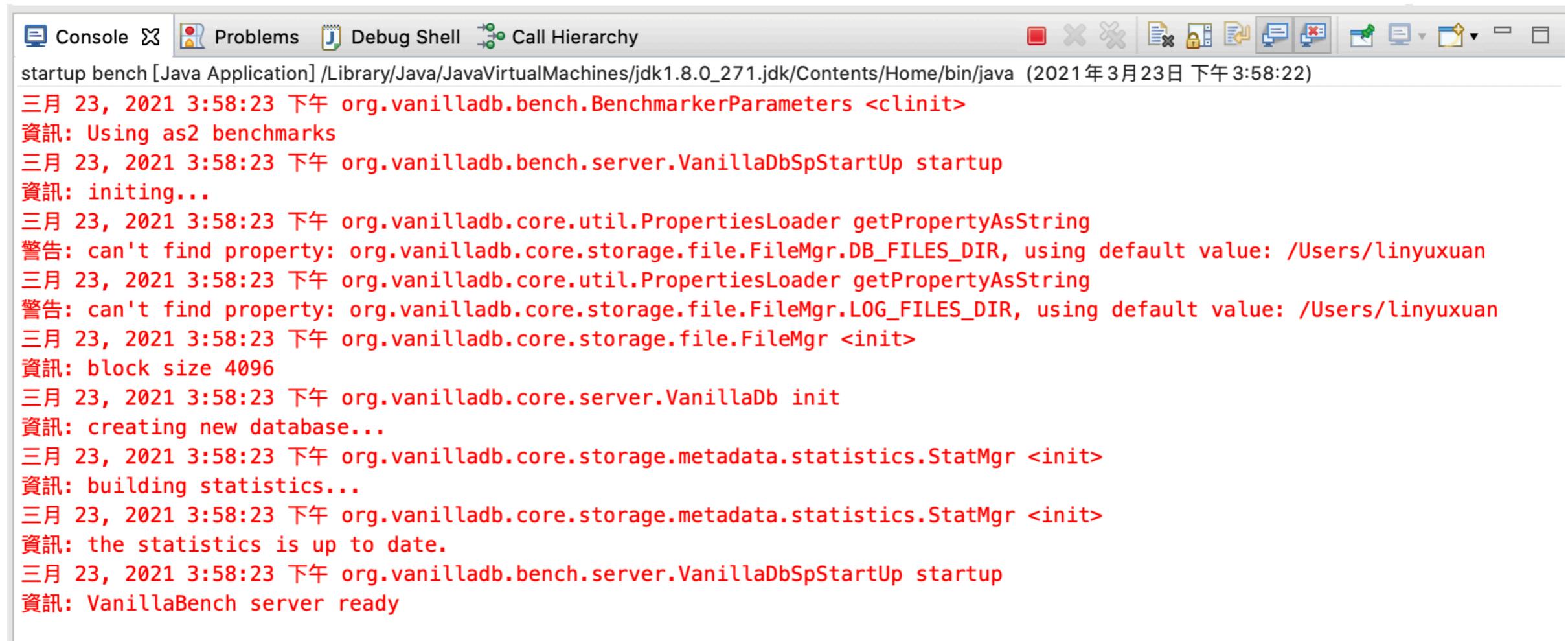
# Starting Up Server (2/2)

- Add the Database Directory Name
- You also need to add one more VM argument for benchmarking.



You can copy those arguments from [here](#).

# Server Messages



A screenshot of an IDE's console window showing Java application startup logs. The logs are displayed in red text, indicating informational or diagnostic messages. The log output is as follows:

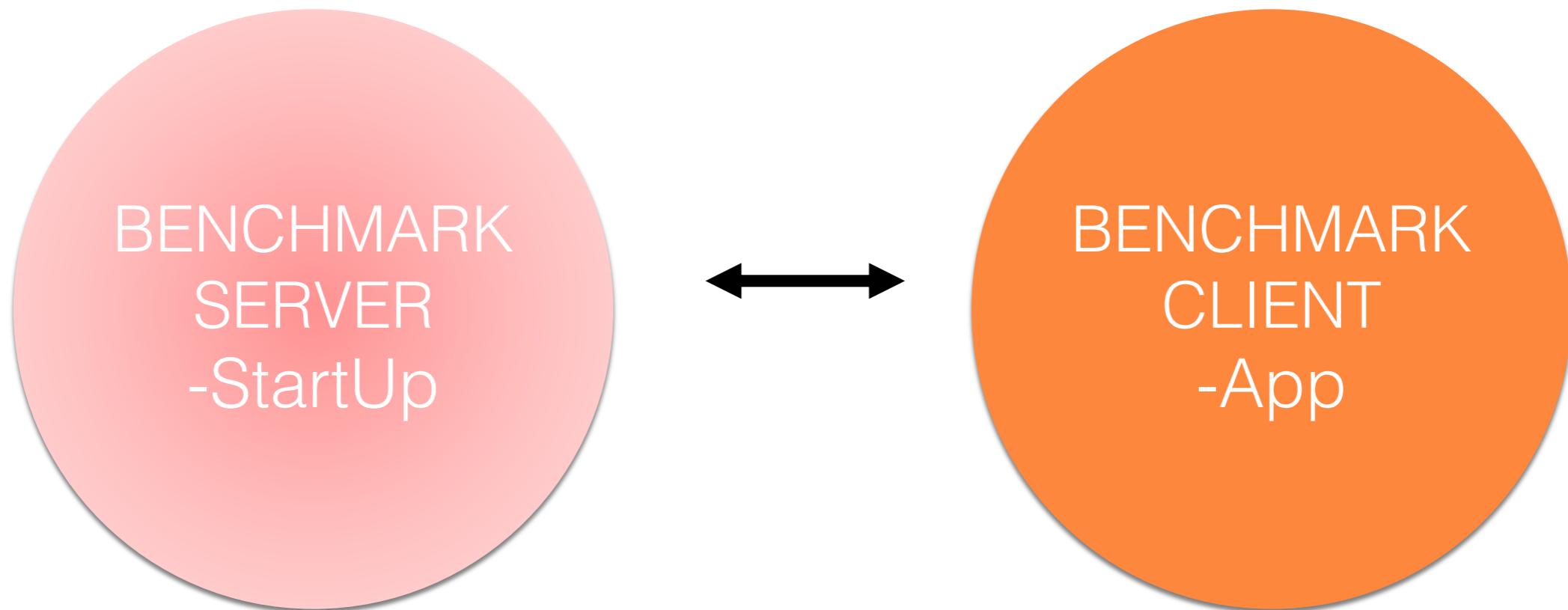
```
startup bench [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_271.jdk/Contents/Home/bin/java (2021年3月23日 下午3:58:22)
三月 23, 2021 3:58:23 下午 org.vanilladb.bench.BenchmarkParameters <clinit>
資訊: Using as2 benchmarks
三月 23, 2021 3:58:23 下午 org.vanilladb.bench.server.VanillaDbSpStartUp startup
資訊: initing...
三月 23, 2021 3:58:23 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsString
警告: can't find property: org.vanilladb.core.storage.file.FileMgr.DB_FILES_DIR, using default value: /Users/linyuxuan
三月 23, 2021 3:58:23 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsString
警告: can't find property: org.vanilladb.core.storage.file.FileMgr.LOG_FILES_DIR, using default value: /Users/linyuxuan
三月 23, 2021 3:58:23 下午 org.vanilladb.core.storage.file.FileMgr <init>
資訊: block size 4096
三月 23, 2021 3:58:23 下午 org.vanilladb.core.server.VanillaDb init
資訊: creating new database...
三月 23, 2021 3:58:23 下午 org.vanilladb.core.storage.metadata.statistics.StatMgr <init>
資訊: building statistics...
三月 23, 2021 3:58:23 下午 org.vanilladb.core.storage.metadata.statistics.StatMgr <init>
資訊: the statistics is up to date.
三月 23, 2021 3:58:23 下午 org.vanilladb.bench.server.VanillaDbSpStartUp startup
資訊: VanillaBench server ready
```

You should see similar messages  
if there is nothing wrong.

