Using VanillaDB

Database Systems

DataLab, CS, NTHU

Spring, 2020

VanillaDB

Simple, fast, and extensible database system prototypes.

Projects

- There are 3 projects in VanillaDB
  - Single-node DBMS: VanillaCore
  - Benchmarking: VanillaBench
  - Communication module for distributed DBMSs: VanillaComm

Outline

- VanillaCore
    - Prepare Everything You Need
    - Server Properties
    - Starting Up VanillaCore
    - Console SQL Interpreter

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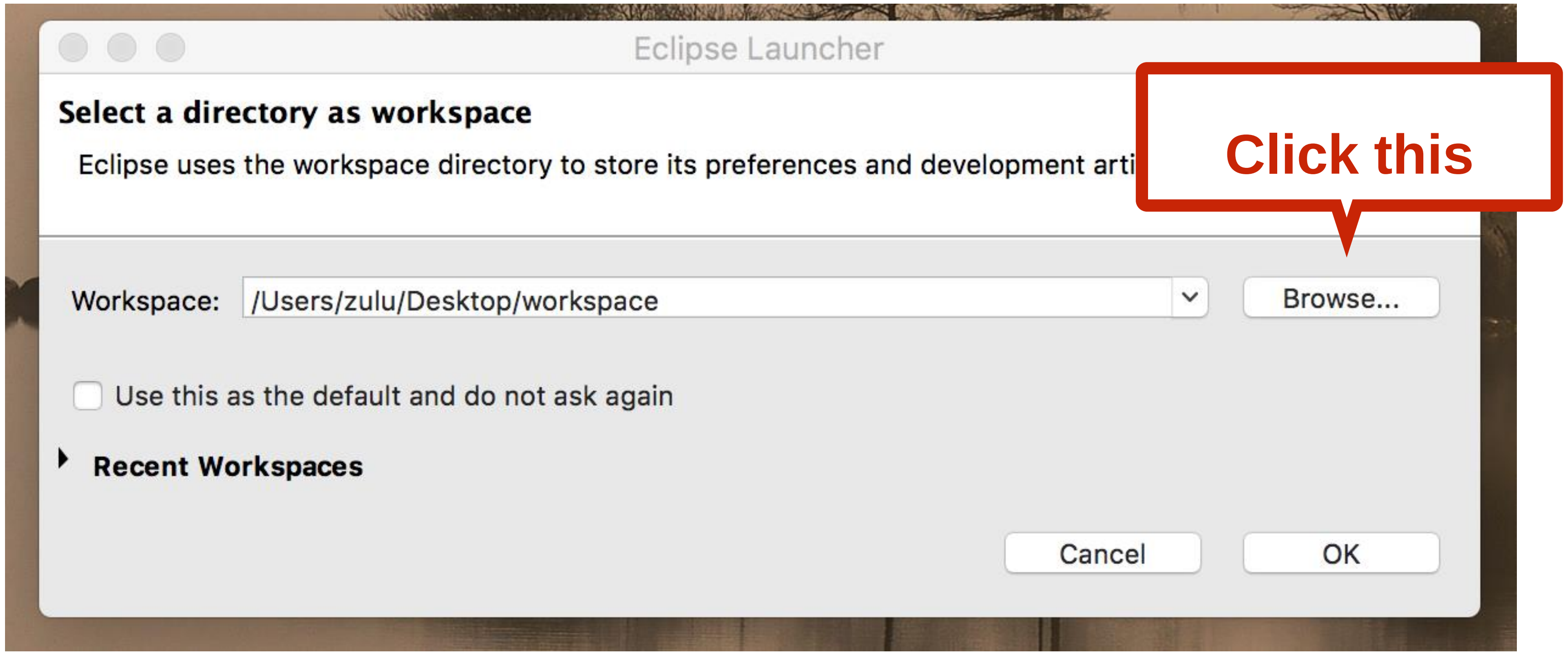
Setting Up Environment

- JDK 8
  - http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
- Eclipse
  - https://www.eclipse.org/downloads/packages/installer

Downloading The Project

- Clone VanillaDB here
  - https://shwu10.cs.nthu.edu.tw/courses/databases/2020-spring/vanilladb

How to Import VanillaCore



Eclipse Launcher

Select a directory as workspace

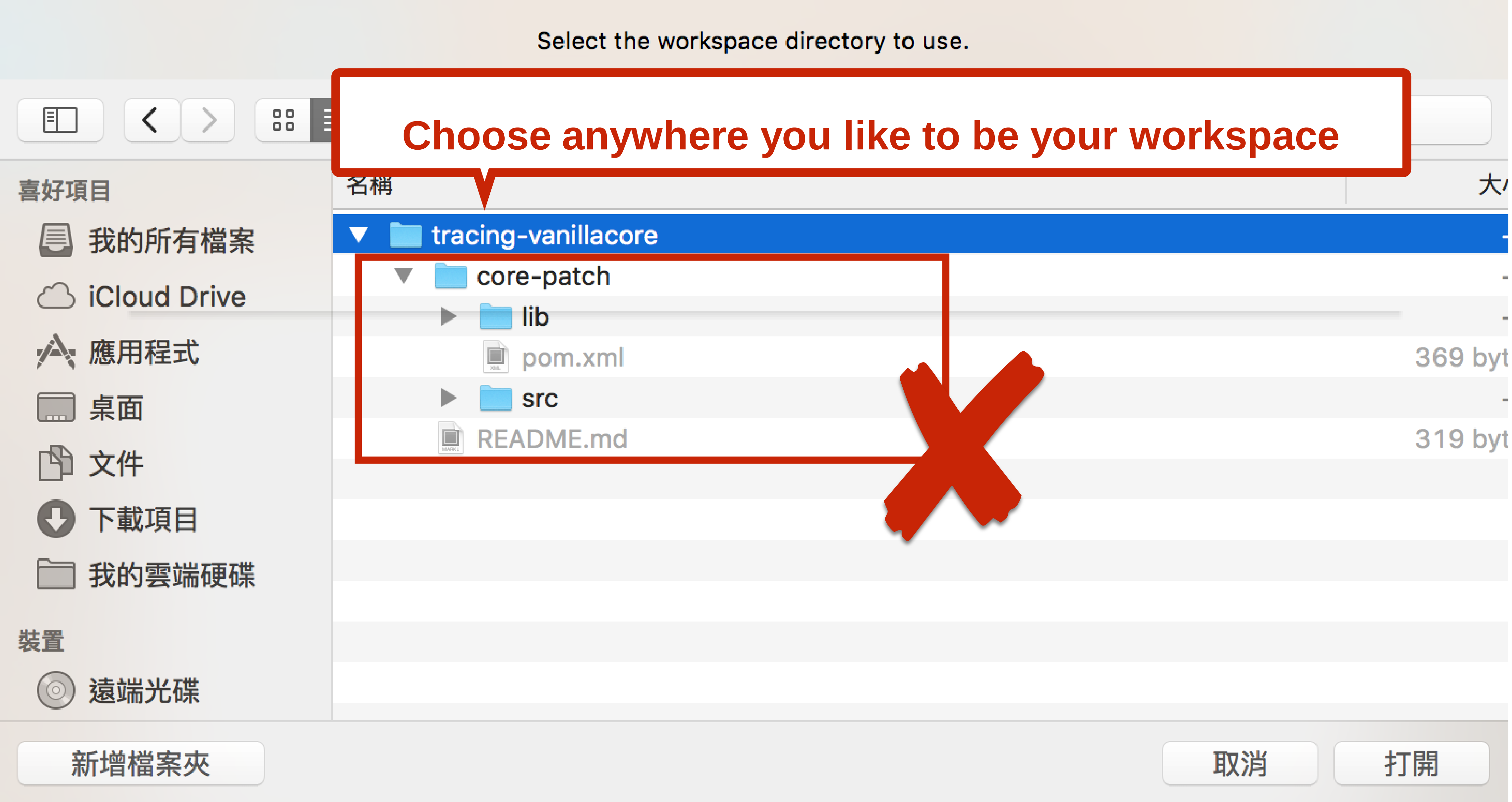
Eclipse uses the workspace directory to store its preferences and development arti

