hyper[in]

Transforming the retail real estate

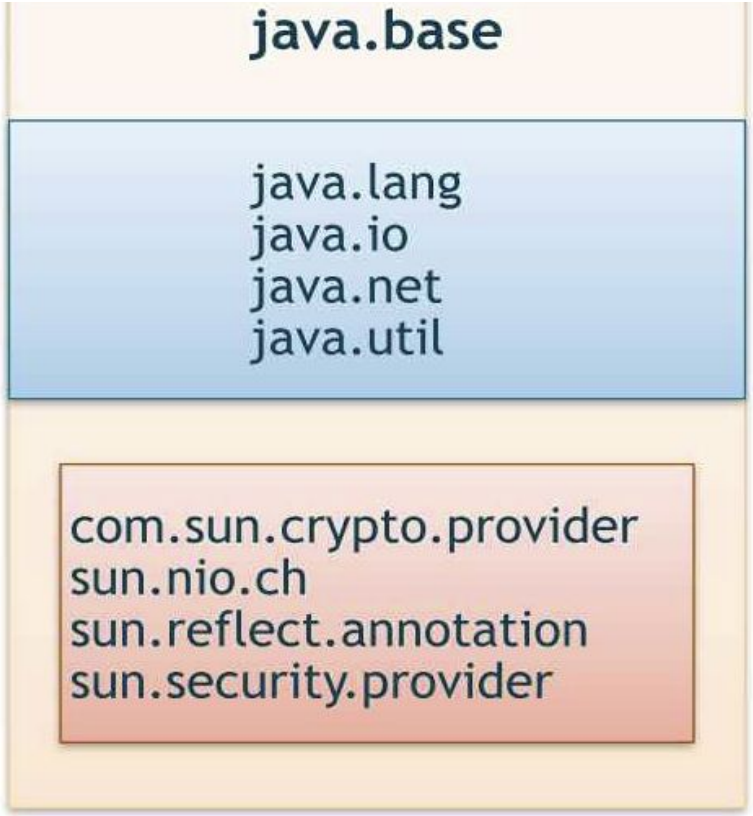
Java Modules

A module is a set of related packages designed for reuse.

