

Software Verification

T4

고수창
전소영
이세라
하지윤

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CI

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Build Environment

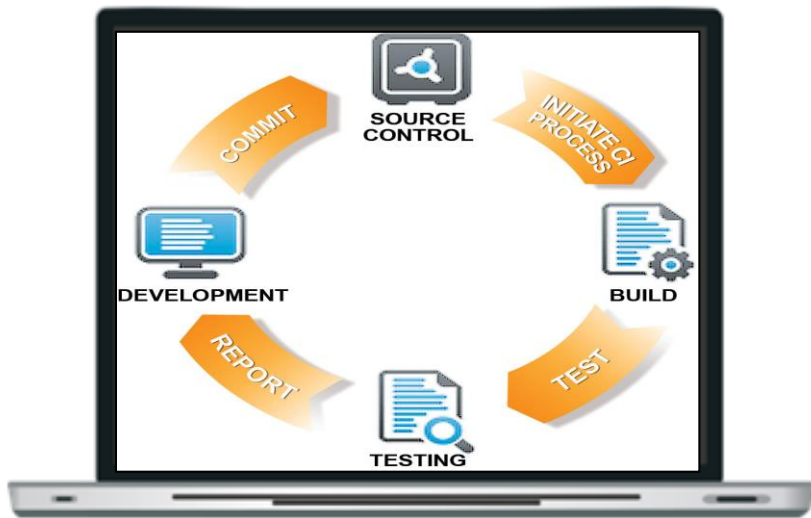
5

Git

1

Continuous Integration

What is CI?



- 소프트웨어 개발에서 Build/Test의 프로세스를 지속적으로 수행하는 것
- 개발자 생산성 향상
- 버그의 빠른 발견 및 해결
- 더 빠른 업데이트 제공

Continuous Integration

What is CI?

Continuous Integration에 필요한 것

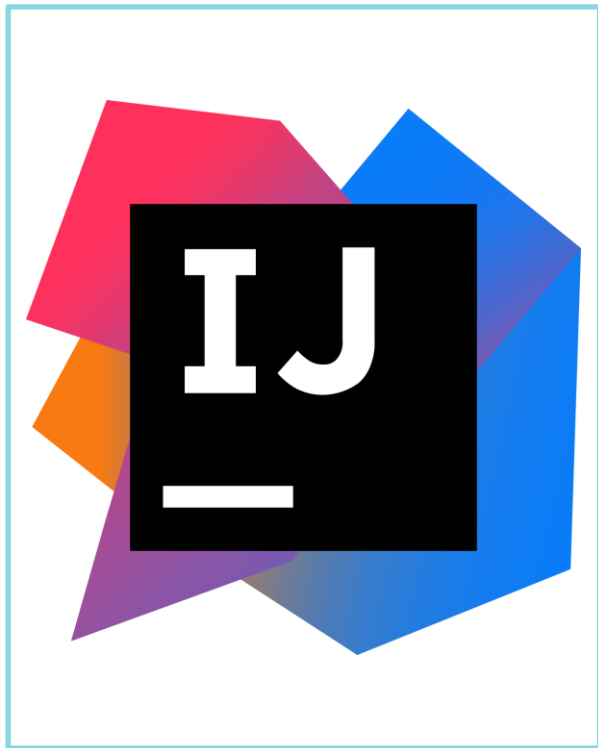
- CI 도구(CI server)
: Jenkins, Travis
- 버전 관리 시스템(SCM)
: Git, SVN
- 빌드 도구(Build Tool)
: Maven, Ant, Gradle
- 테스트 도구(Test Tool)
: JUnit



2

IntelliJ IDEA

What is IntelliJ IDEA?

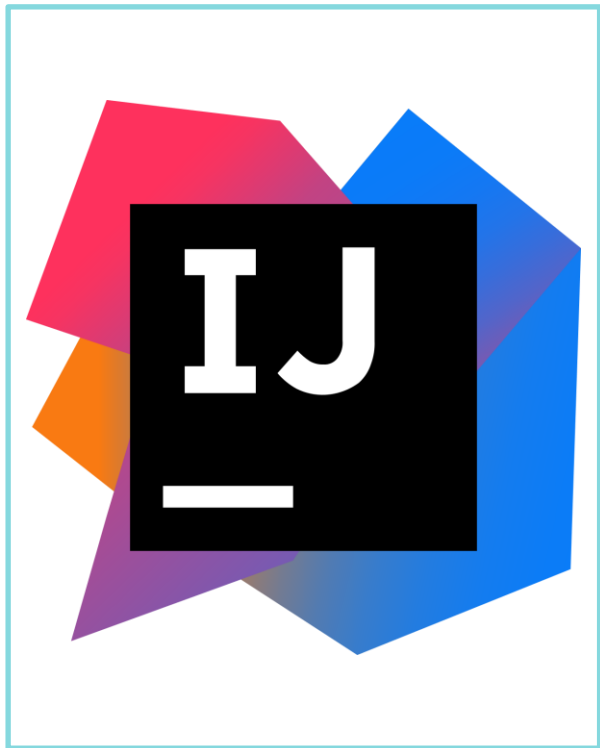


- JetBrains사에서 제작한 상용 자바 통합 개발환경
- Refactoring과 고급 코드 탐색 기능을 가장 먼저 지원
- IDE의 안정성이 뛰어나며 플러그인 호환 및 충돌 문제가 적음
- JAVA이외의 다른 프로그래밍 언어 지원

2

IntelliJ IDEA

Why is IntelliJ IDEA?



- 이클립스보다 가벼움
- 내장 개발자 도구
- UI/UX 예쁨

IntelliJ IDEA

Install JDK

- <http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html> 접속

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The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

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IntelliJ IDEA

Install JDK

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The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

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- Java Developer Newsletter: From your Oracle account, select **Subscriptions**, expand **Technology**, and subscribe to **Java**.
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IntelliJ IDEA