Workspace: /Users/zulu/Desktop/workspace

□ Use this as the default and do not ask again

Recent Workspaces

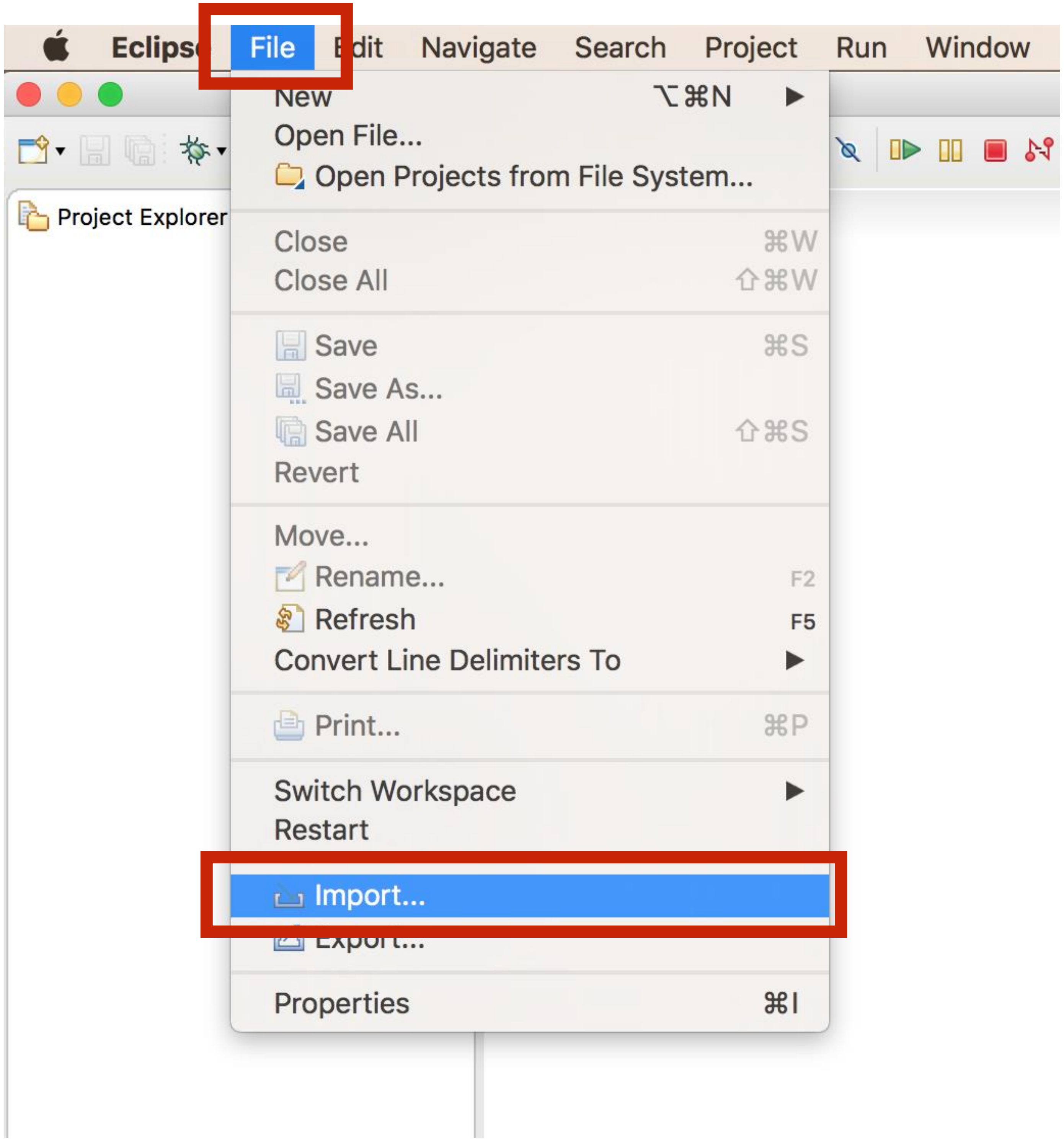
Click this

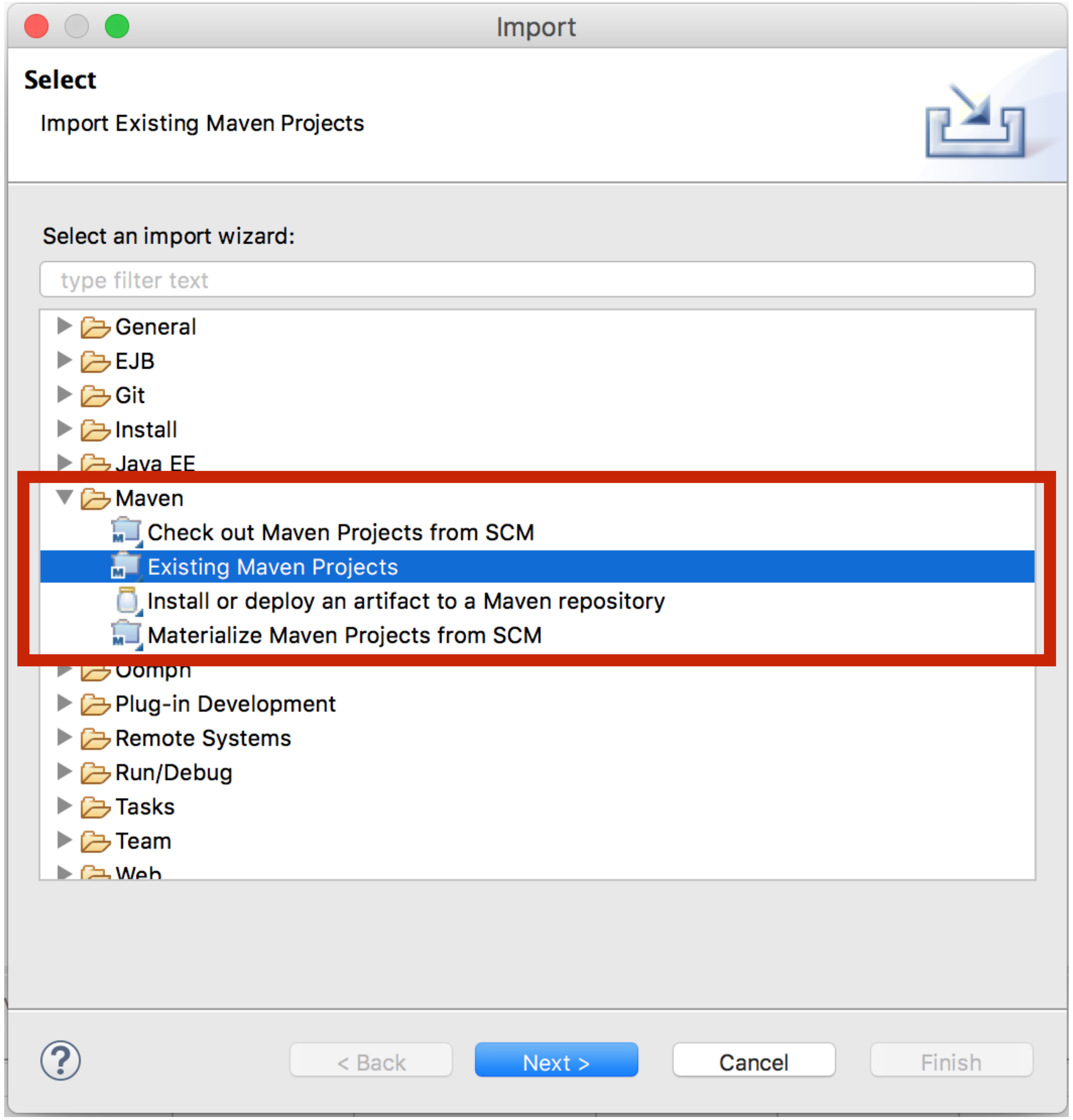


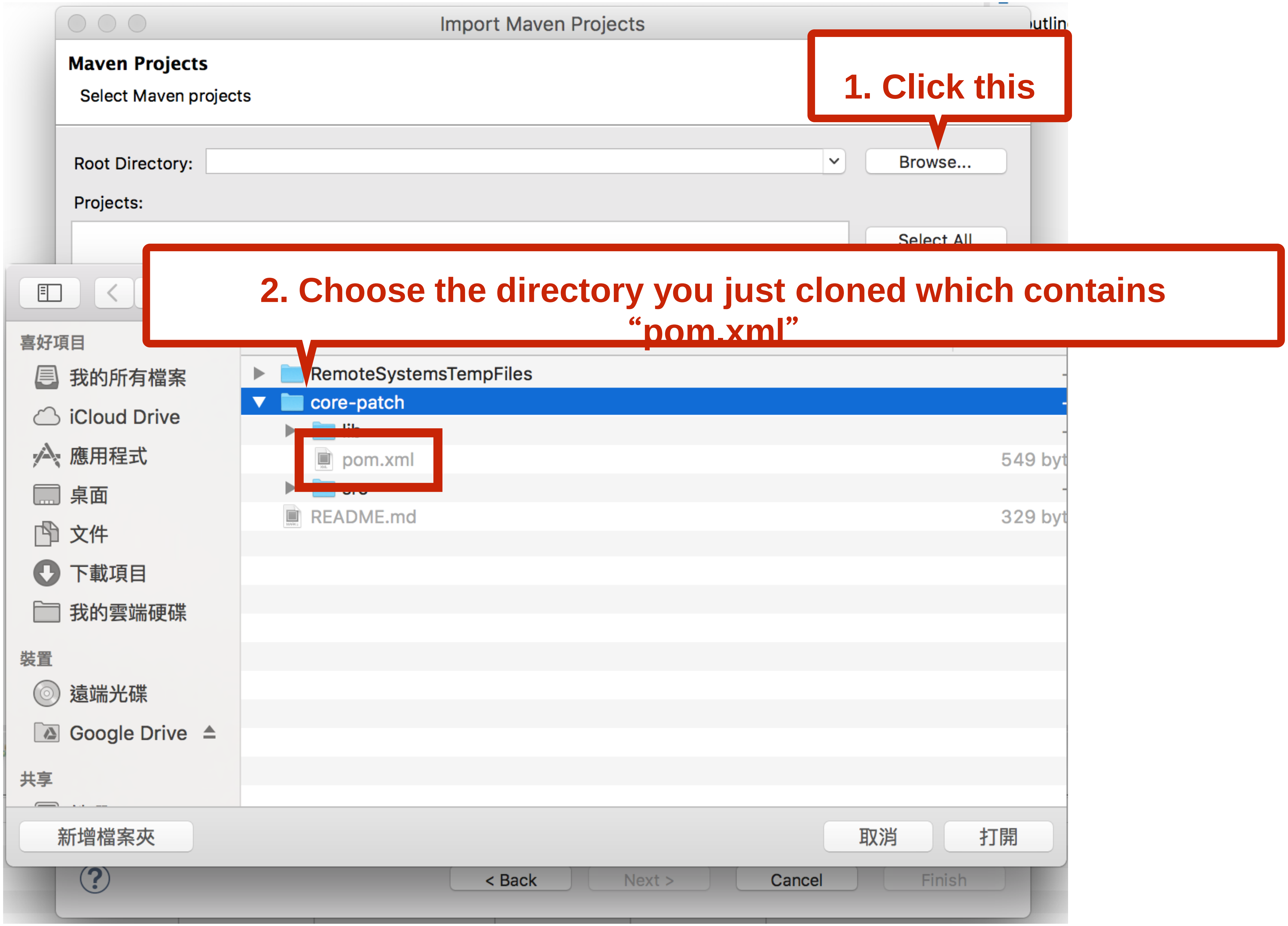
Select the workspace directory to use.