Modules Goals

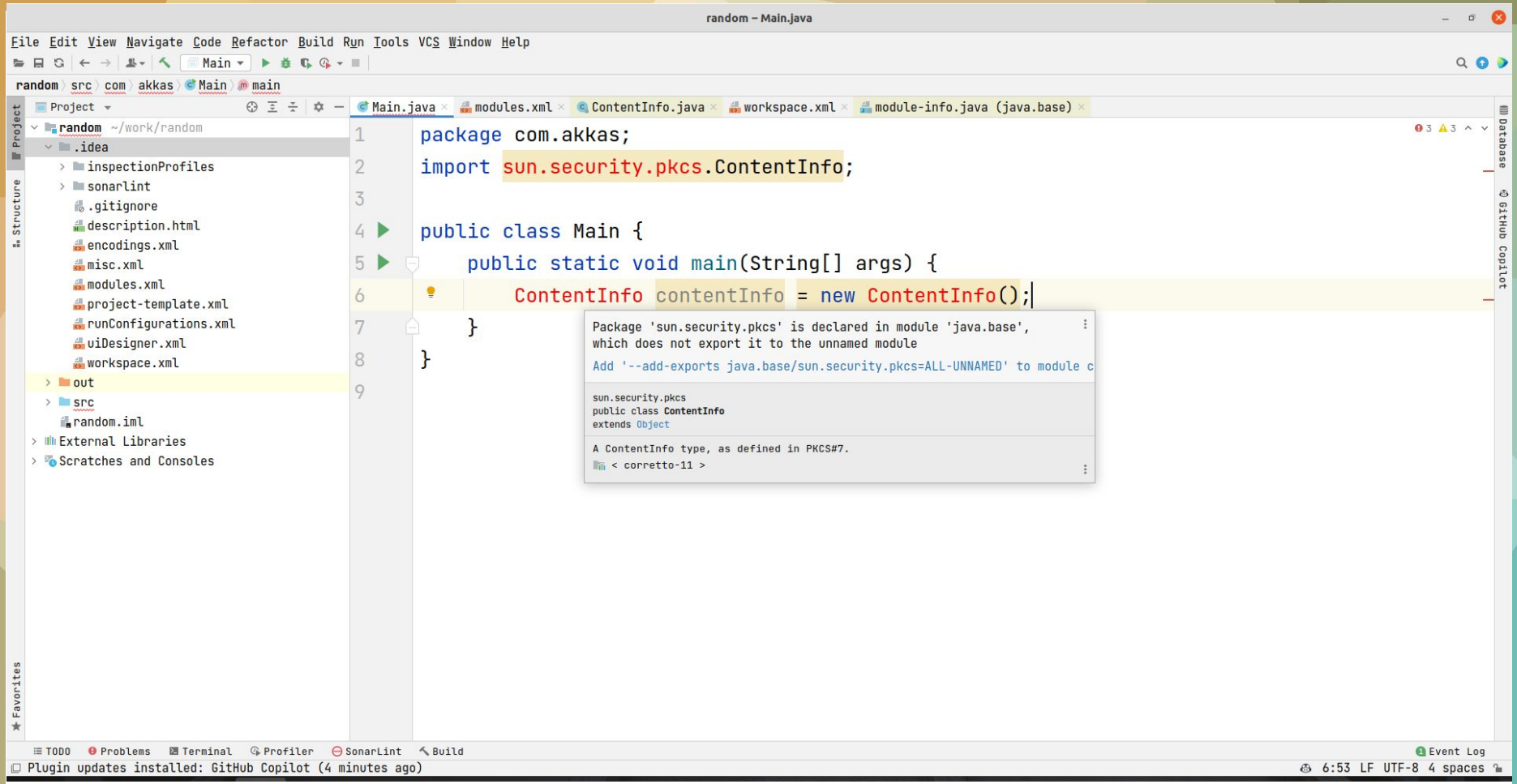
- Strong encapsulation
- Reliable dependencies

```
// module-info.java
module java.base {
        exports java.lang;
        exports java.io;
        exports java.net;
        exports java.util;
}
```



source: oracle.com


File Edit View Navigate Code Refactor Build Run Tools VCS Window Help
Main
[JRT] java.base sun security pkcs ContentInfo
Project
com.sun
java
javax
jdk.internal
META-INF.services
sun
invoke
launcher
net
nio
reflect
security
action
internal
jca
pkcs
ContentInfo
EncryptedPrivateKeyInfo
ESSCertId
ParsingException
PKCS7
PKCS8Key
PKCS9Attribute
PKCS9Attributes
SignerInfo
SigningCertificateInfo
pkcs10
pkcs12
provider
rsa
ssl
Main.java
ContentInfo.java
Reader Mode
27
28 import ...
31
A ContentInfo type, as defined in PKCS#7.
Author: Benjamin Renaud
37
38 public class ContentInfo {
39
40 // pkcs7 pre-defined content types
41 private static int[] pkcs7 = {1, 2, 840, 113549, 1, 7};
42 private static int[] data = {1, 2, 840, 113549, 1, 7, 1};
43 private static int[] sdata = {1, 2, 840, 113549, 1, 7, 2};
44 private static int[] edata = {1, 2, 840, 113549, 1, 7, 3};
45 private static int[] sedata = {1, 2, 840, 113549, 1, 7, 4};
46 private static int[] ddata = {1, 2, 840, 113549, 1, 7, 5};
47 private static int[] crdata = {1, 2, 840, 113549, 1, 7, 6};
48 private static int[] nsdata = {2, 16, 840, 1, 113730, 2, 5};
49 // timestamp token (id-ct-TSTInfo) from RFC 3161
50 private static int[] tstInfo = {1, 2, 840, 113549, 1, 9, 16, 1, 4};
51 // this is for backwards-compatibility with JDK 1.1.x
Database
GitHub Copilot
Structure
Favorites
TODO
Problems
Terminal
Profiler
SonarLint
Build
Event Log
38:21 LF UTF-8 4 spaces