Install JDK

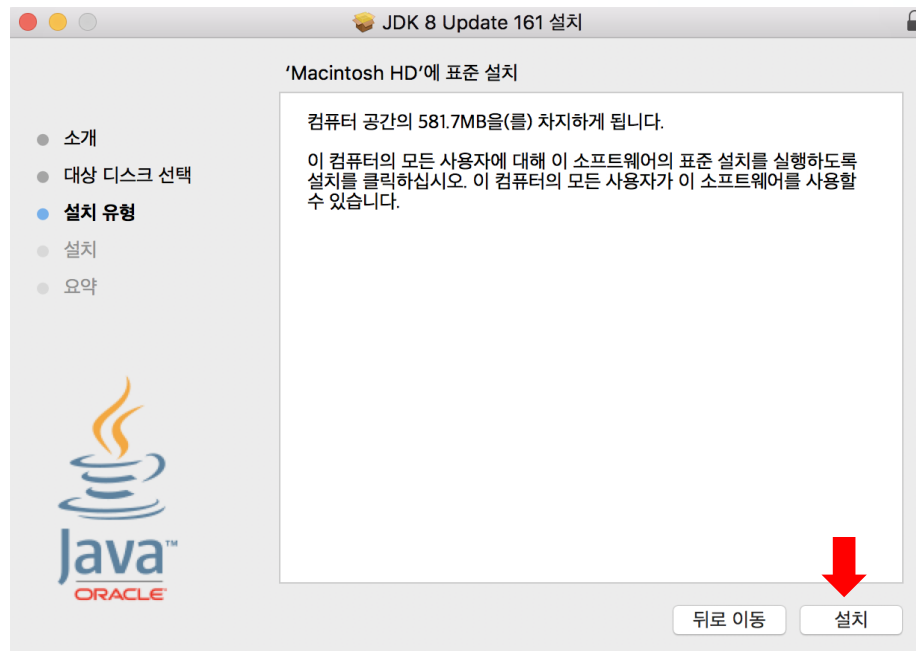
- 다운로드 파일 실행



IntelliJ IDEA

Install JDK

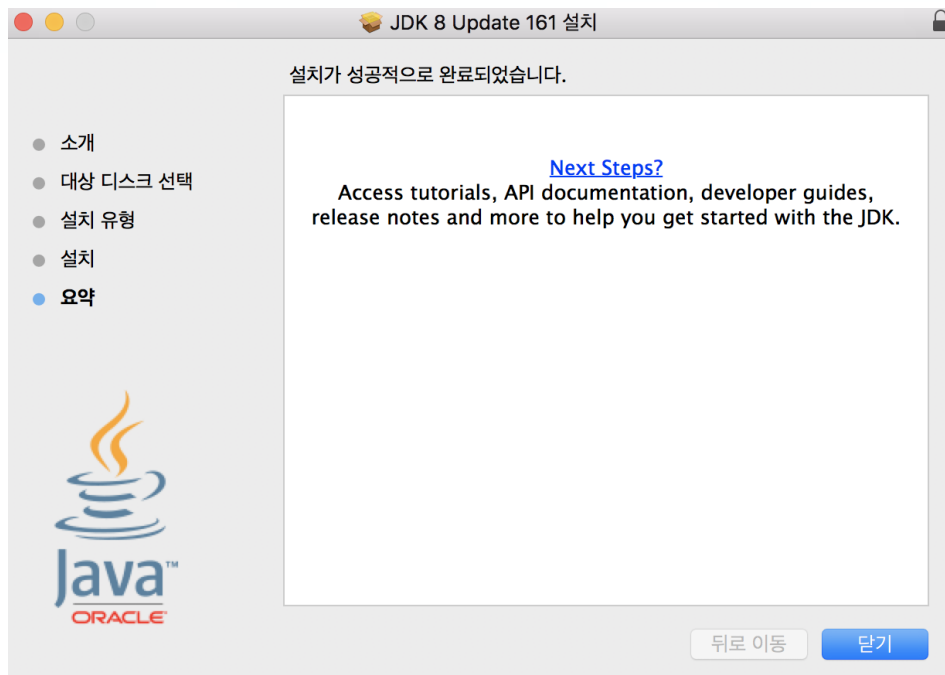
- 계속, 설치 클릭



IntelliJ IDEA

Install JDK

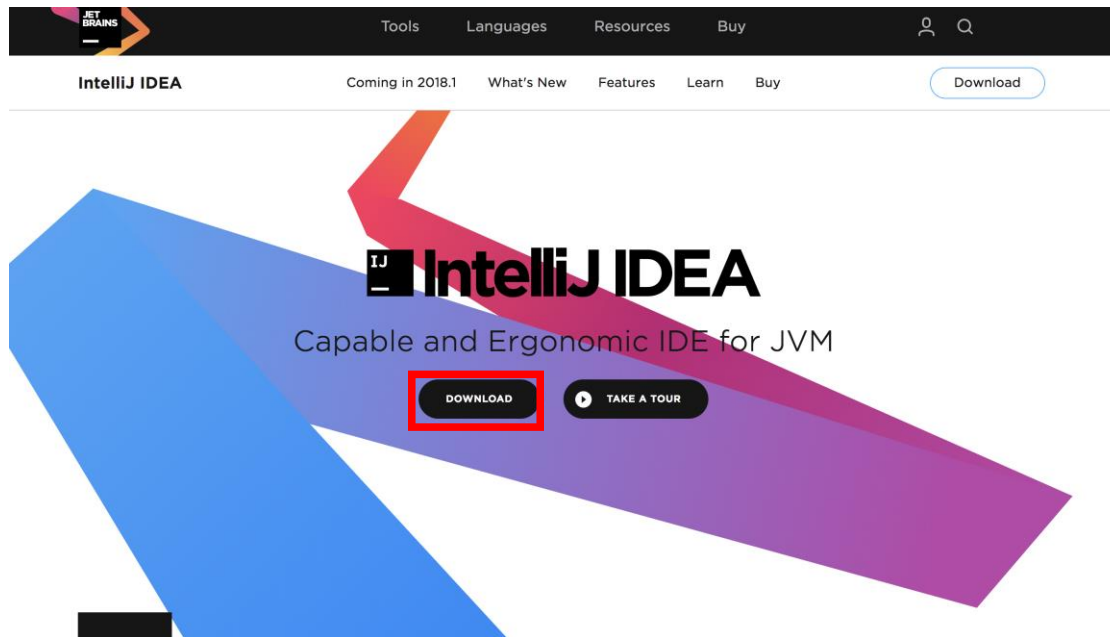
- 설치 완료



IntelliJ IDEA

Install IntelliJ

- <https://www.jetbrains.com/idea/> 접속



IntelliJ IDEA

Install IntelliJ

- Community DOWNLOAD



Version: 2017.3.5
Build: 173.4674.33
Released: March 13, 2018
[Release notes](#)

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For JVM and Android development

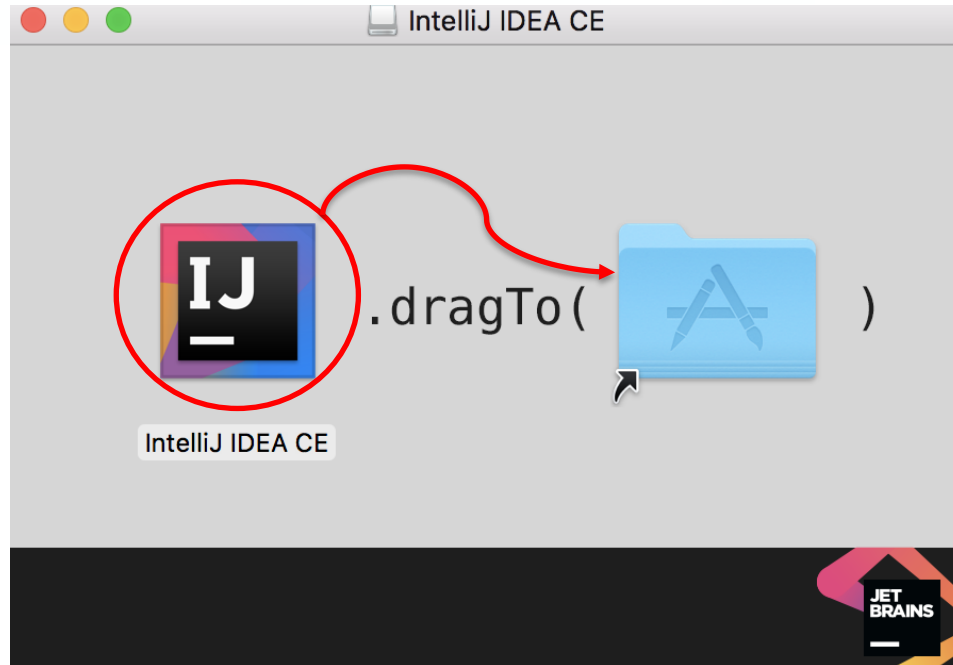
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Free, open-source