Choose anywhere you like to be your workspace

be careful not choose the directory which contains “pom.xml”

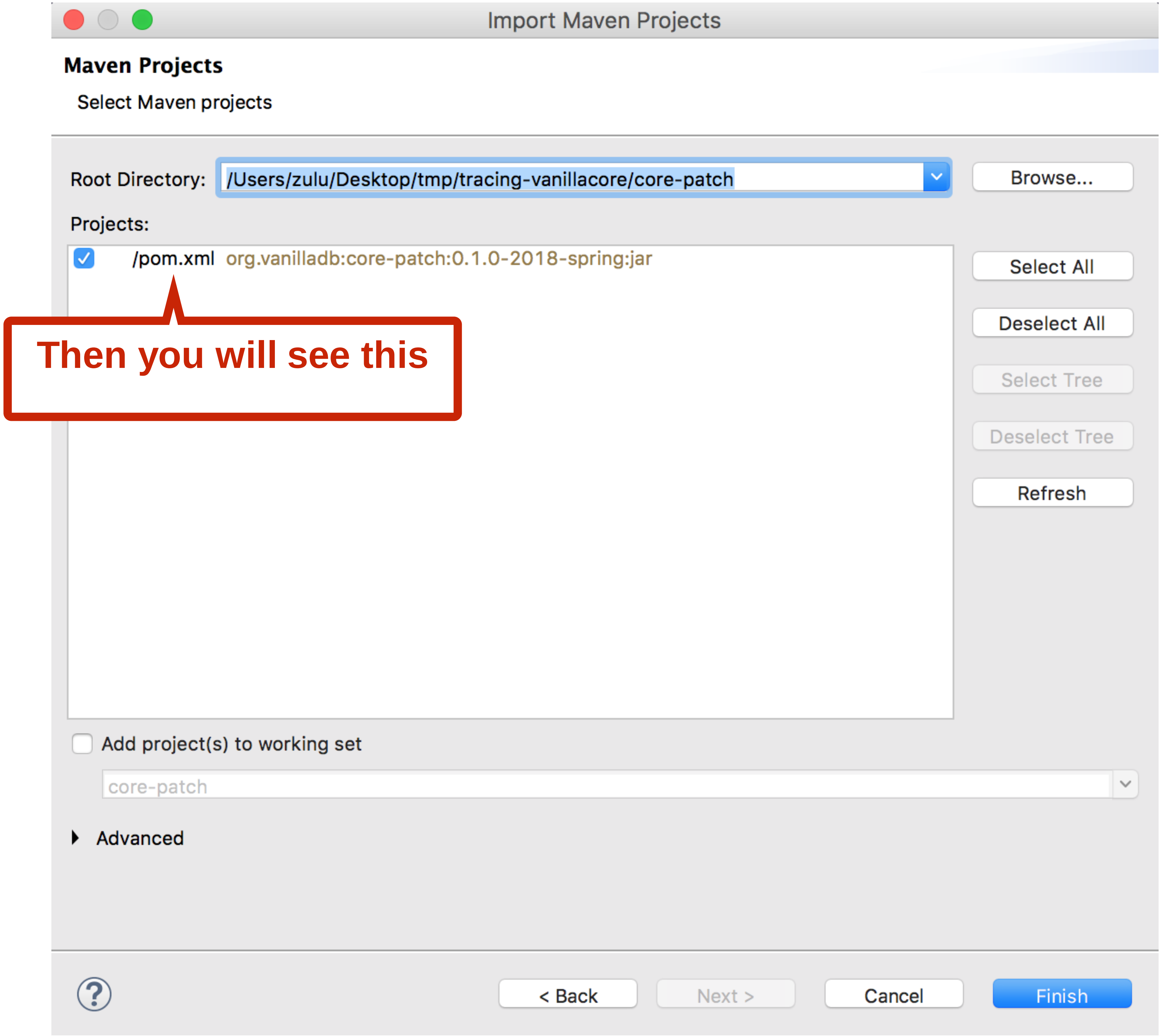

Eclipse
File
Edit
Navigate
Search
Project
Run
Window
Project Explorer
New ⌥⌘N ▶
Open File...
Open Projects from File System...
Close ⌘W
Close All ⇧⌘W
Save ⌘S
Save As...
Save All ⇧⌘S
Revert
Move...
Rename... F2
Refresh F5
Convert Line Delimiters To ▶
Print... ⌘P
Switch Workspace ▶
Restart
Import...
Export...
Properties ⌘I


Import
Select
Import Existing Maven Projects
Select an import wizard:
type filter text
General
EJB
Git
Install
Java EE
Maven
Check out Maven Projects from SCM
Existing Maven Projects
Install or deploy an artifact to a Maven repository
Materialize Maven Projects from SCM
Oomph
Plug-in Development
Remote Systems
Run/Debug
Tasks
Team
Web
?
< Back
Next >
Cancel
Finish



1. Click this

2. Choose the directory you just cloned which contains “pom.xml”



Import Maven Projects

Maven Projects

Select Maven projects

Root Directory: /Users/zulu/Desktop/tmp/tracing-vanillacore/core-patch

Projects:

☑ /pom.xml org.vanilladb:core-patch:0.1.0-2018-spring:jar

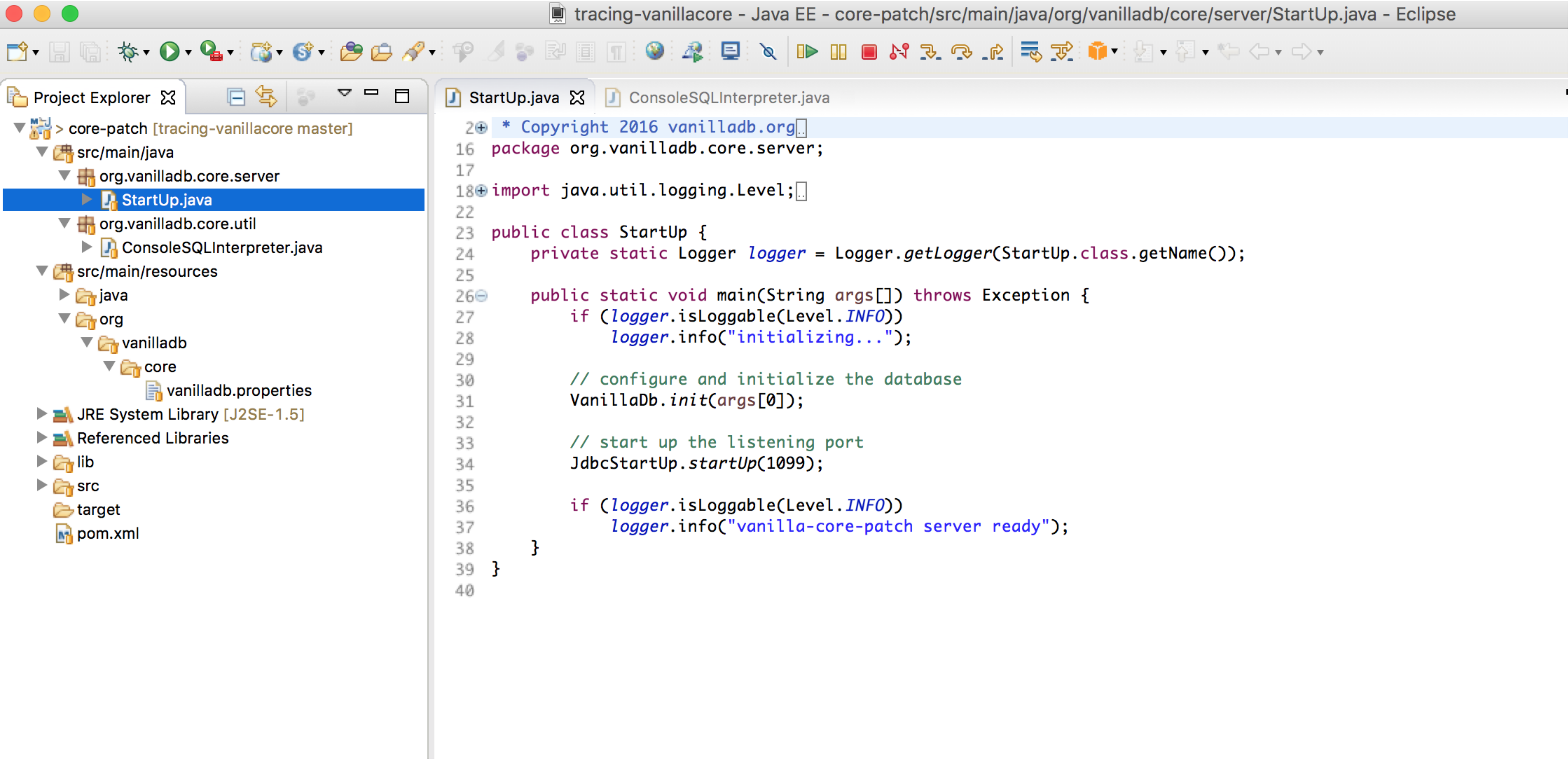
□ Add project(s) to working set

core-patch

Advanced

Then you will see this

Done



tracing-vanillacore - Java EE - core-patch/src/main/java/org/vanilladb/core/server/StartUp.java - Eclipse
Project Explorer
StartUp.java
ConsoleSQLInterpreter.java
> core-patch [tracing-vanillacore master]
src/main/java
org.vanilladb.core.server
StartUp.java
org.vanilladb.core.util
ConsoleSQLInterpreter.java
src/main/resources
java
org
vanilladb
core
vanilladb.properties
JRE System Library [J2SE-1.5]
Referenced Libraries
lib
src
target
pom.xml

```java
 * Copyright 2016 vanilladb.org
package org.vanilladb.core.server;

import java.util.logging.Level;

public class StartUp {
    private static Logger logger = Logger.getLogger(StartUp.class.getName());

    public static void main(String args[]) throws Exception {
        if (logger.isLoggable(Level.INFO))
            logger.info("initializing...");

        // configure and initialize the database
        VanillaDb.init(args[0]);

        // start up the listening port
        JdbcStartUp.startUp(1099);

        if (logger.isLoggable(Level.INFO))
            logger.info("vanilla-core-patch server ready");
    }
}

```

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- VanillaCore
  - Prepare Everything You Need
  - Server Properties
  - Starting Up VanillaCore
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VanillaCore Properties File