random – Main.java
File Edit View Navigate Code Refactor Build Run Tools VCS Window Help
Main
random src com akkas Main main
Project
random ~/work/random
.idea
inspectionProfiles
sonarlint
.gitignore
description.html
encodings.xml
misc.xml
modules.xml
project-template.xml
runConfigurations.xml
uiDesigner.xml
workspace.xml
out
src
random.iml
External Libraries
Scratches and Consoles
Main.java
modules.xml
ContentInfo.java
workspace.xml
module-info.java (java.base)
1 package com.akkas;
2 import sun.security.pkcs.ContentInfo;
3
4 public class Main {
5 public static void main(String[] args) {
6 ContentInfo contentInfo = new ContentInfo();
7 }
8 }
9
Package 'sun.security.pkcs' is declared in module 'java.base',
which does not export it to the unnamed module
Add '--add-exports java.base/sun.security.pkcs=ALL-UNNAMED' to module c
sun.security.pkcs
public class ContentInfo
extends Object
A ContentInfo type, as defined in PKCS#7.
< corretto-11 >
Database
GitHub Copilot
Structure
Favorites
TODO
Problems
Terminal
Profiler
SonarLint
Build
Event Log
Plugin updates installed: GitHub Copilot (4 minutes ago)
6:53 LF UTF-8 4 spaces


Main.java
module-info.java (java.base)
java.sql.rowset;
exports sun.security.action to
java.desktop,
java.security.jgss;
exports sun.security.internal.interfaces to jdk.crypto.cryptoki;
exports sun.security.internal.spec to jdk.crypto.cryptoki;
exports sun.security.jca to
java.smartcardio,
jdk.crypto.cryptoki,
jdk.crypto.ec,
exports sun.security.pkcs to
jdk.crypto.ec,
jdk.jartool;

JDK 1 - JDK 8

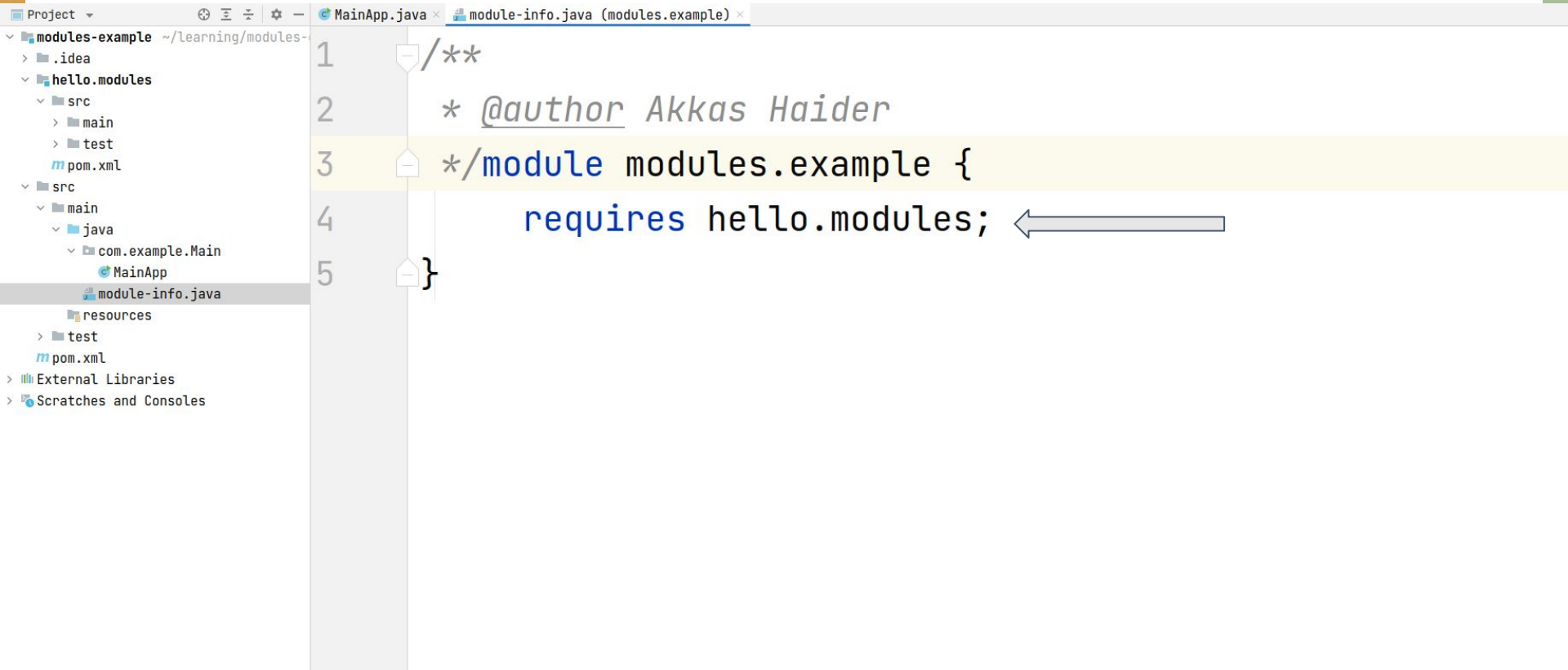
- public
- protected
- package
- private