IntelliJ IDEA

Install IntelliJ

- Drag to



IntelliJ IDEA

Install IntelliJ

- 초기화면
- 테마 설정
- 기본 Plug in 설정



IntelliJ IDEA

New project

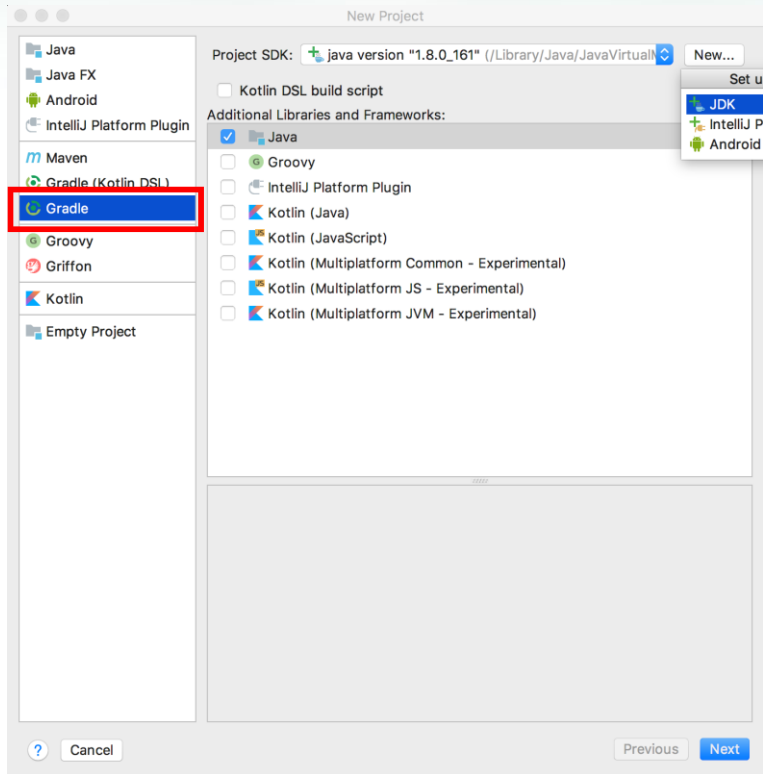
- Create New project 선택



IntelliJ IDEA

New project

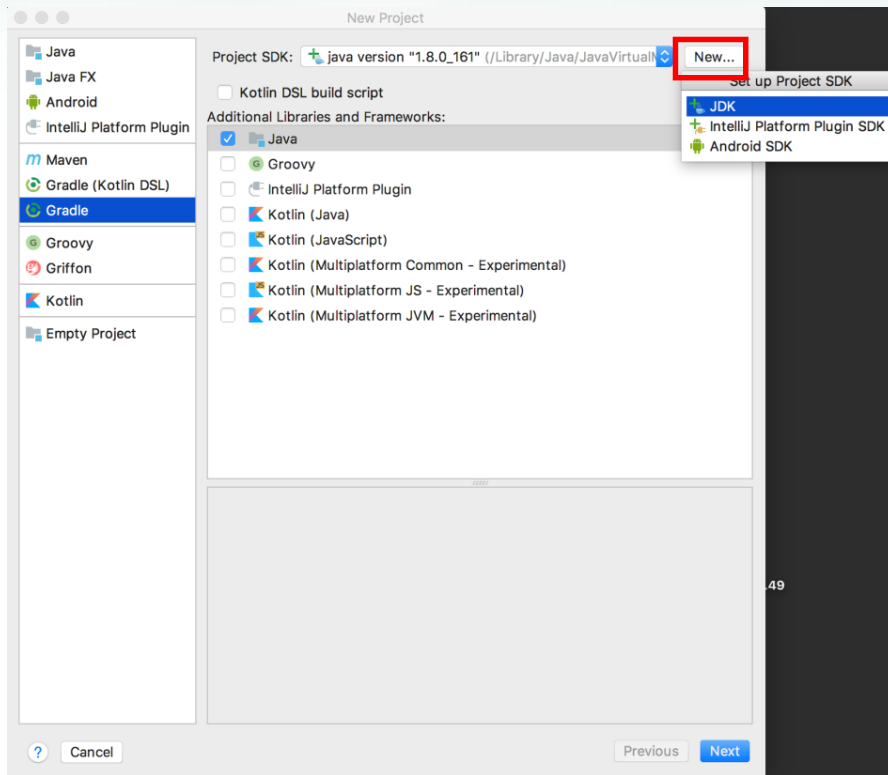
- Create New project 클릭
- Gradle 선택



IntelliJ IDEA

New project

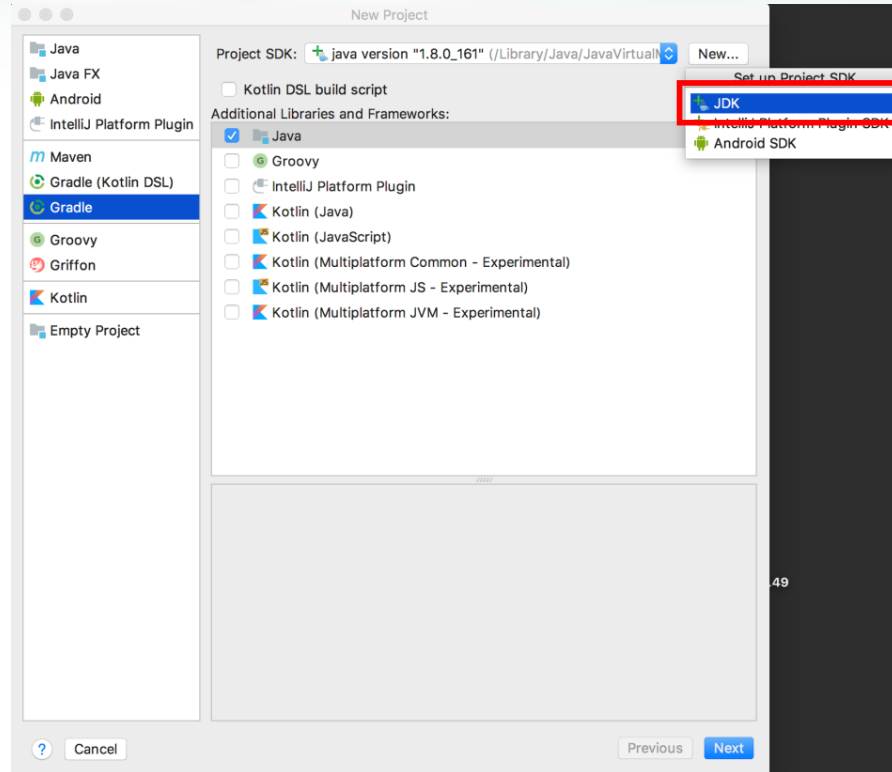
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭



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New project

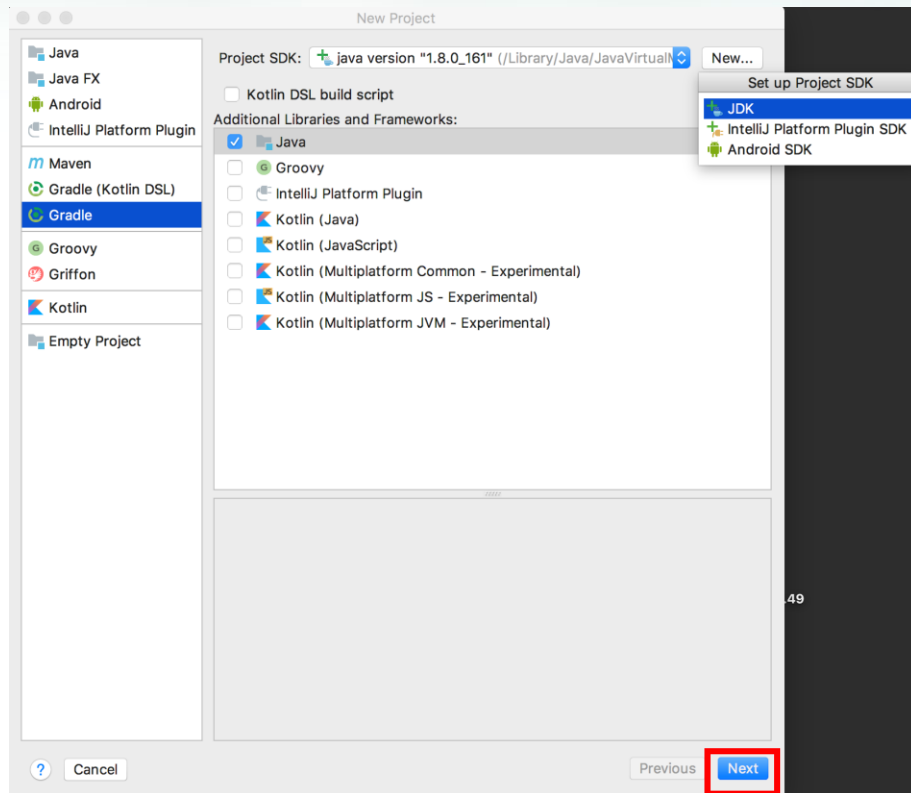
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭



IntelliJ IDEA

New project

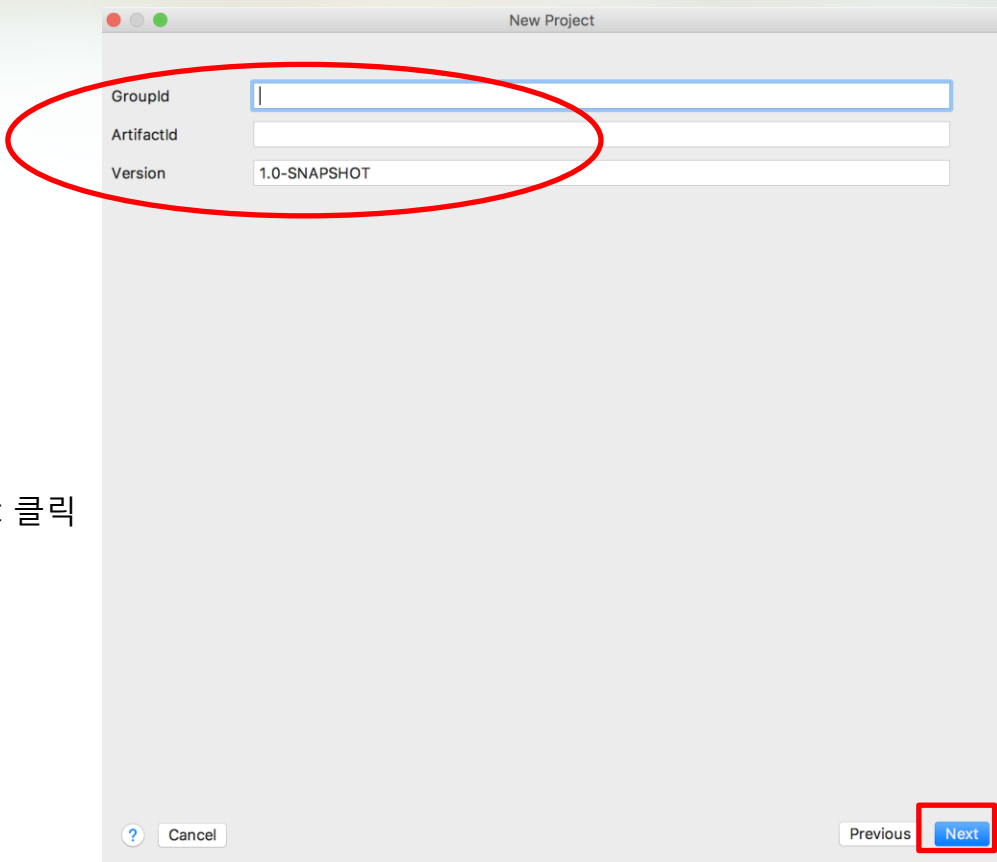
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭
- Next 클릭