- Configurations for VanillaCore are all stored in a properties file

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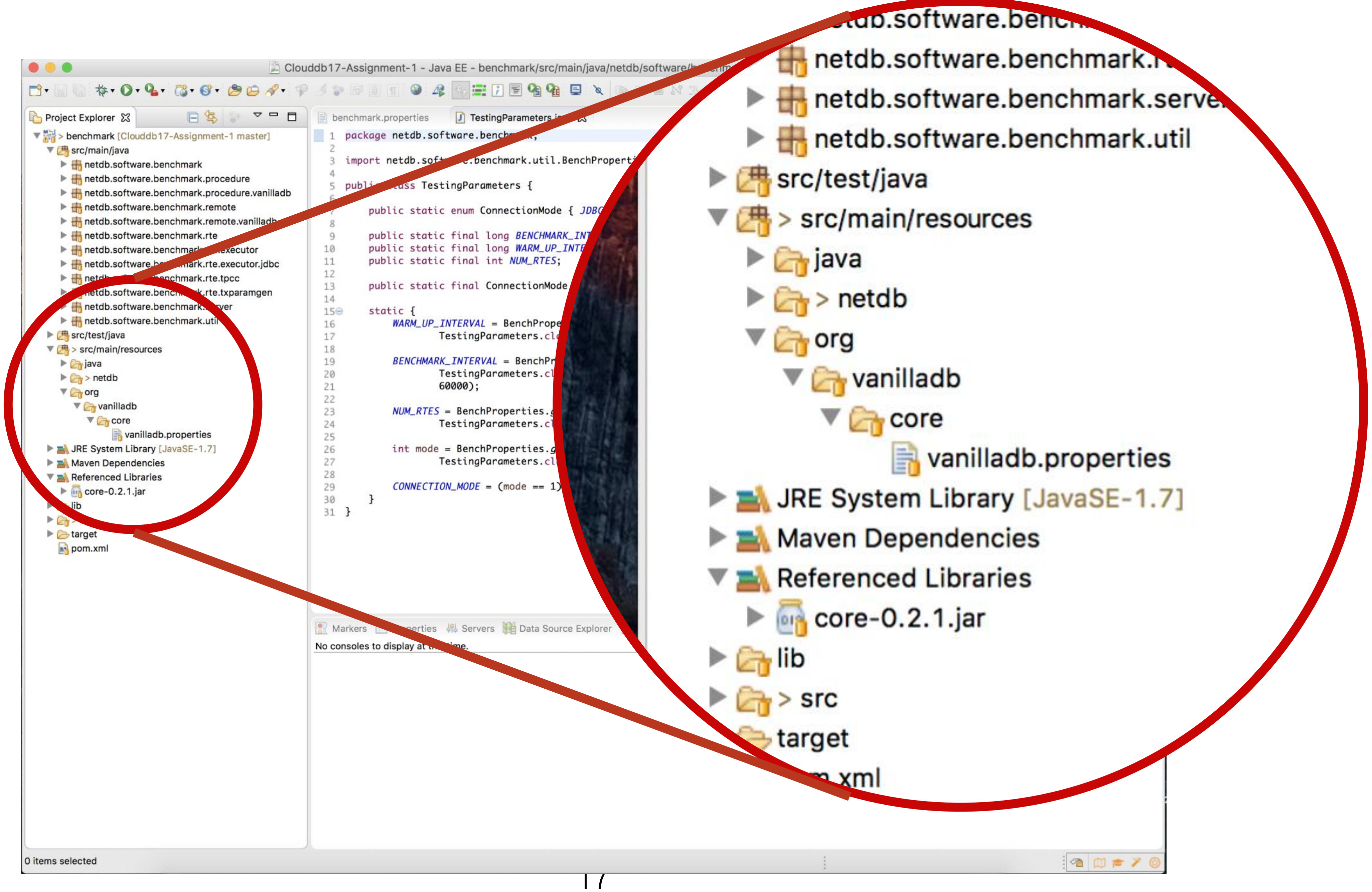
VanillaCore Properties File

- vanilladb.properties



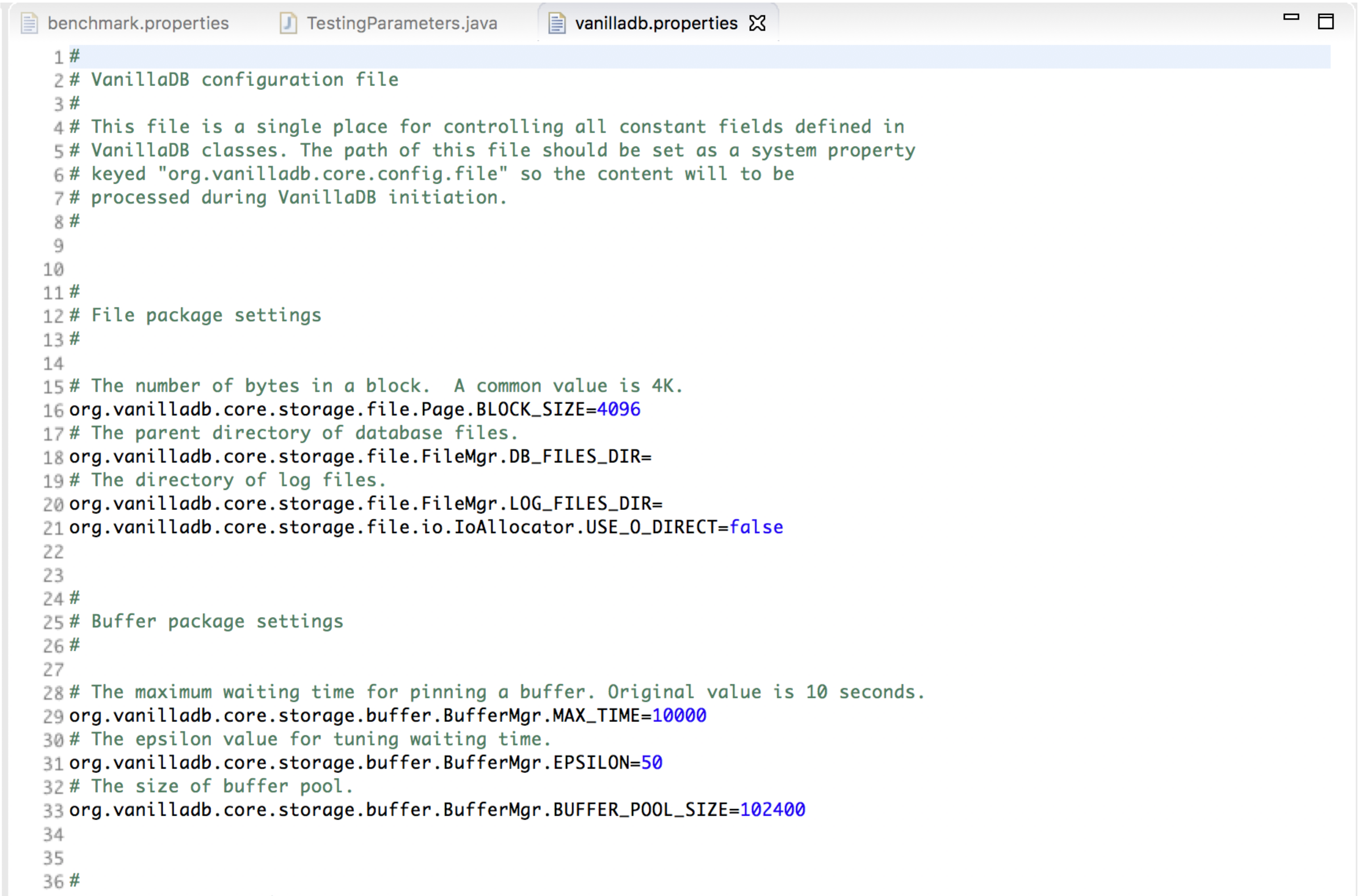
```
> benchmark [Clouddb17-Assignment-1 master]
  src/main/java
    netdb.software.benchmark
    netdb.software.benchmark.procedure
    netdb.software.benchmark.procedure.vanilladb
    netdb.software.benchmark.remote
    netdb.software.benchmark.remote.vanilladb
    netdb.software.benchmark.rte
    netdb.software.benchmark.rte.executor
    netdb.software.benchmark.rte.executor.jdbc
    netdb.software.benchmark.rte.tpcc
    netdb.software.benchmark.rte.txparamgen
    netdb.software.benchmark.server
    netdb.software.benchmark.util
  src/test/java
  > src/main/resources
    java
    > netdb
    org
      vanilladb
        core
          vanilladb.properties
  JRE System Library [JavaSE-1.7]
  Maven Dependencies
  Referenced Libraries
    core-0.2.1.jar
  lib
  > src
  target
  pom.xml
```

```java
package netdb.software.benchmark;

import netdb.software.benchmark.util.BenchPropert

public class TestingParameters {

    public static enum ConnectionMode { JDBC

    public static final long BENCHMARK_INT
    public static final long WARM_UP_INTE
    public static final int NUM_RTES;

    public static final ConnectionMode

    static {
        WARM_UP_INTERVAL = BenchPrope
                TestingParameters.cl

        BENCHMARK_INTERVAL = BenchPr
                TestingParameters.cl
                60000);

        NUM_RTES = BenchProperties.g
                TestingParameters.cl

        int mode = BenchProperties.g
                TestingParameters.cl

        CONNECTION_MODE = (mode == 1)
    }
}
```

No consoles to display at this time.

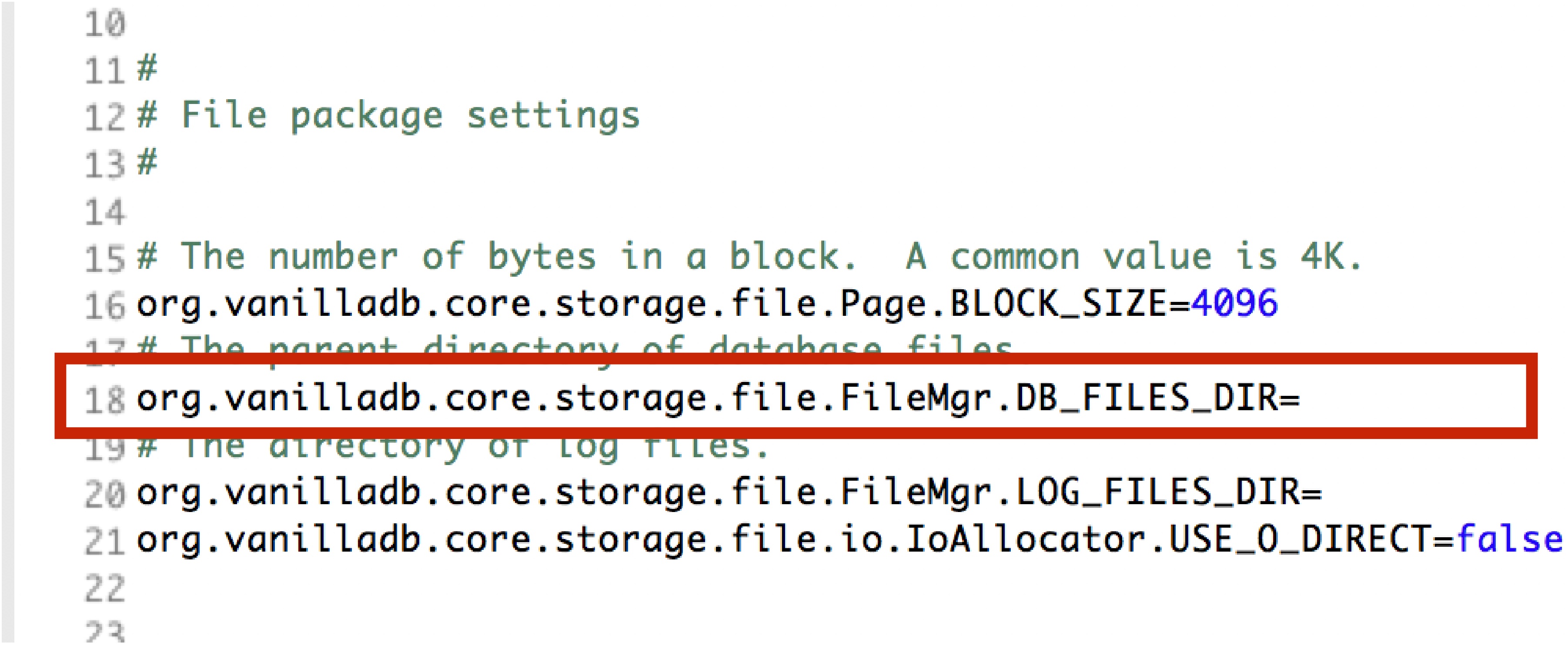
netdb.software.benchmark.server
netdb.software.benchmark.util
src/test/java
> src/main/resources
java
> netdb
org
vanilladb
core
vanilladb.properties
JRE System Library [JavaSE-1.7]
Maven Dependencies
Referenced Libraries
core-0.2.1.jar
lib
> src
target
pom.xml