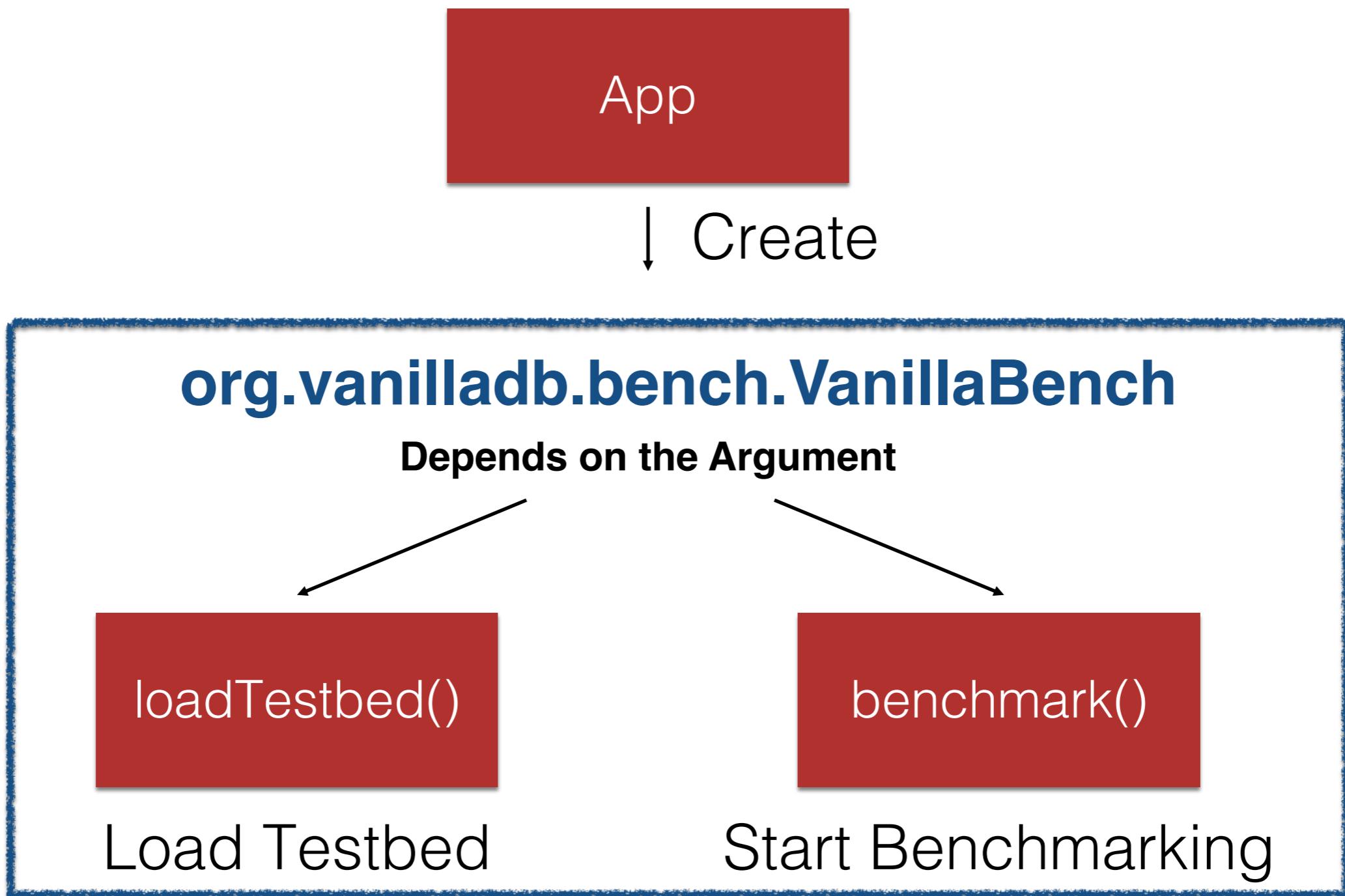
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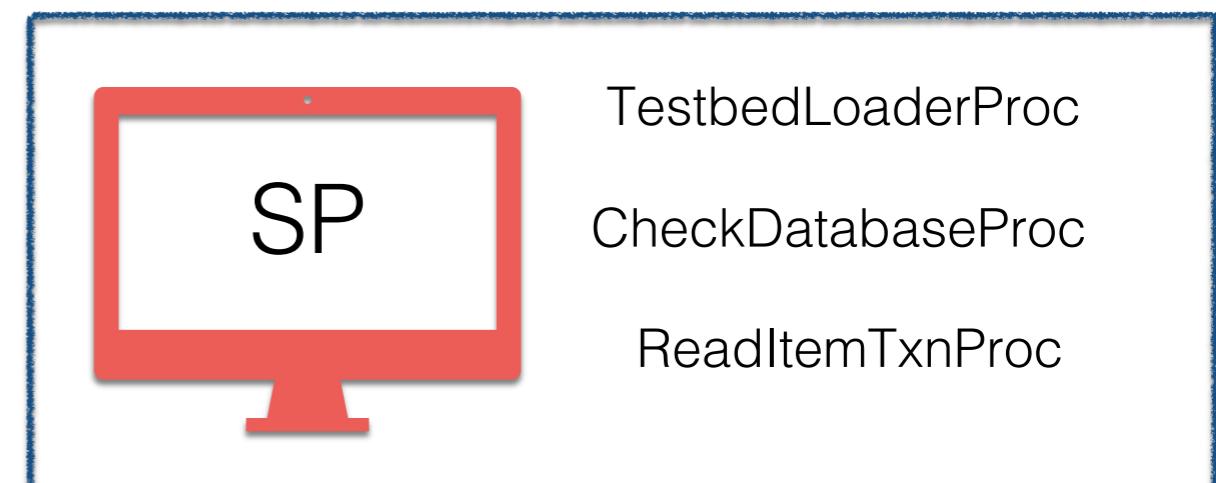
# Two Main Methods