IntelliJ IDEA

New project

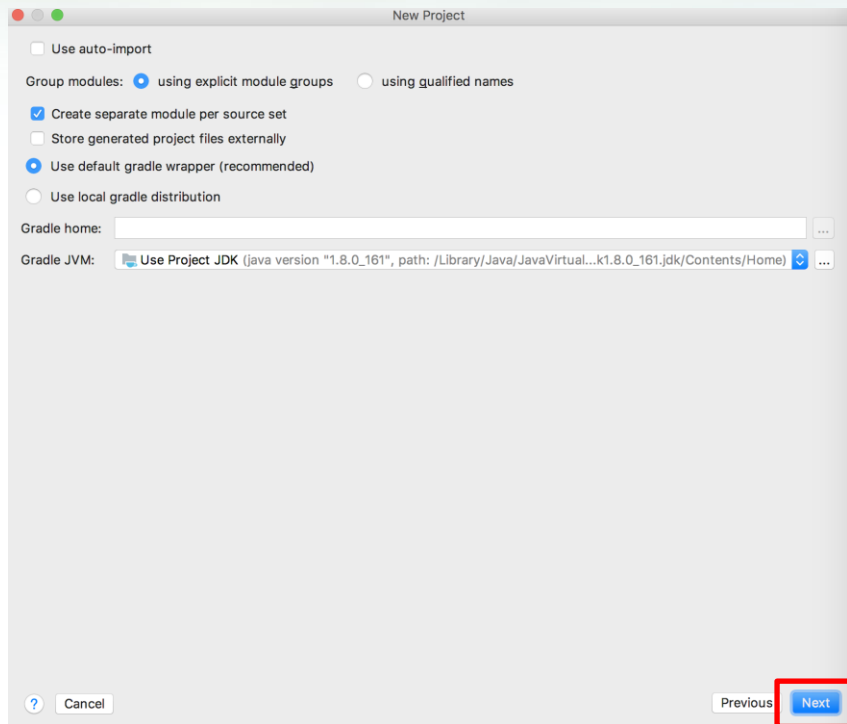
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭
- Next 클릭
- Groupid, Artifactid, Version 입력 후 Next 클릭



IntelliJ IDEA

New project

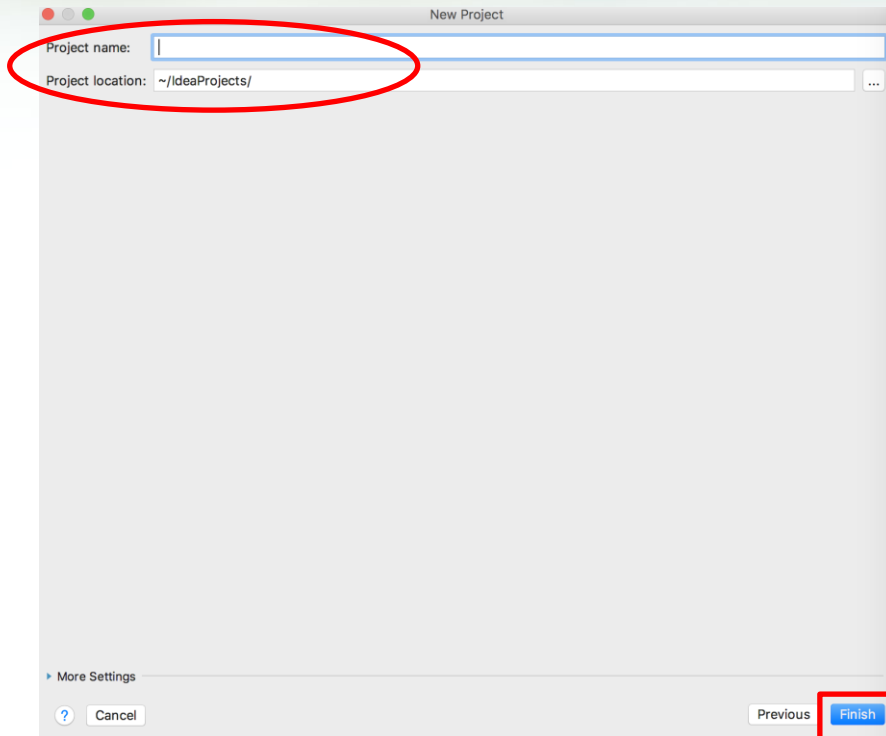
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭
- Next 클릭
- Groupid, Artifactid, Version 입력 후 Next 클릭
- Next 클릭



IntelliJ IDEA

New project

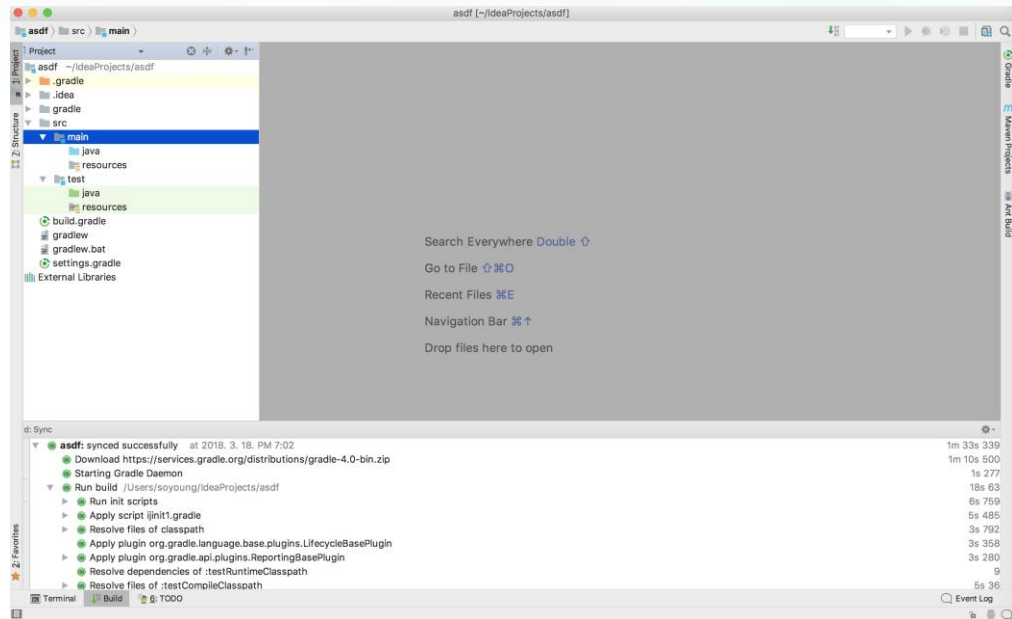
- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭
- Next 클릭
- Groupid, Artifactid, Version 입력 후 Next 클릭
- Next 클릭
- Project name 입력 후, Finish 클릭



IntelliJ IDEA

New project

- Create New project 클릭
- Gradle 선택
- Project SDK 오른쪽 New 클릭
- JDK 클릭
- Next 클릭
- Groupid, Artifactid, Version 입력 후 Next 클릭
- Next 클릭
- Project name 입력 후, Finish 클릭
- 프로젝트 생성



3

JUnit

What is JUnit?



- Unit test를 위한 Framework
- Java 기반
- 단위 모듈이 정확하게 구현 되었는지 확인 할 수 있는 도구
- Assert로 수행결과 판별
- Annotation 지원
- 문자 또는 GUI 기반

JUnit

What is Junit?