vanilladb.properties



```
#
# VanillaDB configuration file
#
# This file is a single place for controlling all constant fields defined in
# VanillaDB classes. The path of this file should be set as a system property
# keyed "org.vanilladb.core.config.file" so the content will to be
# processed during VanillaDB initiation.
#


#
# File package settings
#

# The number of bytes in a block.  A common value is 4K.
org.vanilladb.core.storage.file.Page.BLOCK_SIZE=4096
# The parent directory of database files.
org.vanilladb.core.storage.file.FileMgr.DB_FILES_DIR=
# The directory of log files.
org.vanilladb.core.storage.file.FileMgr.LOG_FILES_DIR=
org.vanilladb.core.storage.file.io.IoAllocator.USE_O_DIRECT=false


#
# Buffer package settings
#

# The maximum waiting time for pinning a buffer. Original value is 10 seconds.
org.vanilladb.core.storage.buffer.BufferMgr.MAX_TIME=10000
# The epsilon value for tuning waiting time.
org.vanilladb.core.storage.buffer.BufferMgr.EPSILON=50
# The size of buffer pool.
org.vanilladb.core.storage.buffer.BufferMgr.BUFFER_POOL_SIZE=102400


#
```

vanilladb.properties



```

#
# File package settings
#

# The number of bytes in a block.  A common value is 4K.
org.vanilladb.core.storage.file.Page.BLOCK_SIZE=4096
# The parent directory of database files
org.vanilladb.core.storage.file.FileMgr.DB_FILES_DIR=
# The directory of log files.
org.vanilladb.core.storage.file.FileMgr.LOG_FILES_DIR=
org.vanilladb.core.storage.file.io.IoAllocator.USE_O_DIRECT=false


```

- Your DataBase files will be stored in this directory
- If it is empty, the Default directory would be your User directory

Outline

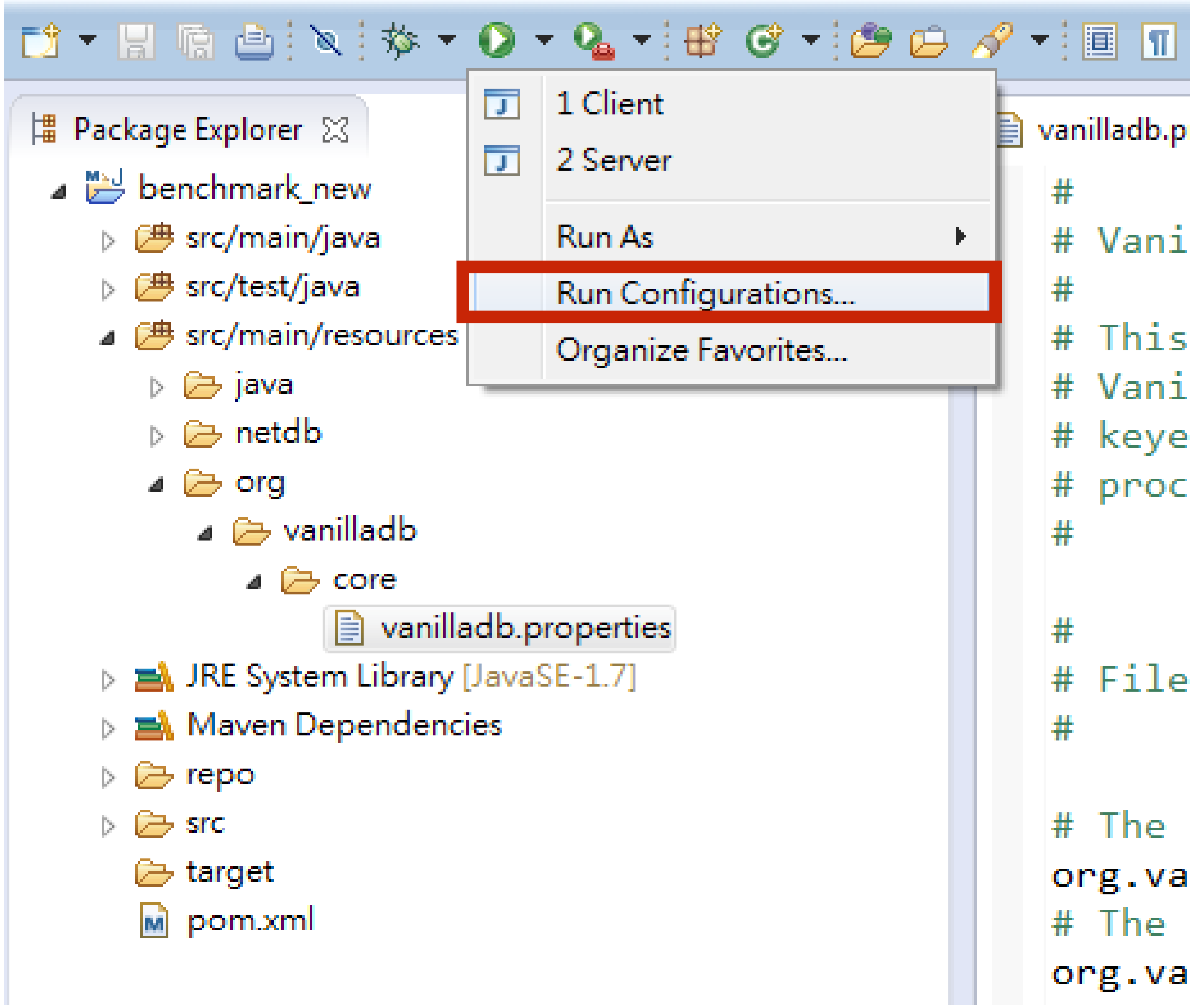
- VanillaCore
  - Prepare Everything You Need
  - Server Properties
  - Starting Up VanillaCore
  - Console SQL Interpreter

Starting Up VanillaCore

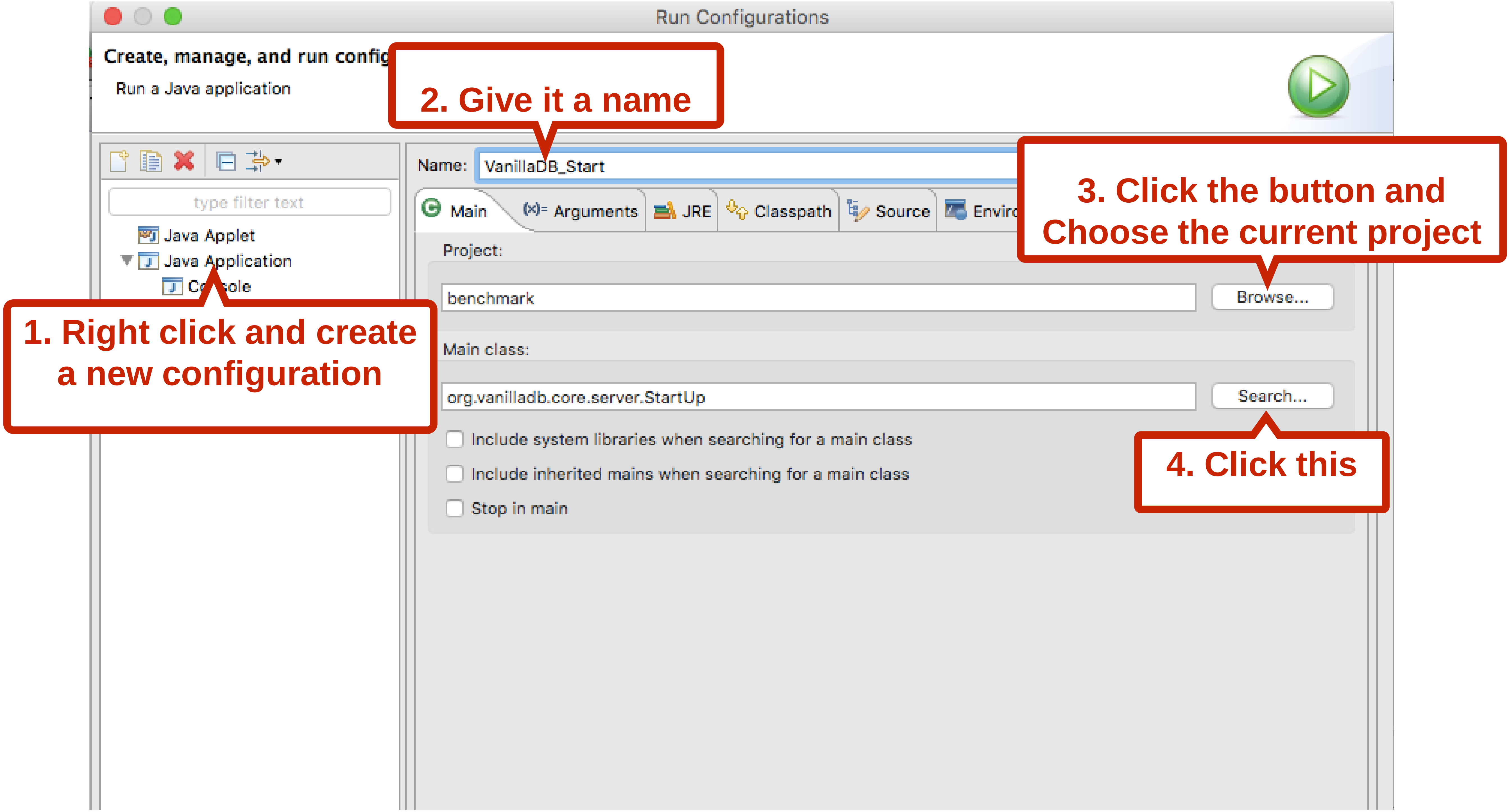
- To start up a VanillaCore server, we have to give it the following arguments
  - Database Directory Name
  - The locations of properties files