# The Workflow of A Client

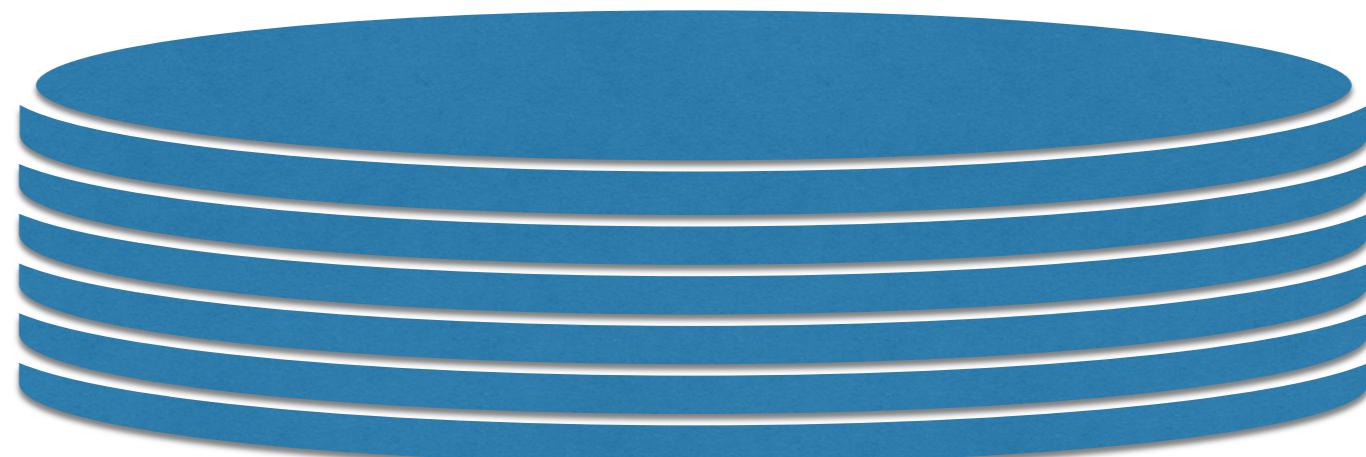


# JDBC / SP ?

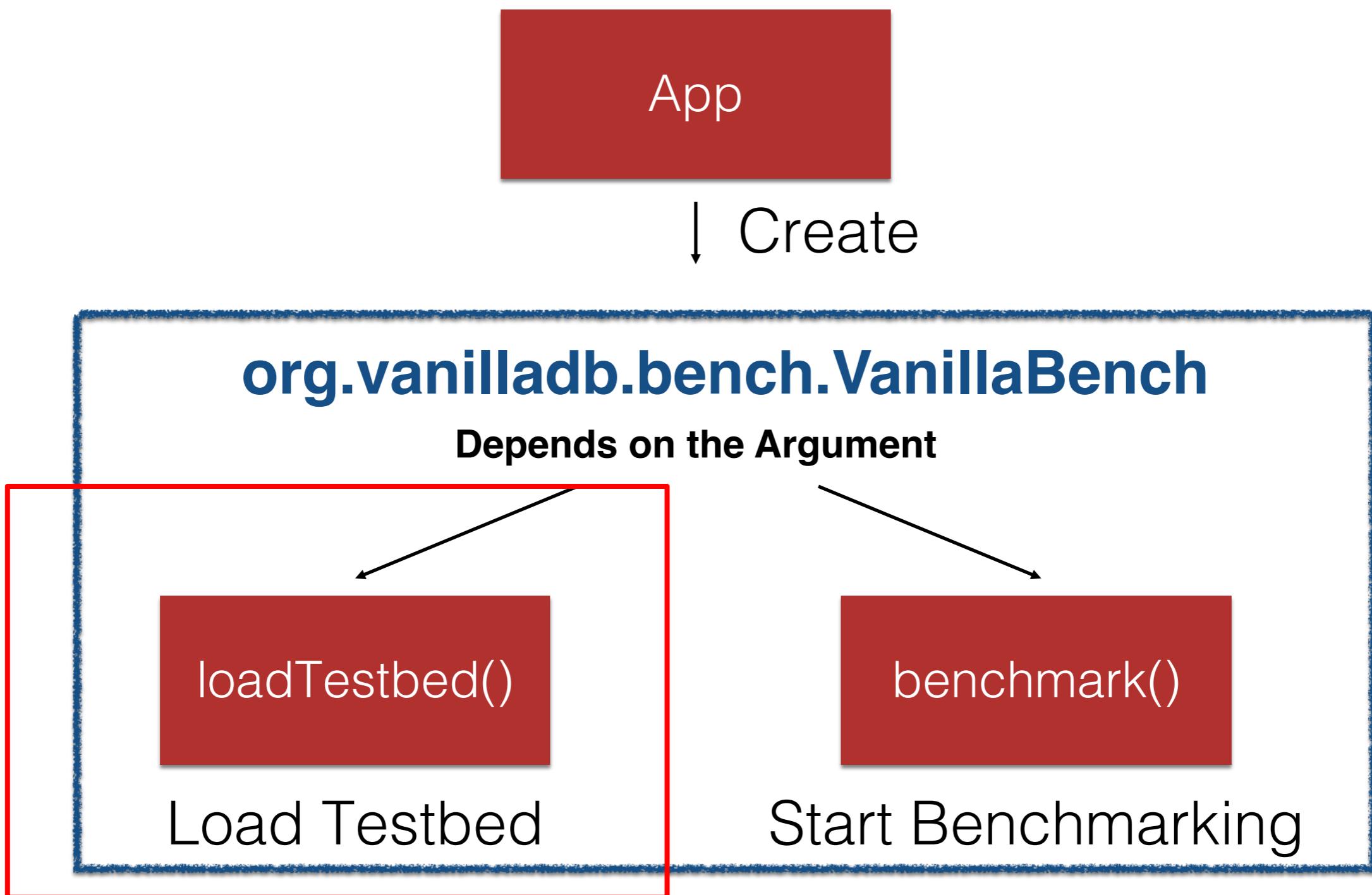


Query

Parameter



# The Workflow of A Client



# Loading Testbed

loadTestbed()

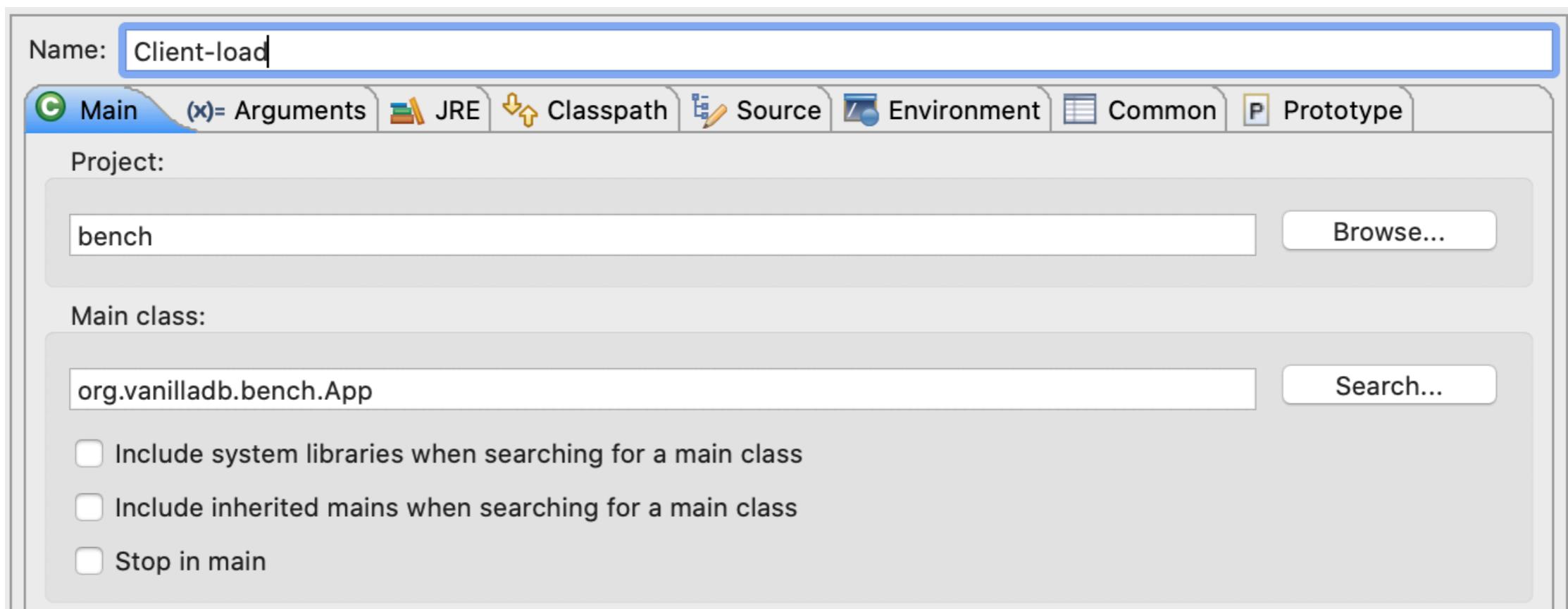


Connect to server and execute:

TestbedLoader

# Running Client

- To run clients, create a run configuration for it

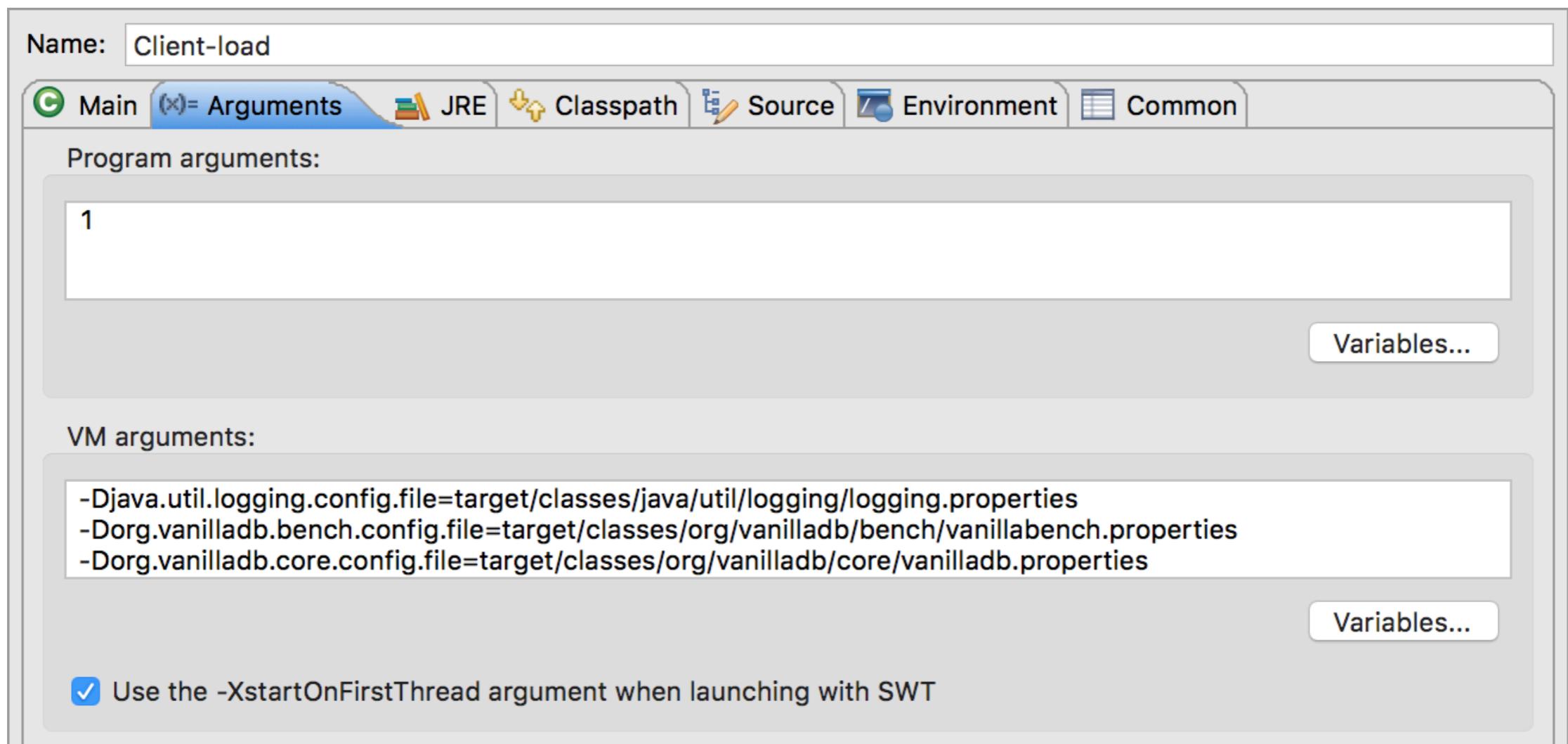


# Arguments

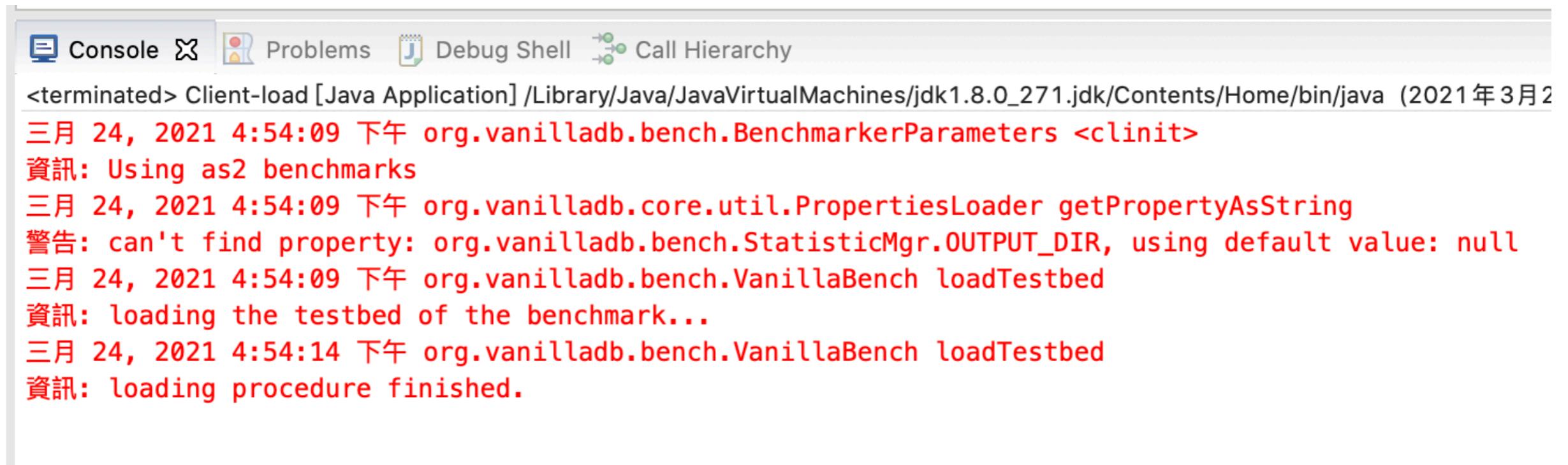
- We also need to set some arguments
- Program Arguments
  - [Action]
    - 1 : Load Test-Bed
    - 2 : Lunch Benchmark
- VM Arguments

```
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties  
-Dorg.vanilladb.bench.config.file=target/classes/org/vanilladb/bench/vanillabench.properties  
-Dorg.vanilladb.core.config.file=target/classes/org/vanilladb/core/vanilladb.properties
```