- 단정문(Assert Class)

: 데이터 검증을 하기 위한 메소드들로 구성

: 프로그램 작성/처리 작업 등에 관련된 내용이나 조건에 대한 가정 및 예상

`assertArrayEquals(a,b)`

배열 a와b가 일치함을 확인

`assertEquals(a,b)`

객체 a와b의 값이 같은지 확인

`assertSame(a,b)`

객체 a와b가 같은 객체임을 확인

`assertTrue(a)`

a가 참인지 확인

`assertNotNull(a)`

a객체가 null이 아님을 확인

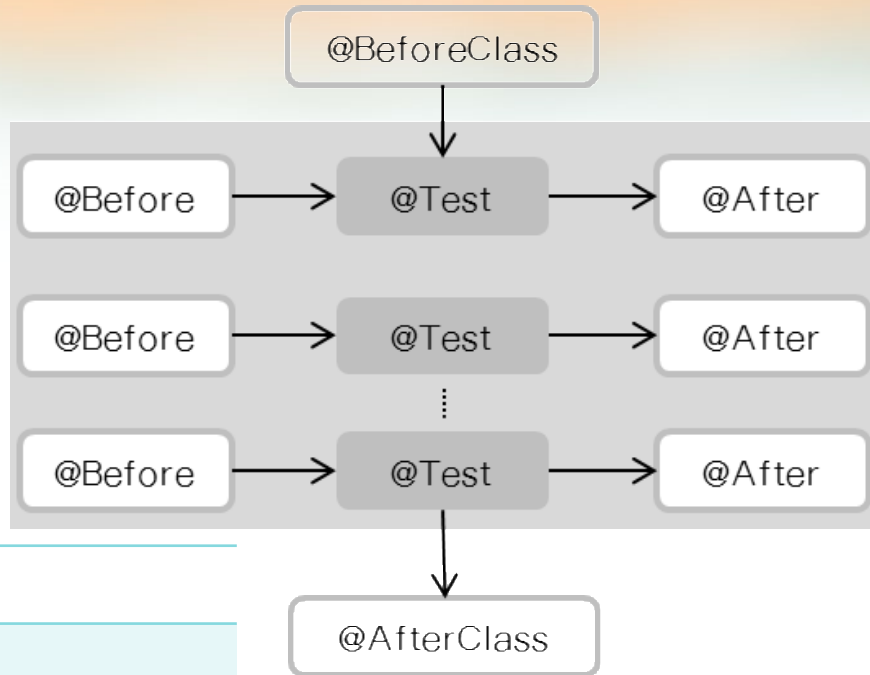
<https://junit.org/junit5/docs/current/api/org/junit/jupiter/api/Assertions.html>

JUnit

What is Junit?

- Annotation

: 클래스/메소드 등 선언시 @를 사용하는 것
: 클래스/메소드의 메타데이터를 선언 할 때 사용

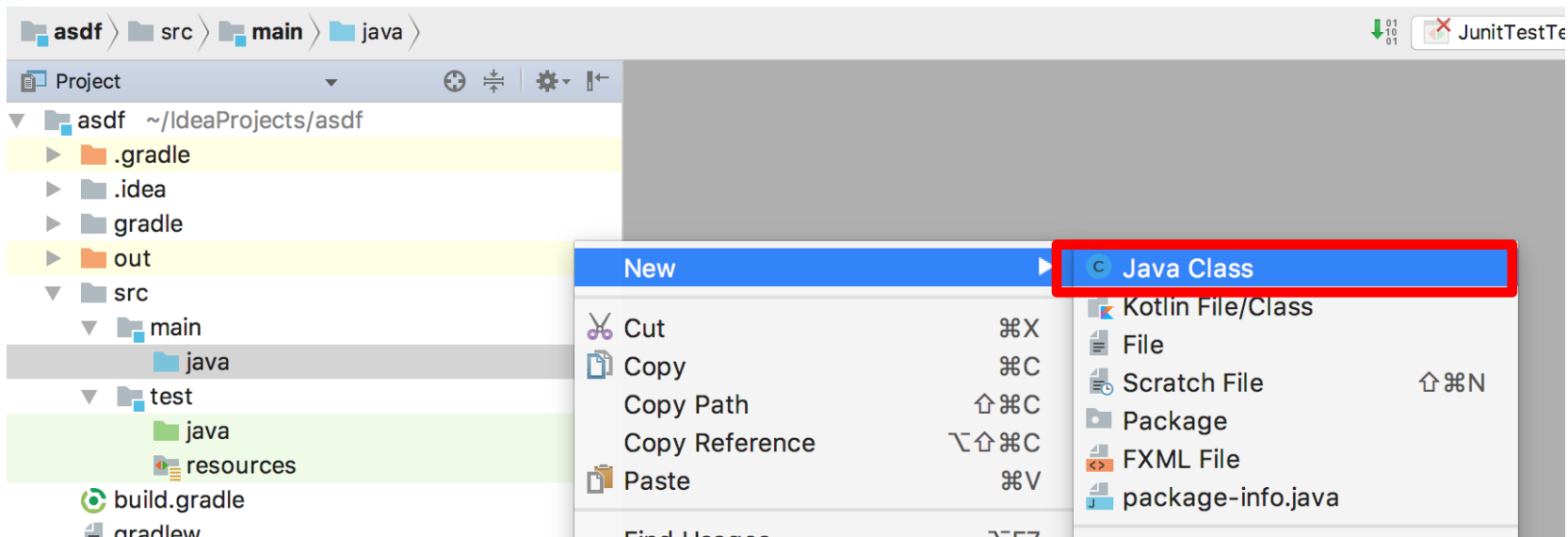


@Test	테스트를 수행하는 메소드
@Before	각 테스트의 시작마다 실행되는 메소드
@After	각 테스트의 종료마다 실행되는 메소드
@BeforeClass	모든 테스트의 시작 이전에 단 한 번 실행되는 메소드
@AfterClass	모든 테스트의 종료 이후에 단 한 번 실행되는 메소드

JUnit

JUnit test

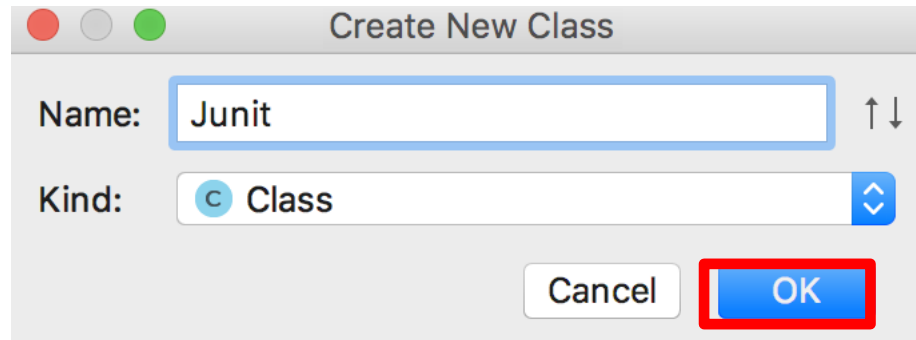
- src/main java 오른쪽 클릭, New-Java Class 클릭



JUnit

JUnit test

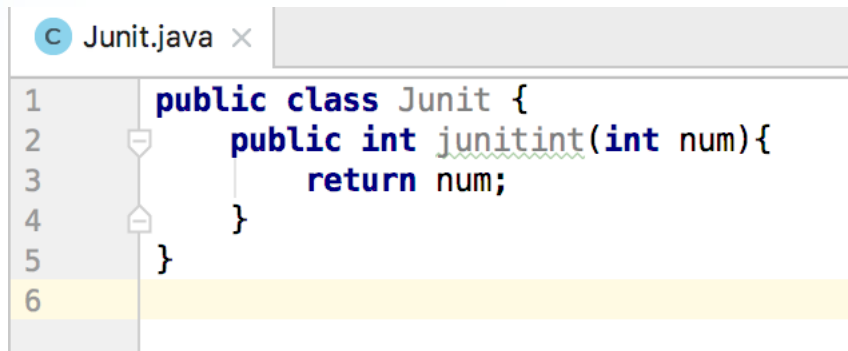
- Class이름 입력 후 OK 클릭



JUnit

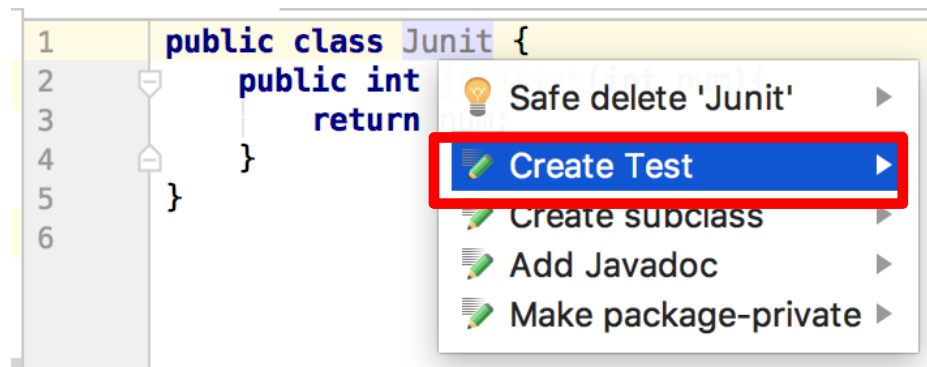
JUnit test

- Class 생성 후 코드 작성



```
1 public class Junit {
2     public int junitint(int num){
3         return num;
4     }
5 }
6
```