JDK 9 - onwards

- public to everyone
- public but only to friend modules
- public only within a module
- protected
- package
- private


Project
modules-example ~/learning/modules-
.idea
hello.modules
1
src
main
java
com.example.modules
hello
2
HelloModules
world
3
HelloWorld
module-info.java
resources
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
module-info.java (hello.modules)
1 /**
2 * @author Akkas Haider
3 */
4 module hello.modules {
5 4 exports com.example.modules.hello;
6 }
5

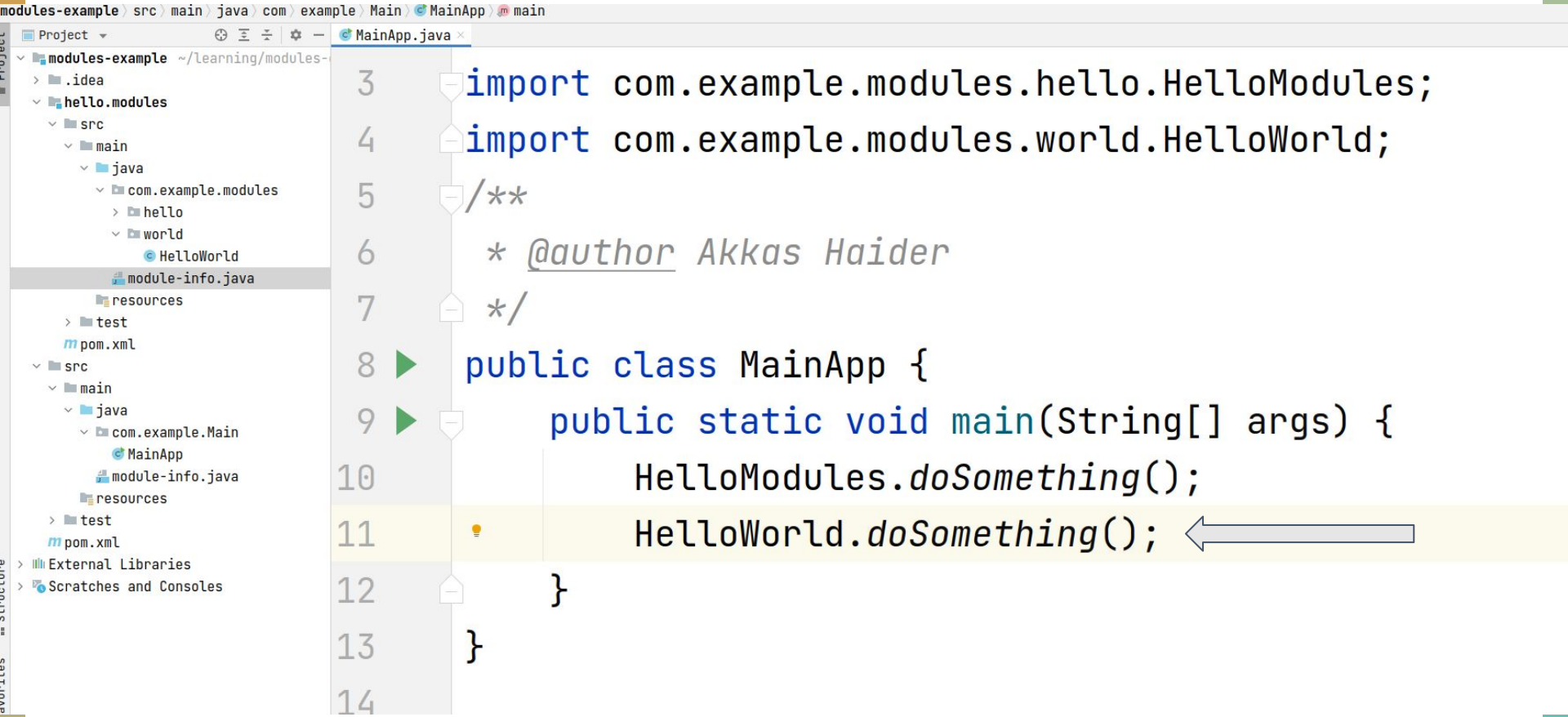

odules-example / src / main / java / com / example / main / MainApp
Project
MainApp.java
modules-example ~/learning/modules-
.idea
hello.modules
src
main
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
1 package com.example.Main;
2
3 import com.example.modules.hello.HelloModules;
4 /**
5 * @author Akkas Haider
6 */
7 public class MainApp {
8 public static void main(String[] args) {
9 HelloModules.doSomething();
10 }
11 }
12
Package 'com.example.modules.hello' is declared in module 'hello.modules', but module 'modules.example' does not read it
Add 'requires hello.modules' directive to module-info.java Alt+Shift+En


Project
modules-example ~/learning/modules-
.idea
hello.modules
src
main
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
MainApp.java
module-info.java (modules.example)
1 /**
2 * @author Akkas Haider
3 */module modules.example {
4 requires hello.modules;
5 }


modules-example › src › main › java › com › example › Main › MainApp
Project
MainApp.java
module-info.java (modules.example)
modules-example ~/learning/modules-
.idea
hello.modules
src
main
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
3 import com.example.modules.hello.HelloModules;
4 /**
5 * @author Akkas Haider
6 */
7 public class MainApp {
8 public static void main(String[] args) {
9 HelloModules.doSomething();
10 }
11 }
12
Structure
Favorites


Project