# Loading Testbed



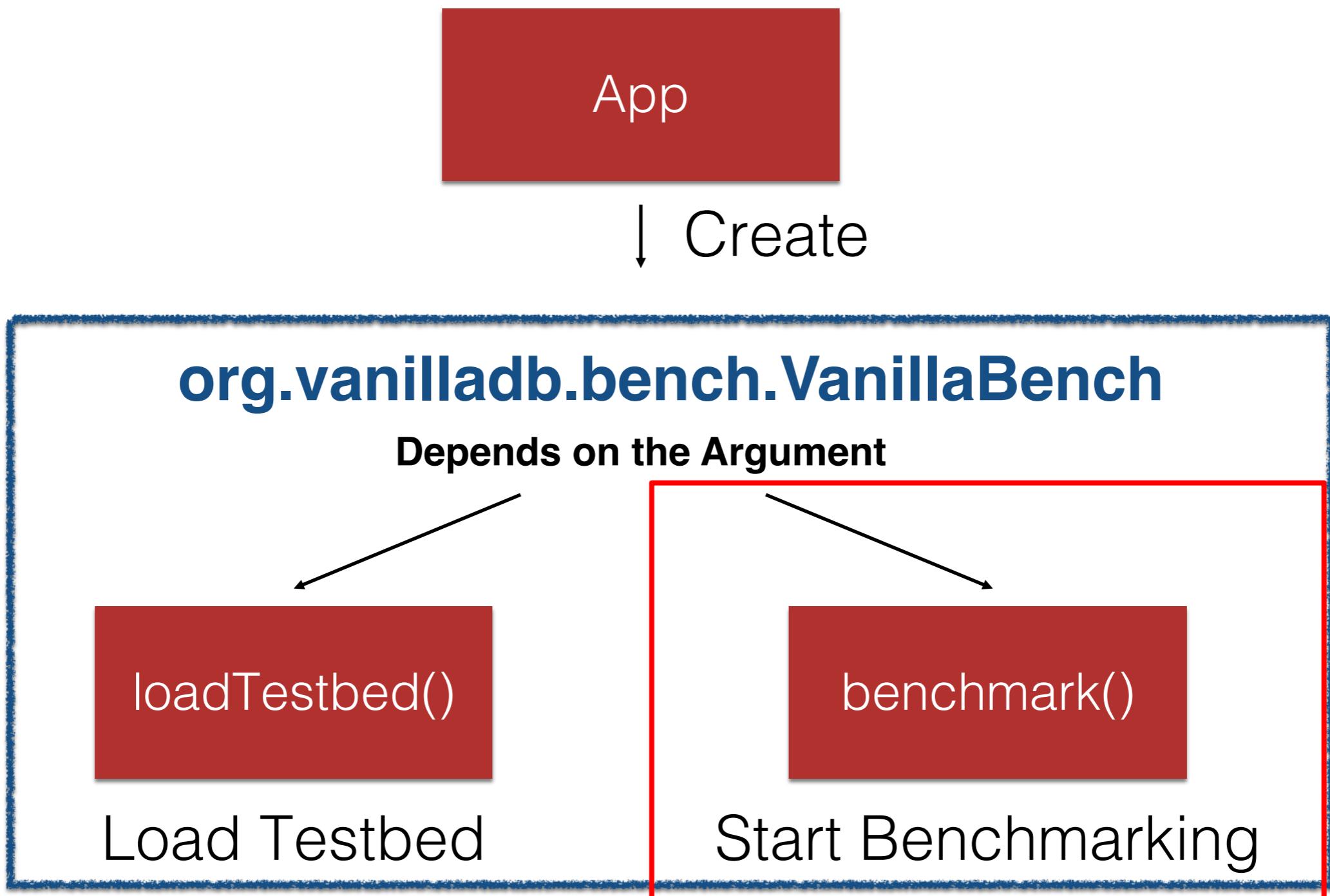
# Client Messages



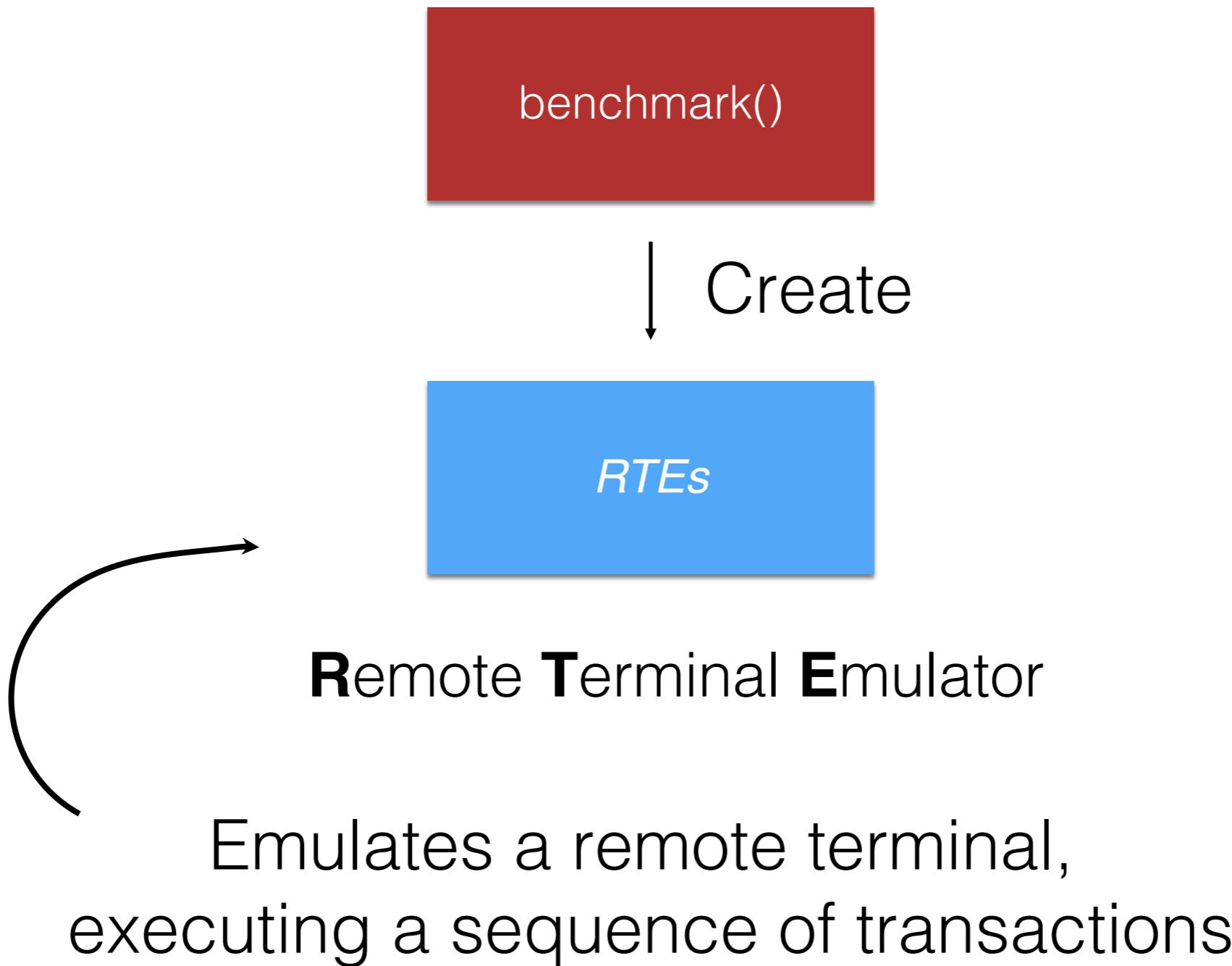
The screenshot shows a software interface with a toolbar at the top containing 'Console', 'Problems', 'Debug Shell', and 'Call Hierarchy' buttons. The main area is a terminal window displaying the following text:

```
<terminated> Client-load [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_271.jdk/Contents/Home/bin/java (2021年3月2  
三月 24, 2021 4:54:09 下午 org.vanilladb.bench.BenchmarkerParameters <clinit>  
資訊: Using as2 benchmarks  
三月 24, 2021 4:54:09 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsString  
警告: can't find property: org.vanilladb.bench.StatisticMgr.OUTPUT_DIR, using default value: null  
三月 24, 2021 4:54:09 下午 org.vanilladb.bench.VanillaBench loadTestbed  
資訊: loading the testbed of the benchmark...  
三月 24, 2021 4:54:14 下午 org.vanilladb.bench.VanillaBench loadTestbed  
資訊: loading procedure finished.
```