- Class name 클릭후 Alt+Enter, Create Test 클릭



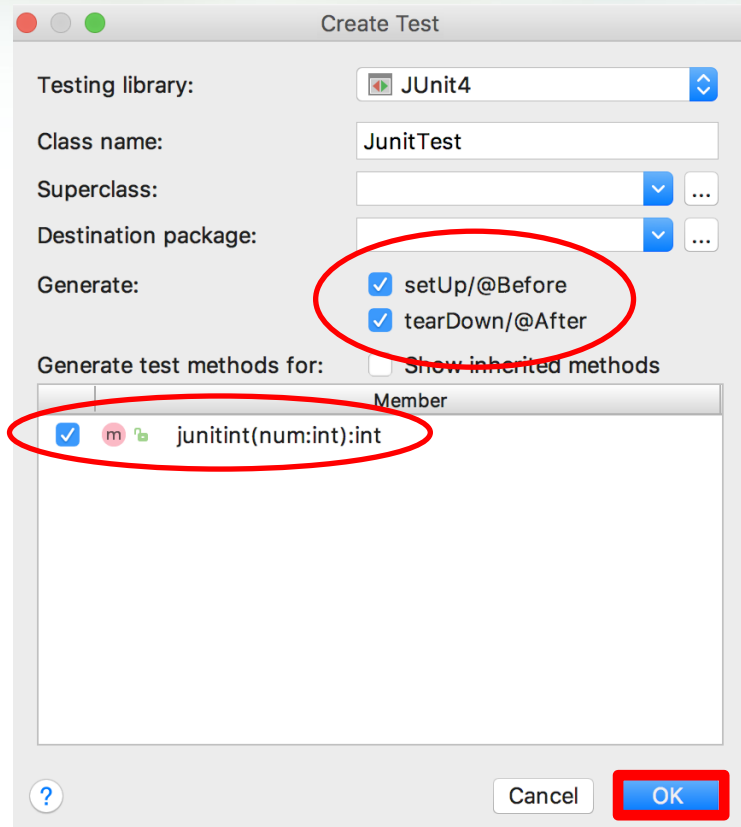
```
1 public class Junit {
2     public int
3     return
4     }
5 }
6
```

- Safe delete 'JUnit'
- Create Test**
- Create subclass
- Add Javadoc
- Make package-private

JUnit

JUnit test

- 생성하고 싶은 method 체크해서 OK 클릭



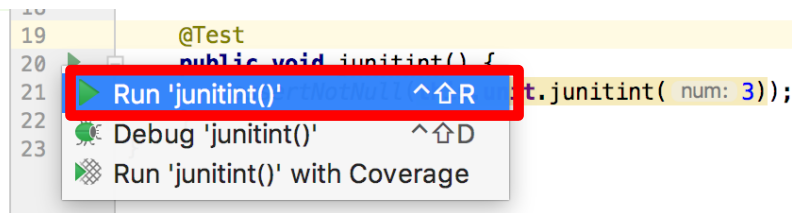
JUnit

JUnit test

- 생성된 빈 함수에 테스트 코드 작성

```
public class JunitTest {  
    private Junit unit;  
    @Before  
    public void setUp() throws Exception {  
        this.unit = new Junit();  
    }  
  
    @After  
    public void tearDown() throws Exception {  
        this.unit=null;  
    }  
  
    @Test  
    public void junitint() {  
        assertNotNull(this.unit.junitint( num: 3));  
    }  
}
```

- 테스트 실행



JUnit

JUnit test

- 결과 확인



4₁

Build Environment

Jenkins



- CI 도구
- 반복적인 작업을 모니터링하는 도구
- 지속적인 자동화 빌드/테스트
- **Web 인터페이스**
- 다수의 프로젝트 동시 빌드 제공
- 다양한 언어/OS 지원

Build Environment

Jenkins

- <https://jenkins.io/download/> 접속 - 자신 OS에 맞는 파일 다운로드

[Changelog](#) | [Upgrade Guide](#) | [Past Releases](#)

Deploy Jenkins 2.107.1



Download Jenkins 2.107.1 for:

Docker
FreeBSD
Gentoo 🐧
Mac OS X
OpenBSD 🐧
openSUSE
Red Hat/Fedora/CentOS
Ubuntu/Debian
Windows
Generic Java package (.war)

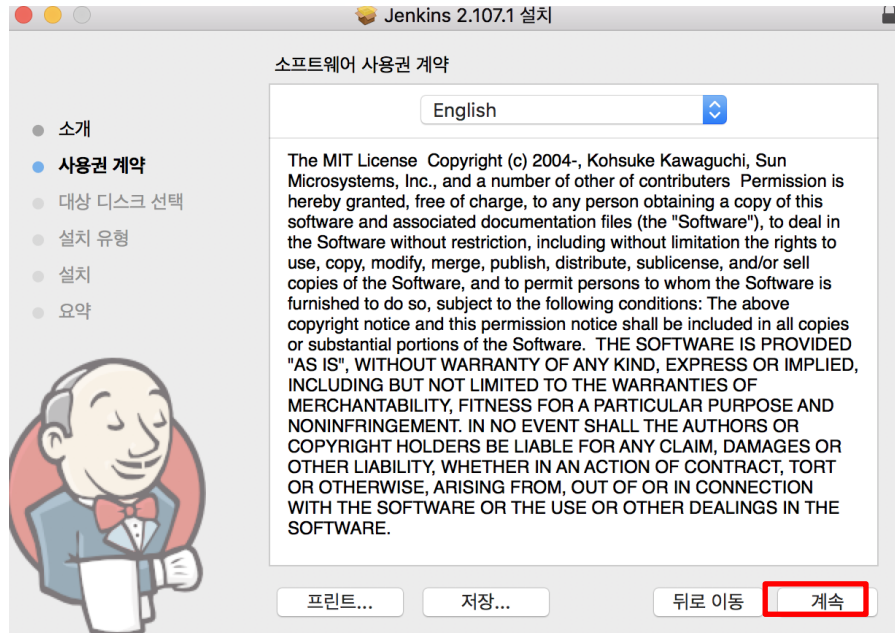
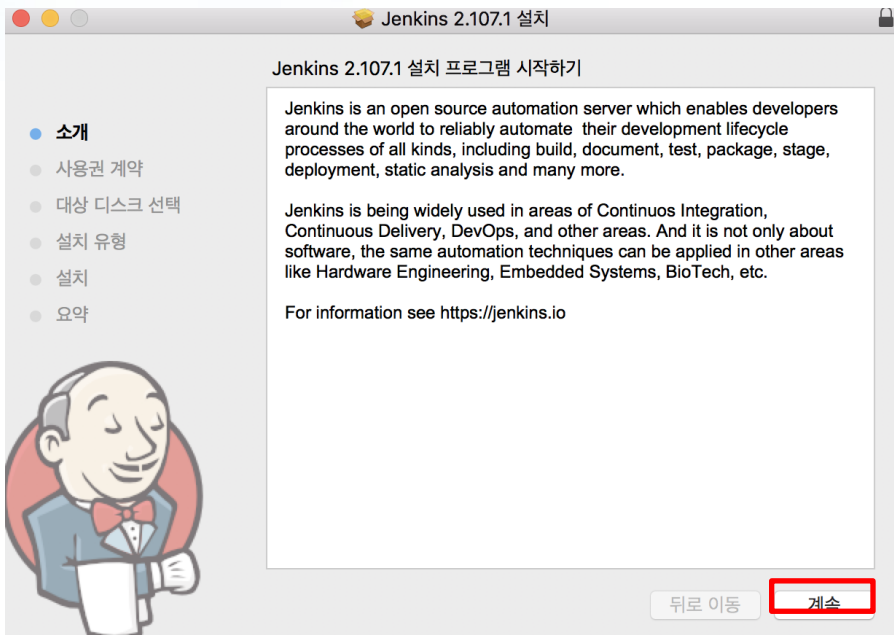
Download Jenkins 2.111 for:

Arch Linux 🐧
Docker
FreeBSD 🐧
Gentoo 🐧
Mac OS X
OpenBSD 🐧
openSUSE
Red Hat/Fedora/CentOS
Ubuntu/Debian
OpenIndiana Hipster 🐧
Windows
Generic Java package (.war)