[Icon Source]

Setting Run Configuration



```
#
# Vani
#
# This
# Vani
# keye
# proc
#


#
# File
#


# The
org.va
# The
org.va
```



Name: VanillaDB_Start

Project: benchmark

Main class: org.vanilladb.core.server.StartUp

□ Include system libraries when searching for a main class

□ Include inherited mains when searching for a main class

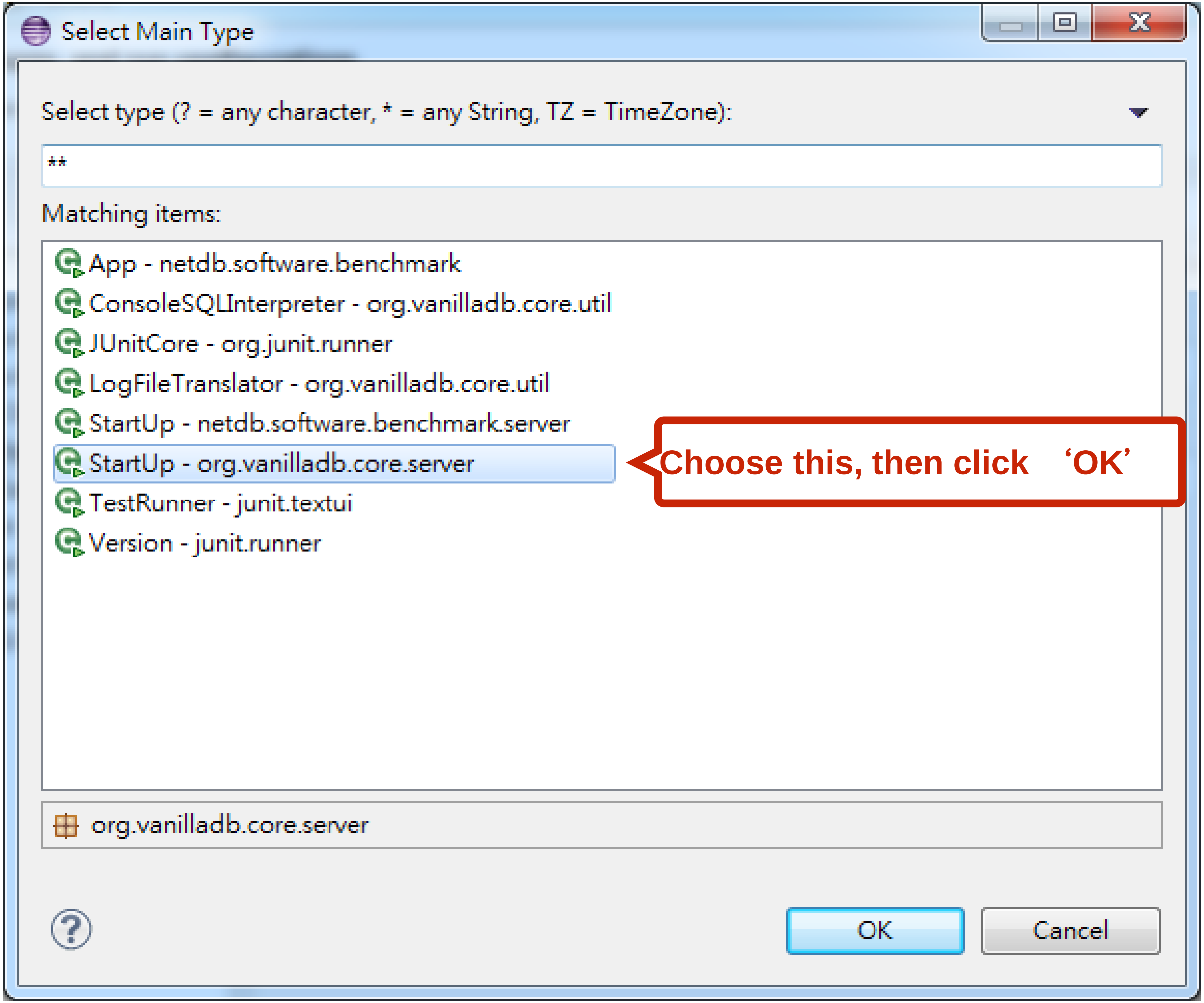
□ Stop in main

1. Right click and create a new configuration

2. Give it a name

3. Click the button and Choose the current project

4. Click this



Select Main Type

Select type (? = any character, * = any String, TZ = TimeZone):

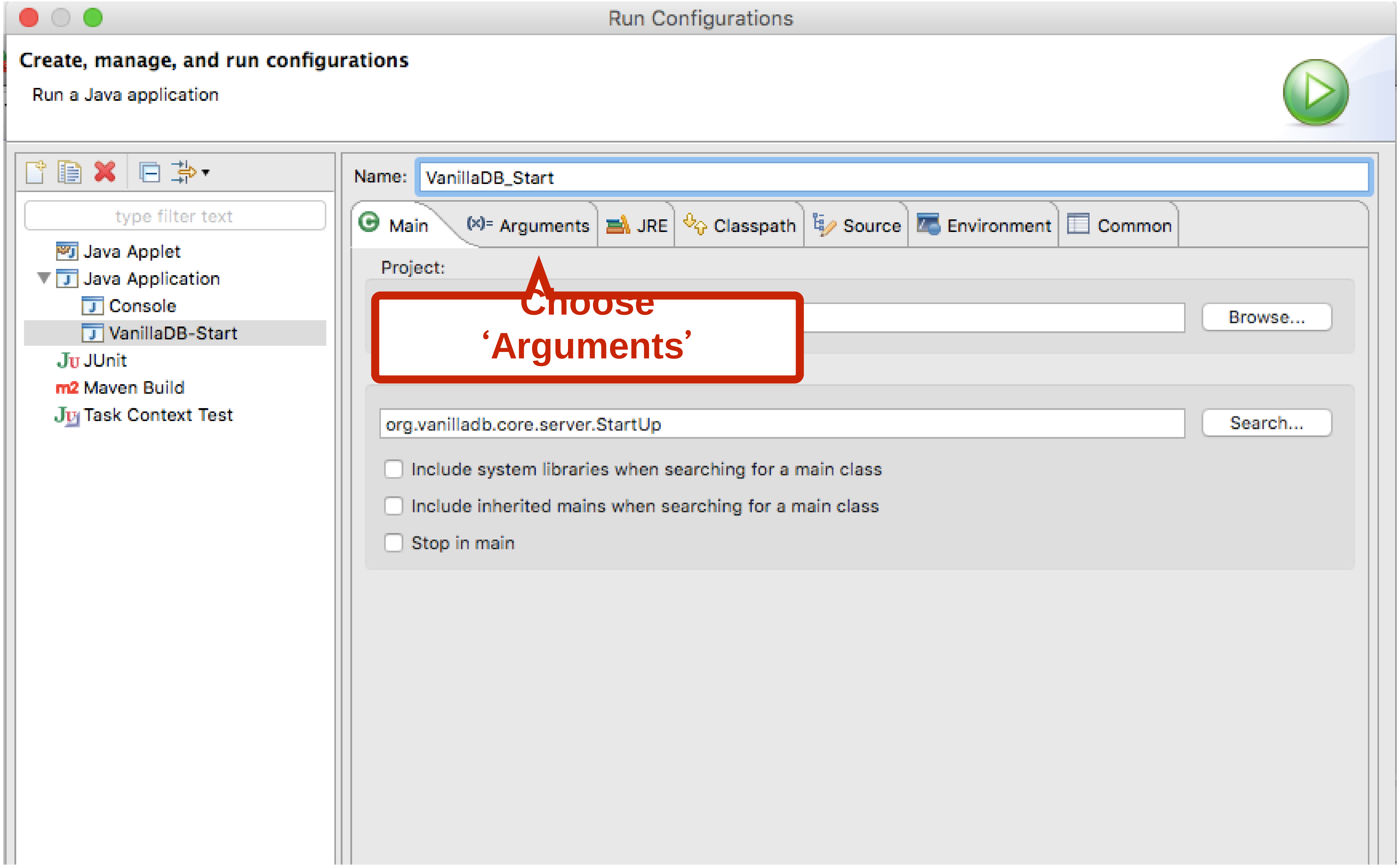
**

Matching items:

- App - netdb.software.benchmark
- ConsoleSQLInterpreter - org.vanilladb.core.util
- JUnitCore - org.junit.runner
- LogFileTranslator - org.vanilladb.core.util
- StartUp - netdb.software.benchmark.server
- StartUp - org.vanilladb.core.server
- TestRunner - junit.textui
- Version - junit.runner

org.vanilladb.core.server

Choose this, then click ‘OK’



Run Configurations

Create, manage, and run configurations

Run a Java application

Name: VanillaDB_Start

Project:

org.vanilladb.core.server.StartUp

☐ Include system libraries when searching for a main class

☐ Include inherited mains when searching for a main class

☐ Stop in main

Choose ‘Arguments’

Arguments (1/2)