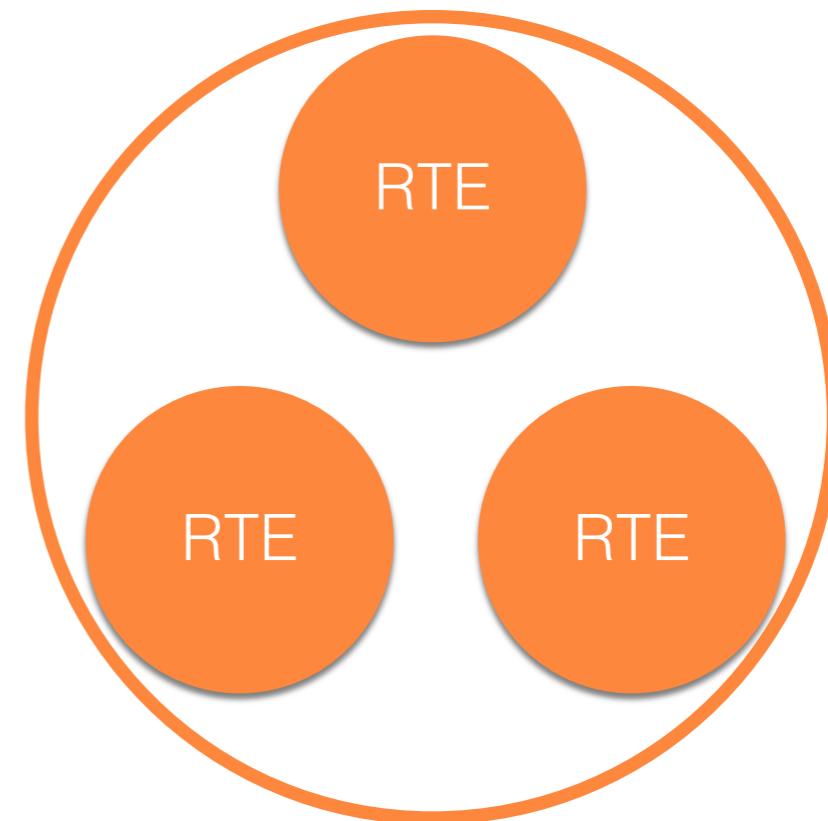
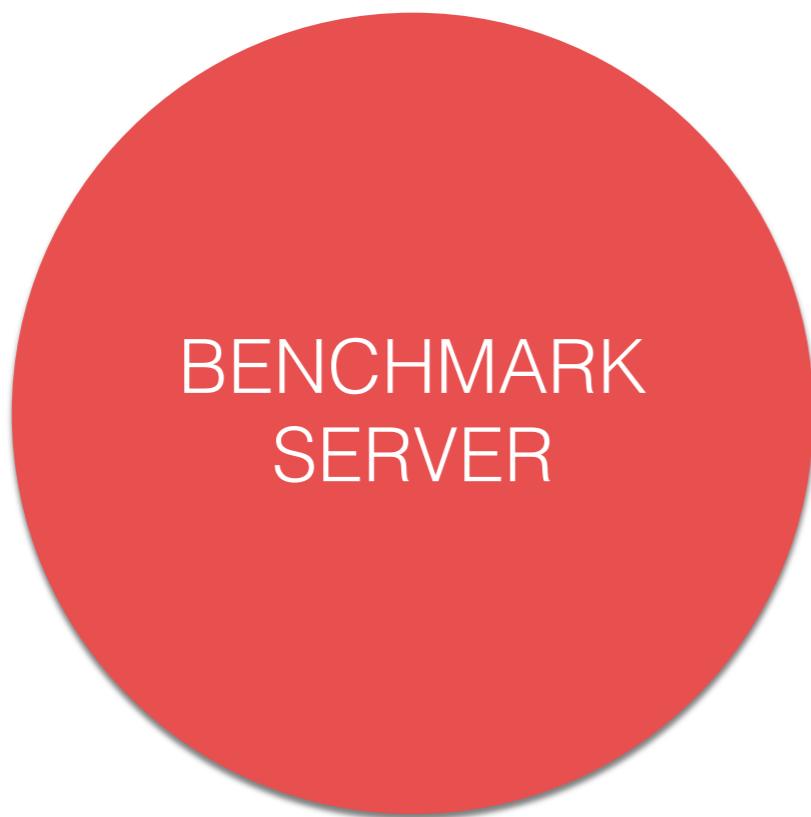
# The Workflow of A Client