Build Environment

Jenkins

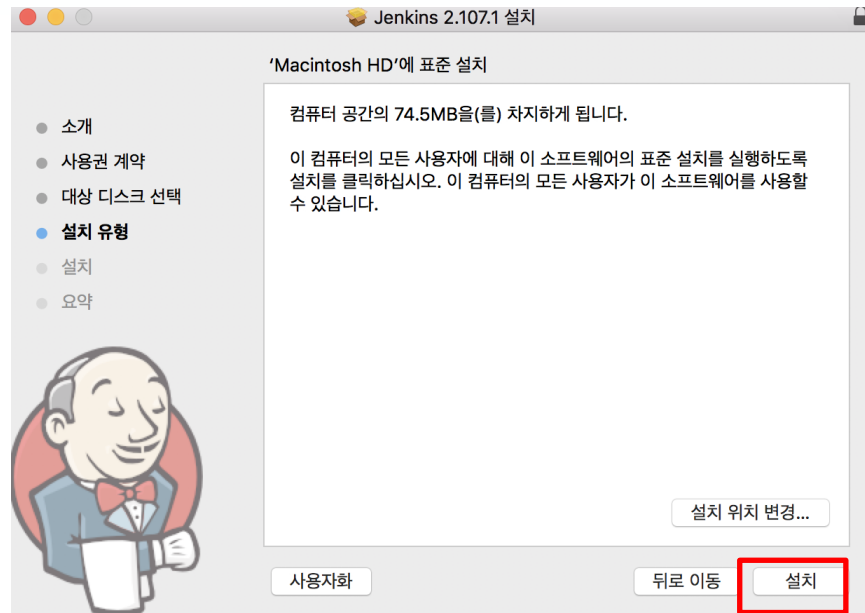
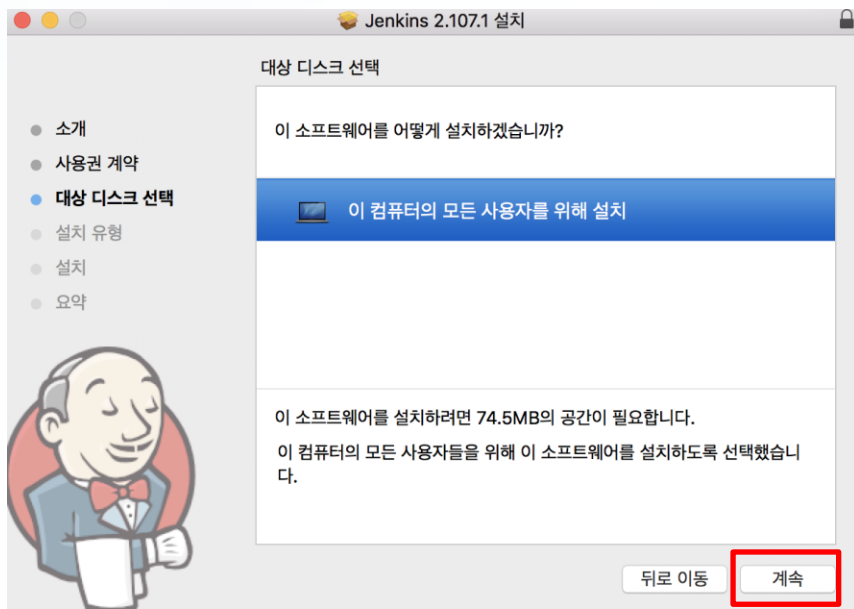
- 계속 클릭



Build Environment

Jenkins

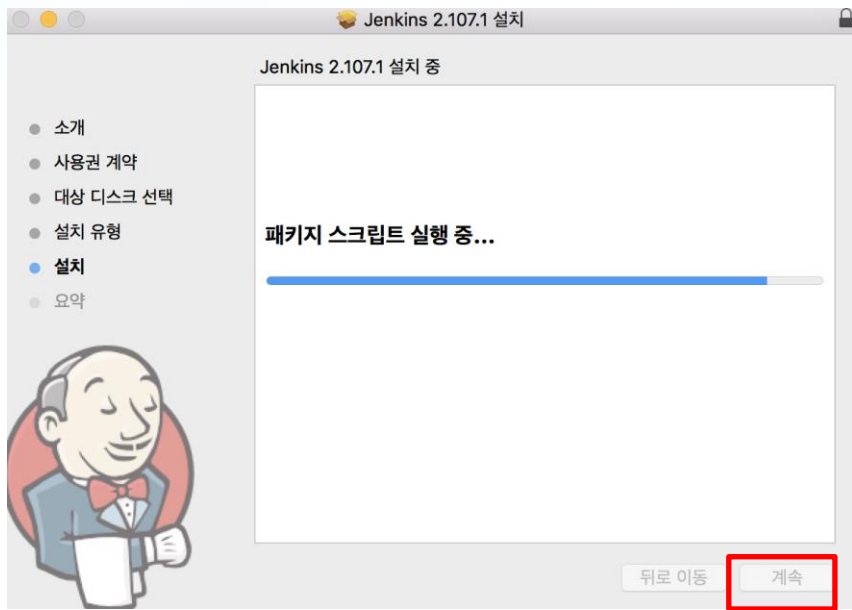
- 계속 클릭



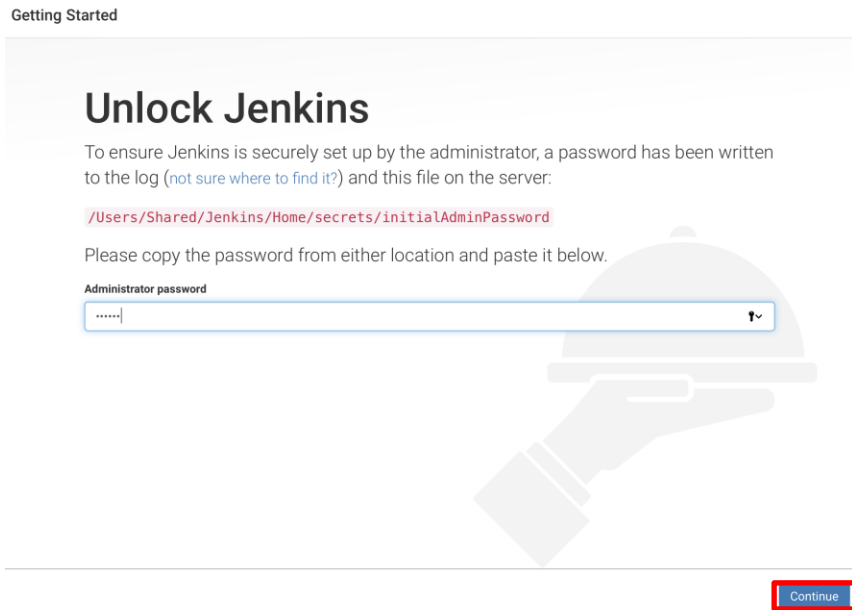
Build Environment

Jenkins

- 계속 클릭



- Password 입력 후 Continue 클릭



Build Environment

Jenkins

- Terminal에 입력

```
[Jeonui-MacBook-Pro:~ soyoung$ sudo cat /Users/Shared/Jenkins/Home/secrets/initia]
lAdminPassword
[Password: ]
Sorry, try again.
[Password: ]
09ff1d30616e4a648c3415ef37a3fdeb
```

Build Environment

Jenkins

- Install suggested plugins 클릭

Getting Started

Customize Jenkins

Plugins extend Jenkins with additional features to support many different needs.

Install suggested plugins

Install plugins the Jenkins community finds most useful.

Select plugins to install

Select and install plugins most suitable for your needs.

- 설치 진행중

Getting Started

Getting Started

Folders	OWASP Markup Formatter	Build Timeout	Credentials Binding	** Script Security ** Command Agent Launcher
Timestamper	Workspace Cleanup	Ant	Gradle	
Pipeline	GitHub Branch Source	Pipeline: GitHub Groovy Libraries	Pipeline: Stage View	
Git	Subversion	SSH Slaves	Matrix Authorization Strategy	
PAM Authentication	LDAP	Email Extension	Mailer	

** - required dependency

Jenkins 2.107.1

Build Environment

Jenkins

- 개인정보 입력, Save and Finish 클릭
- Start using Jenkins 클릭

Getting Started

Create First Admin User

계정명:

암호:

암호 확인:

이름:

이메일 주소:

Jenkins 2.107.1

[Continue as admin](#)

[Save and Finish](#)

Getting Started

Jenkins is ready!

Your Jenkins setup is complete.

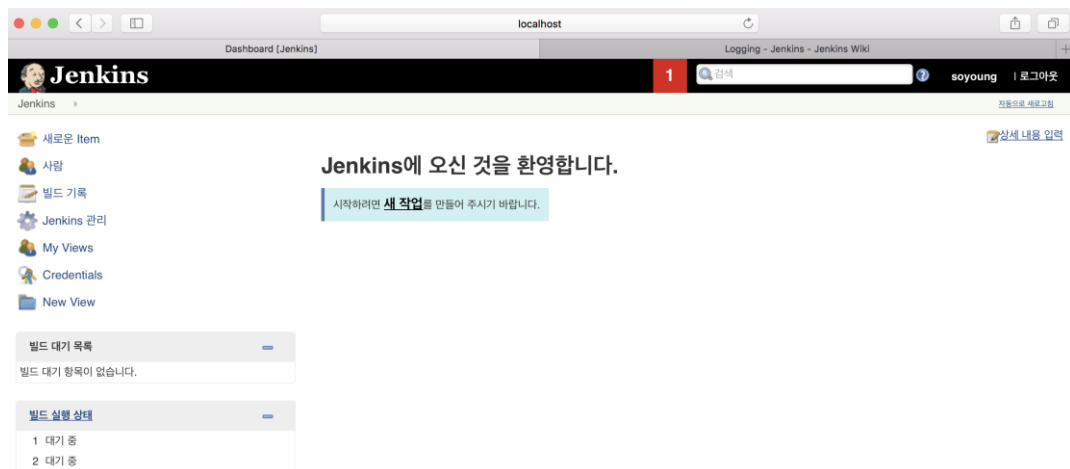
[Start using Jenkins](#)

Jenkins 2.107.1

Build Environment

Jenkins

- 설치완료



4₂

Build Environment

What is Gradle?