- Program Arguments
  - Format

```
[Database Directory Name]
```

  - Example

```
student-db
```

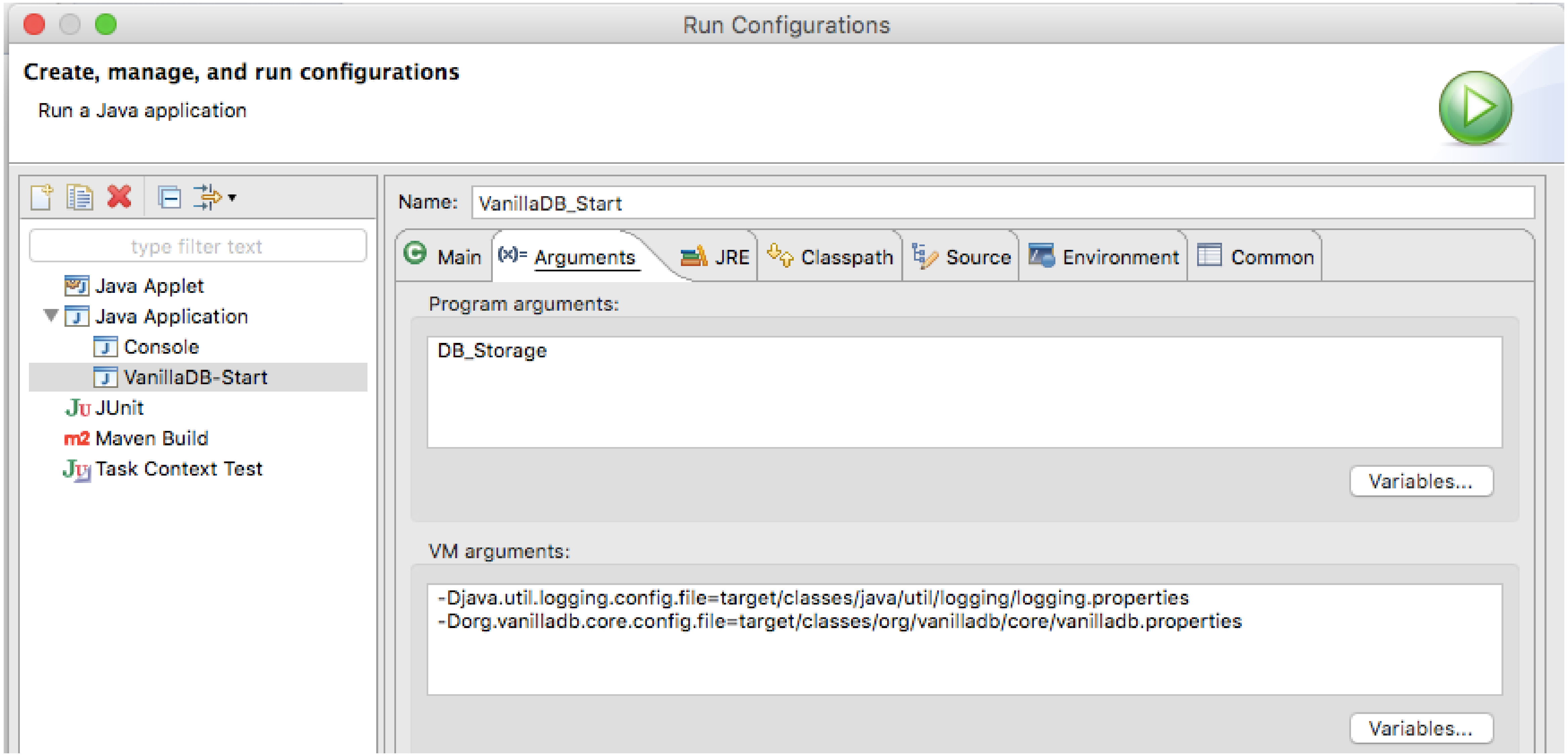
Arguments (2/2)

- VM Arguments
  - For logging properties

```
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties
```

  - For VanillaCore properties

```
-Dorg.vanilladb.core.config.file=target/classes/org/vanilladb/core/vanilladb.properties
```



Name: VanillaDB_Start

Program arguments:

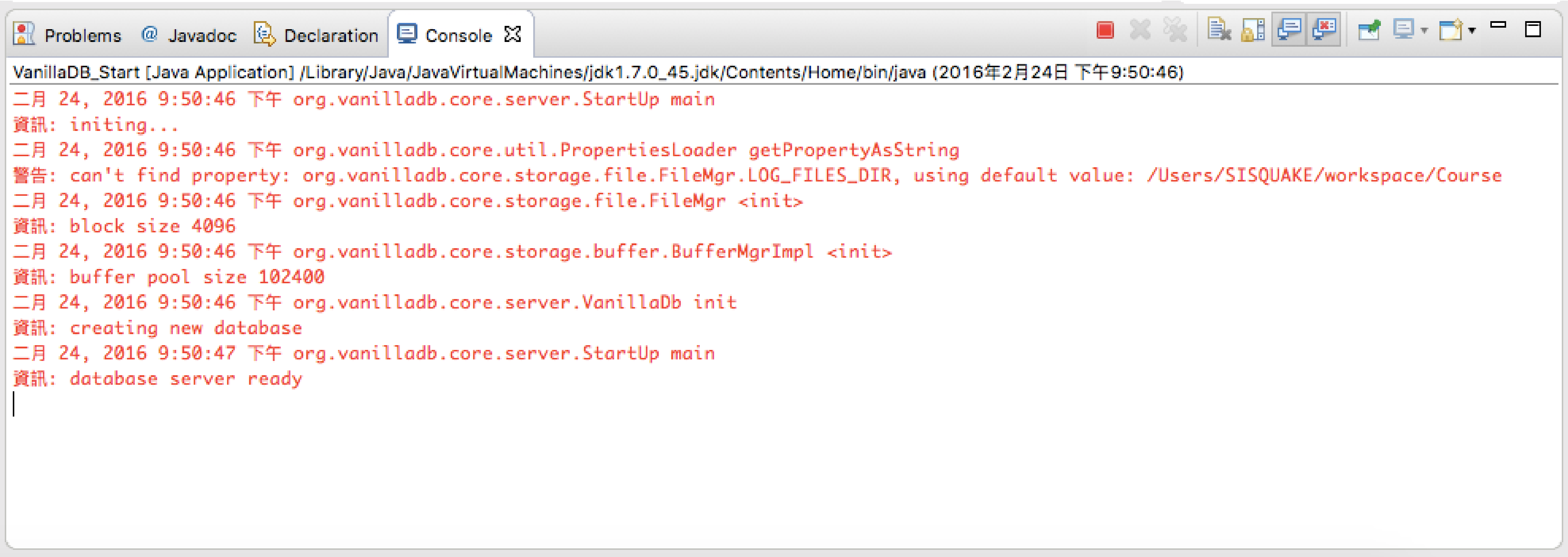
```
DB_Storage
```

VM arguments:

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

You can copy those arguments from here, then click ‘Apply’ and ‘Run’

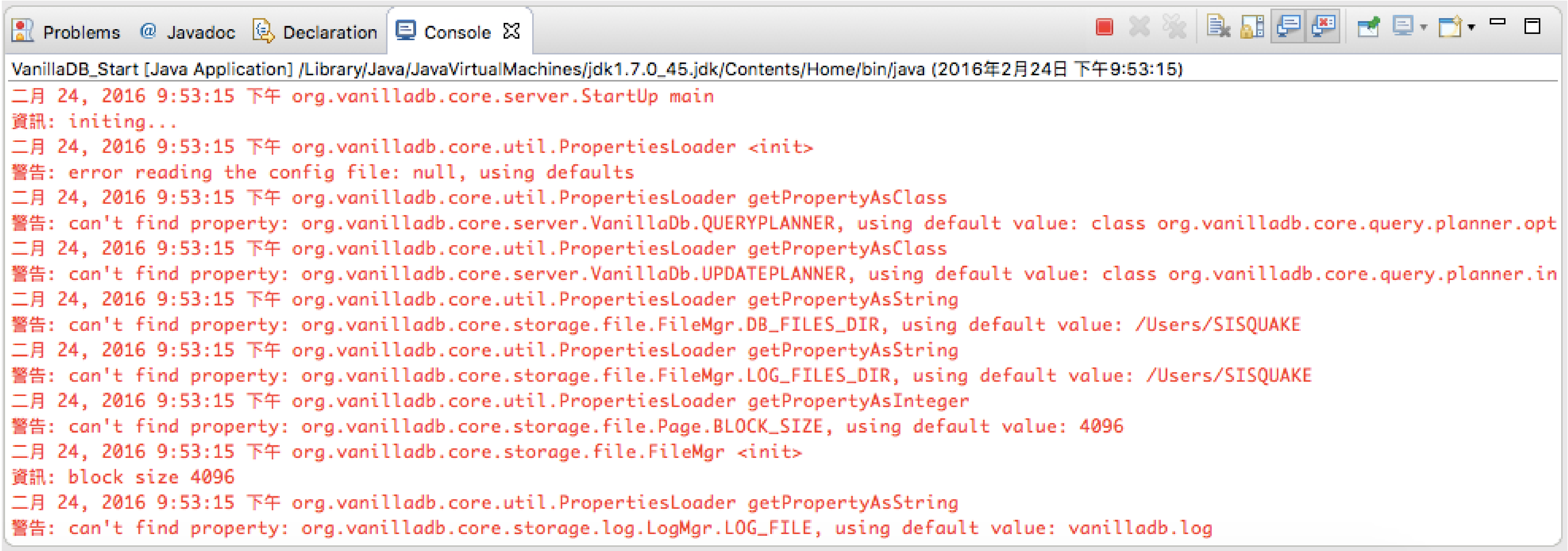
Server Messages (1/3)



```
VanillaDB_Start [Java Application] /Library/Java/JavaVirtualMachines/jdk1.7.0_45.jdk/Contents/Home/bin/java (2016年2月24日 下午9:50:46)
二月 24, 2016 9:50:46 下午 org.vanilladb.core.server.StartUp main
資訊: initing...
二月 24, 2016 9:50:46 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/SISQUAKE/workspace/Course
二月 24, 2016 9:50:46 下午 org.vanilladb.core.storage.file.FileMgr <init>
資訊: block size 4096
二月 24, 2016 9:50:46 下午 org.vanilladb.core.storage.buffer.BufferMgrImpl <init>
資訊: buffer pool size 102400
二月 24, 2016 9:50:46 下午 org.vanilladb.core.server.VanillaDb init
資訊: creating new database
二月 24, 2016 9:50:47 下午 org.vanilladb.core.server.StartUp main
資訊: database server ready
```

You should see this if there is nothing wrong.

Server Messages (2/3)



```
VanillaDB_Start [Java Application] /Library/Java/JavaVirtualMachines/jdk1.7.0_45.jdk/Contents/Home/bin/java (2016年2月24日 下午9:53:15)
二月 24, 2016 9:53:15 下午 org.vanilladb.core.server.StartUp main
資訊: initing...
二月 24, 2016 9:53:15 下午 org.vanilladb.core.util.PropertiesLoader <init>
警告: error reading the config file: null, using defaults
二月 24, 2016 9:53:15 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsClass
警告: can't find property: org.vanilladb.core.server.VanillaDb.QUERYPLANNER, using default value: class org.vanilladb.core.query.planner.opt
二月 24, 2016 9:53:15 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsClass
警告: can't find property: org.vanilladb.core.server.VanillaDb.UPDATEPLANNER, using default value: class org.vanilladb.core.query.planner.in
二月 24, 2016 9:53:15 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/SISQUAKE
二月 24, 2016 9:53:15 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/SISQUAKE
二月 24, 2016 9:53:15 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsInteger
警告: can't find property: org.vanilladb.core.storage.file.Page.BLOCK_SIZE, using default value: 4096
二月 24, 2016 9:53:15 下午 org.vanilladb.core.storage.file.FileMgr <init>
資訊: block size 4096
二月 24, 2016 9:53:15 下午 org.vanilladb.core.util.PropertiesLoader getPropertyAsString
警告: can't find property: org.vanilladb.core.storage.log.LogMgr.LOG_FILE, using default value: vanilladb.log
```

If you saw any ‘Warning’ message, you should check it carefully.