# Starting Benchmark

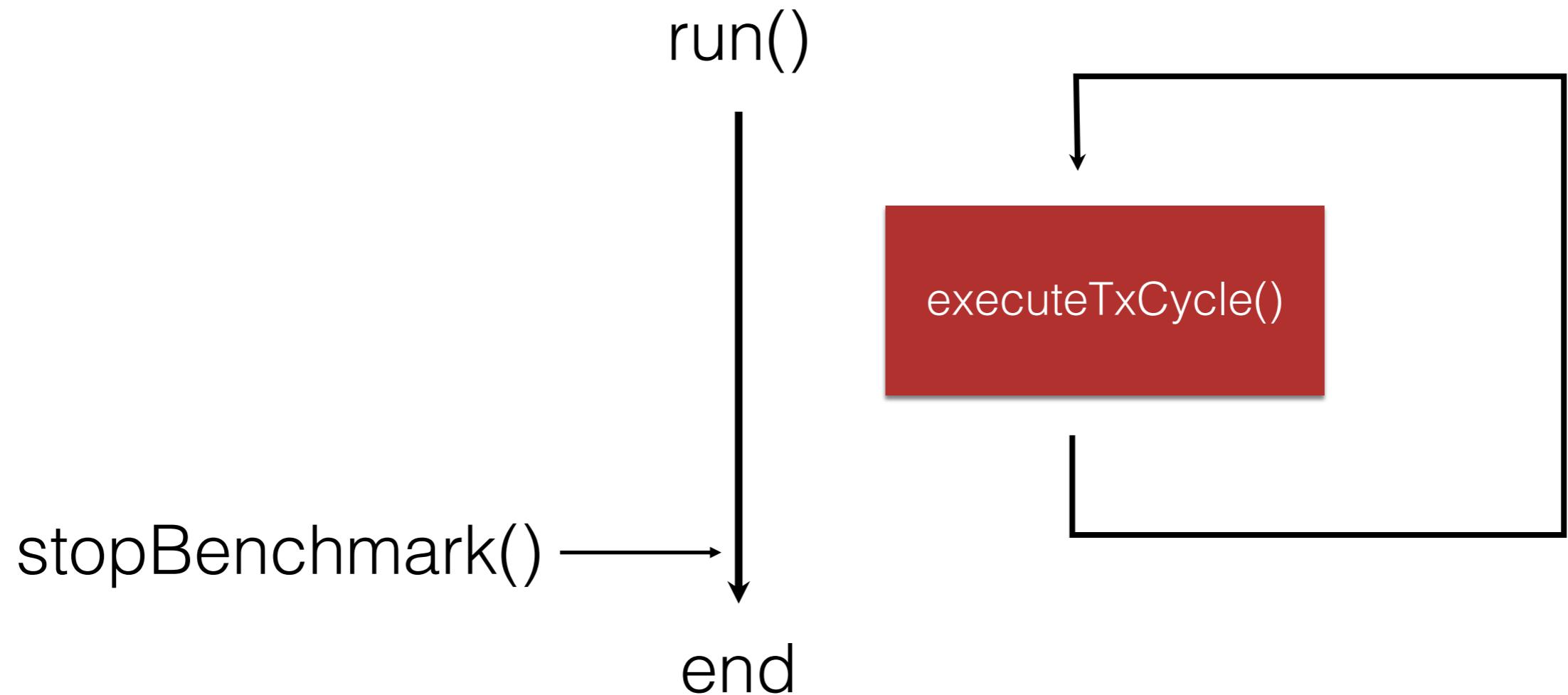


# Server & Client

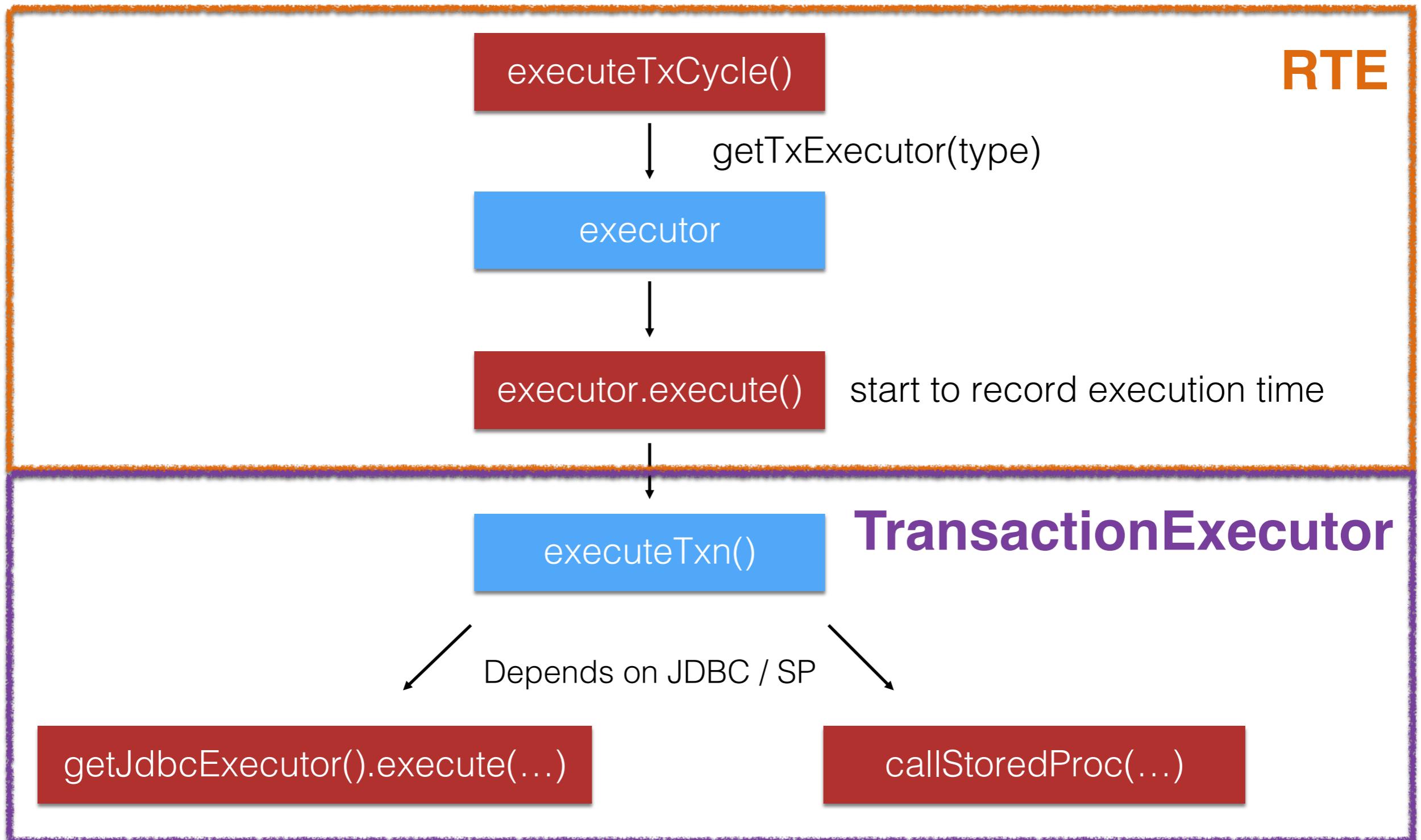


# RTE's Life Cycle

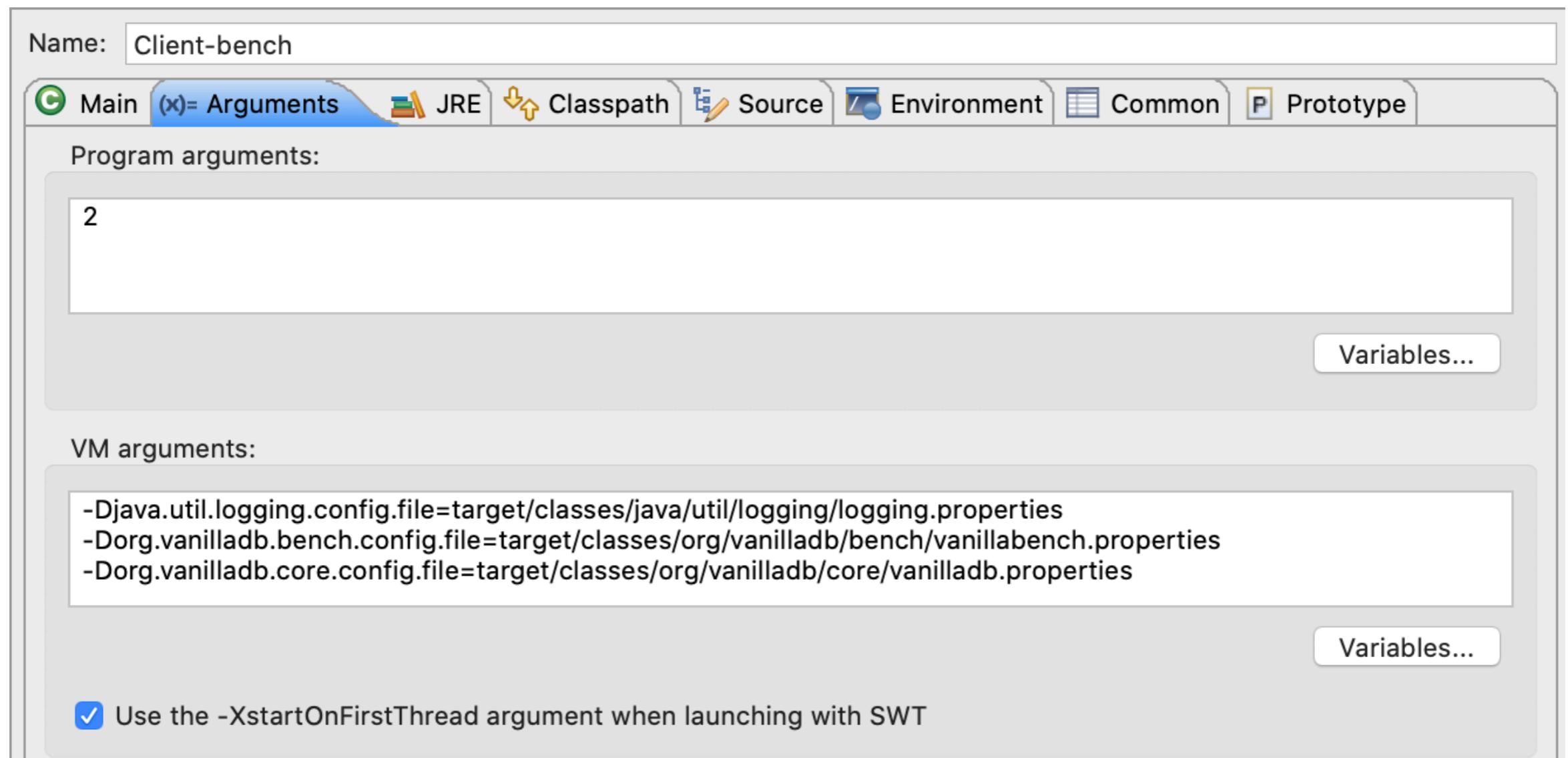
**org.vanilladb.bench.rte.RemoteTerminalEmulator**



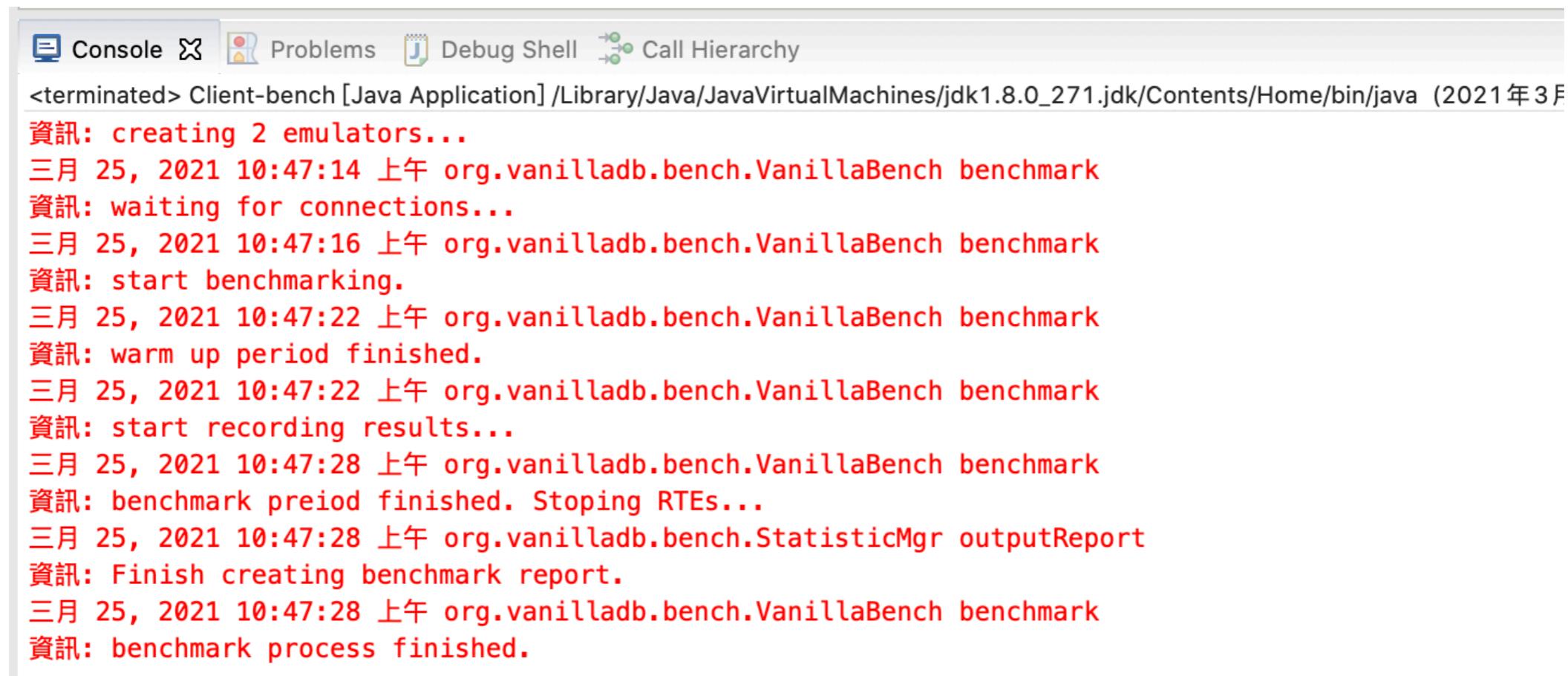
# Executing a Tx



# Benchmarking



# Client Messages



The screenshot shows a software interface with a toolbar at the top containing icons for Console, Problems, Debug Shell, and Call Hierarchy. The main area is a terminal window titled '<terminated> Client-bench [Java Application]'. The output in the terminal is as follows:

```
<terminated> Client-bench [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_271.jdk/Contents/Home/bin/java (2021年3月25日 上午 10:47:14)

資訊: creating 2 emulators...
三月 25, 2021 10:47:14 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: waiting for connections...
三月 25, 2021 10:47:16 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: start benchmarking.
三月 25, 2021 10:47:22 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: warm up period finished.
三月 25, 2021 10:47:22 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: start recording results...
三月 25, 2021 10:47:28 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: benchmark preiod finished. Stoping RTEs...
三月 25, 2021 10:47:28 上午 org.vanilladb.bench.StatisticMgr outputReport
資訊: Finish creating benchmark report.
三月 25, 2021 10:47:28 上午 org.vanilladb.bench.VanillaBench benchmark
資訊: benchmark process finished.
```

# Assignment 2

# Q&A

- If you got any problem, you could check here first
  - [https://shwu10.cs.nthu.edu.tw/courses/databases  
/2021-spring/faq](https://shwu10.cs.nthu.edu.tw/courses/databases/2021-spring/faq)
- If your problem was very unique, just send us an email