modules-example ~/learning/modules-
.idea
hello.modules
src
main
java
com.example.modules
hello
world
HelloWorld
module-info.java
resources
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
MainApp.java
module-info.java (modules.example)
2 1
3 import com.example.modules.hello.HelloModules;
4 import com.example.modules.world.HelloWorld;
5 /**
6 * @author Akkas Haider
7 */
8 public class MainApp {
9 public static void main(String[] args) {
10 HelloModules.doSomething();
11 HelloWorld.doSomething();
12 }
13 }
14
Package 'com.example.modules.world' is declared in module 'hello.
modules', which does not export it to module 'modules.example'
Add 'exports com.example.modules.world' directive to module-info.java


modules-example 〉 hello.modules 〉 src 〉 main 〉 java 〉 module-info.java
Project
modules-example ~/learning/modules-
.idea
hello.modules
src
main
java
com.example.modules
hello
world
HelloWorld
module-info.java
resources
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
MainApp.java
module-info.java (hello.modules)
1 /**
2 * @author Akkas Haider
3 */
4 module hello.modules {
5 exports com.example.modules.hello;
6 exports com.example.modules.world;
7 }


modules-example › src › main › java › com › example › Main › MainApp › main
Project
MainApp.java
modules-example ~/learning/modules-
.idea
hello.modules
src
main
java
com.example.modules
hello
world
HelloWorld
module-info.java
resources
test
pom.xml
src
main
java
com.example.Main
MainApp
module-info.java
resources
test
pom.xml
External Libraries
Scratches and Consoles
3 import com.example.modules.hello.HelloModules;
4 import com.example.modules.world.HelloWorld;
5 /**
6 * @author Akkas Haider
7 */
8 public class MainApp {
9 public static void main(String[] args) {
10 HelloModules.doSomething();
11 HelloWorld.doSomething();
12 }
13 }
14

Modules Goals

- Strong encapsulation
- Reliable dependencies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