Server Messages (3/3)

- “error reading config file, using default “
  - It usually happens when you give a wrong location for a properties file
- “can’ t find property: …., using default: …”
  - It means that there is a property missing in your properties file

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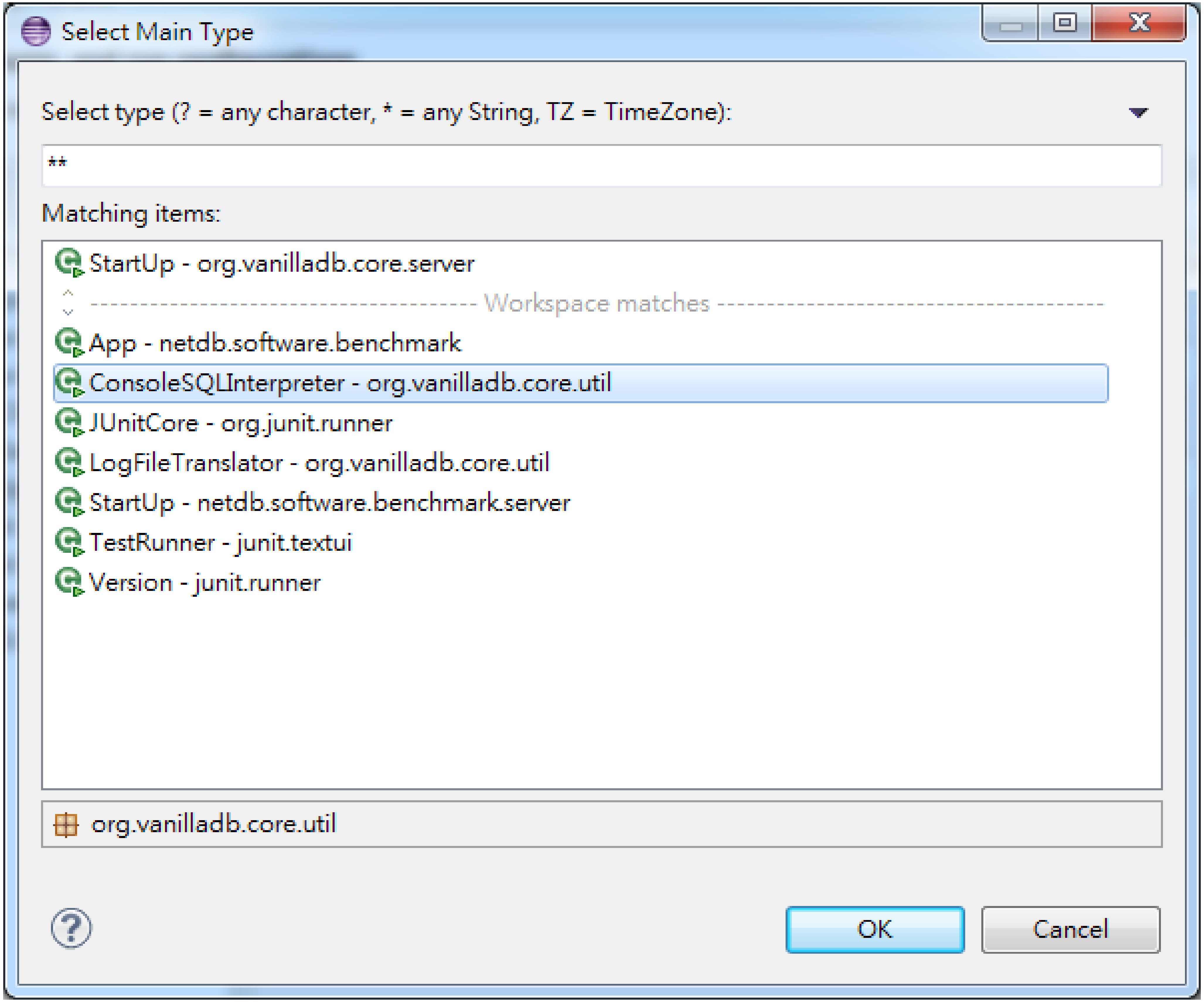
Console SQL Interpreter

- You can use Console SQL Interpreter we provided in VanillaCore to connect with server

[Icon Source]

Console SQL Interpreter

- To use Console SQL Interpreter, just follow these steps
  1. Create a new run configuration
  2. Give it a name and choose your project
  3. Choose "ConsoleSQLInterpreter" for "Main Class"
  4. No VM Argument is required
  5. Run it



Select Main Type

Select type (? = any character, * = any String, TZ = TimeZone):

**

Matching items:

StartUp - org.vanilladb.core.server

------------------------------------ Workspace matches ------------------------------------

App - netdb.software.benchmark

ConsoleSQLInterpreter - org.vanilladb.core.util

JUnitCore - org.junit.runner

LogFileTranslator - org.vanilladb.core.util

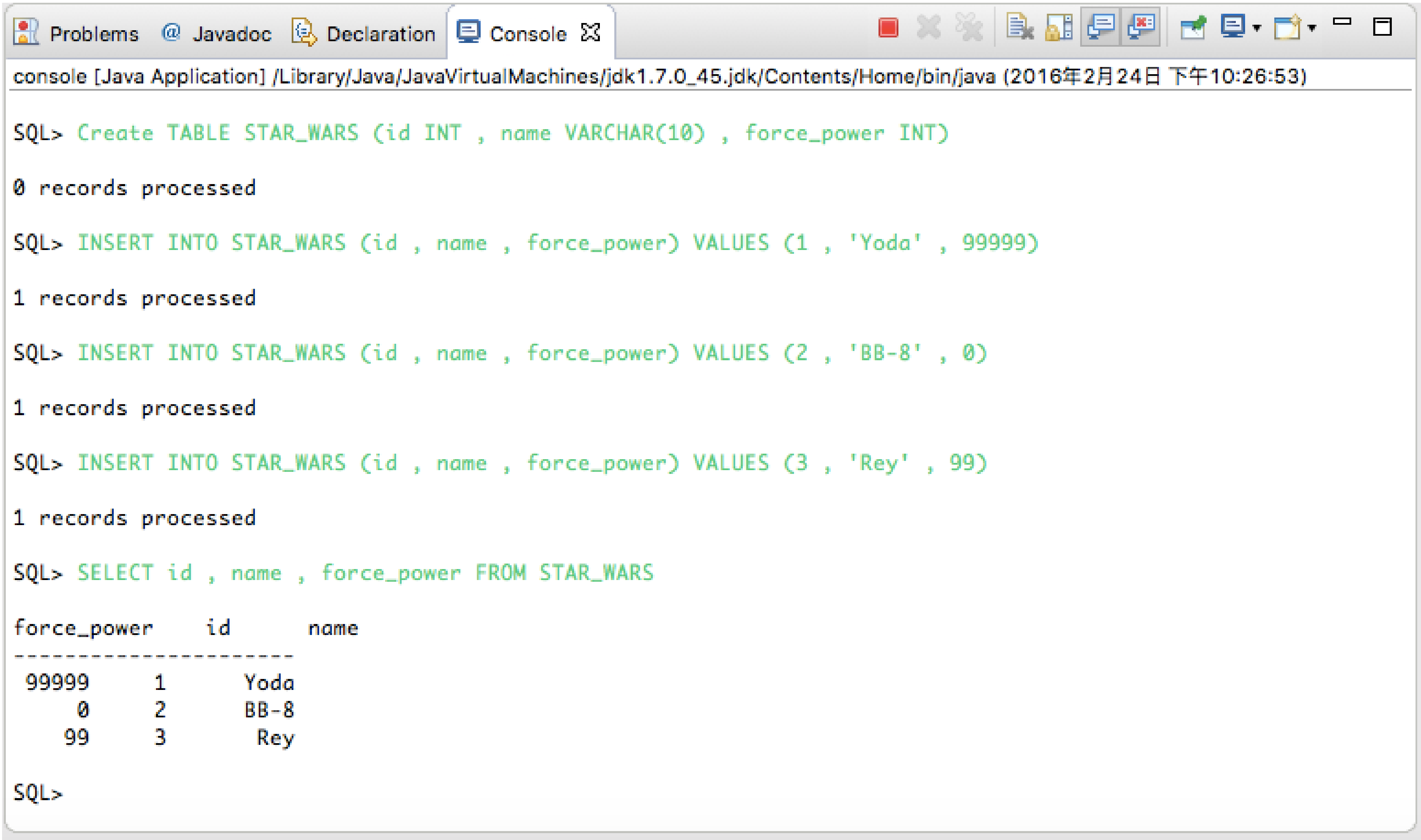
StartUp - netdb.software.benchmark.server

TestRunner - junit.textui

Version - junit.runner

org.vanilladb.core.util

Try it !



```
console [Java Application] /Library/Java/JavaVirtualMachines/jdk1.7.0_45.jdk/Contents/Home/bin/java (2016年2月24日 下午10:26:53)

SQL> Create TABLE STAR_WARS (id INT , name VARCHAR(10) , force_power INT)

0 records processed

SQL> INSERT INTO STAR_WARS (id , name , force_power) VALUES (1 , 'Yoda' , 99999)

1 records processed

SQL> INSERT INTO STAR_WARS (id , name , force_power) VALUES (2 , 'BB-8' , 0)

1 records processed

SQL> INSERT INTO STAR_WARS (id , name , force_power) VALUES (3 , 'Rey' , 99)

1 records processed

SQL> SELECT id , name , force_power FROM STAR_WARS

force_power    id       name
----------------------
 99999      1       Yoda
     0      2       BB-8
    99      3        Rey

SQL>
```

Q&A

- To see what exactly queries you can use, please check here
  - https://shwu10.cs.nthu.edu.tw/courses/databases/2020-spring/faq/blob/master/Vanilladb_Sql.md
- If you got any problem, you can check here first
  - https://shwu10.cs.nthu.edu.tw/courses/databases/2020-spring/faq
- If your problem was very unique, just send a email let us know