- 빌드 자동화 툴
- Ant/Maven과 같은 기존 도구들의 단점을 보강하고 장점을 살린 도구
- Android OS 빌드 도구

4₂

Build Environment

Maven VS Gradle



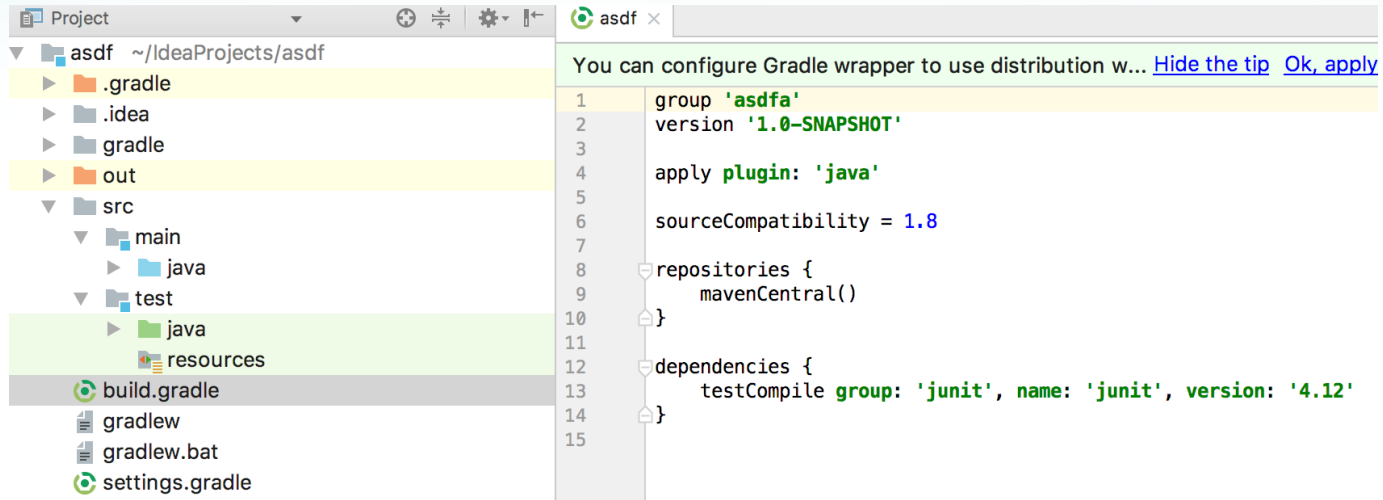
- 상속구조를 이용한 멀티 모듈 구현
- 정적인 요소로 동적인 요소를 표현하려고 하는 데서 오는 불편함



- Groovy언어 기반
- Gradle Wrapper 기능

Build Environment

Gradle test



The screenshot displays an IDE interface with a project explorer on the left and a code editor on the right. The project explorer shows a project named 'asdf' with a directory structure including .gradle, .idea, gradle, out, src (main and test), and resources. The 'test' directory is highlighted in green. The code editor shows the 'build.gradle' file with the following content:

```
1 group 'asdfa'
2 version '1.0-SNAPSHOT'
3
4 apply plugin: 'java'
5
6 sourceCompatibility = 1.8
7
8 repositories {
9     mavenCentral()
10 }
11
12 dependencies {
13     testCompile group: 'junit', name: 'junit', version: '4.12'
14 }
15
```

At the top of the code editor, there is a message: "You can configure Gradle wrapper to use distribution w... [Hide the tip](#) [Ok, apply](#)".

Build Environment

Gradle test

- IntelliJ terminal 창에 ./gradlew build 입력

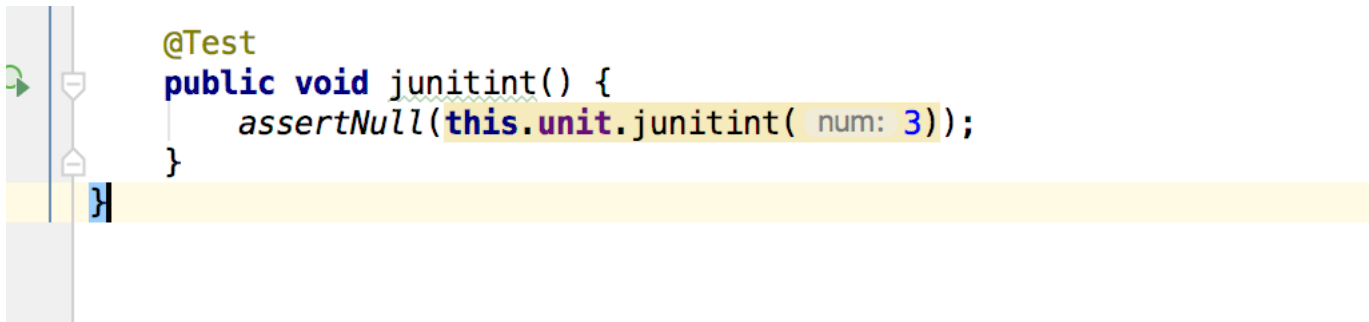
```
Jeonui-MacBook-Pro:asdf soyoung$ ./gradlew build
Starting a Gradle Daemon (subsequent builds will be faster)

BUILD SUCCESSFUL in 8s
4 actionable tasks: 4 executed
Jeonui-MacBook-Pro:asdf soyoung$ █
```

Build Environment

Gradle test

- Test를 위해 코드 변경



```
@Test
public void junitint() {
    assertNull(this.unit.junitint( num: 3));
}
```

The image shows a snippet of Java code from an IDE. On the left, there is a vertical toolbar with icons for running (a green play button), undo (a white arrow), redo (a white arrow), and a blue cursor icon. The code is as follows:

Build Environment

Gradle test

- 결과 확인

```
Jeonui-MacBook-Pro:asdf soyoung$ ./gradlew check

> Task :test

JUnitTest > junitint FAILED
    java.lang.AssertionError at JunitTest.java:21

1 test completed, 1 failed

FAILURE: Build failed with an exception.

* What went wrong:
Execution failed for task ':test'.
> There were failing tests. See the report at: file:///Users/soyoung/IdeaProjects/asdf/build/reports/tests/test/index.html

* Try:
Run with --stacktrace option to get the stack trace. Run with --info or --debug option to get more log output.

BUILD FAILED in 1s
3 actionable tasks: 2 executed, 1 up-to-date
```


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Git

What is Git?

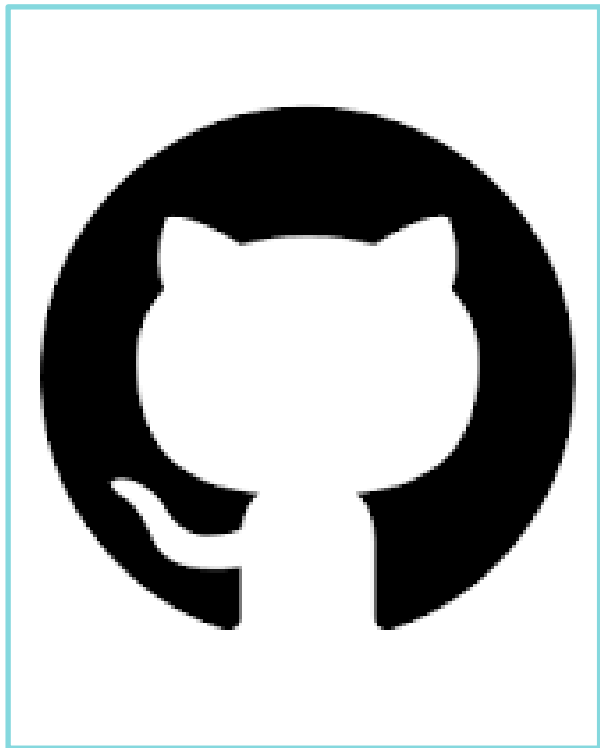


- 분산 버전 관리 시스템
- 소스코드를 여러 PC와 저장소에 나누어 저장
- 네트워크가 연결이 되어 있지 않더라도 계속해서 버전 관리 가능
- 서버 저장소에 오류가 발생해도 로컬 저장소로 복구 가능
- 소스코드를 효과적으로 관리

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Github

What is Github?



- Git 데이터를 온라인에 저장해주는 사이트
- Git의 호스팅 서비스
- 공동작업 가능
- 접근성이 좋음
- 무료

Github

Github registration

- <https://github.com/> 접속 후 Sign up for Github 클릭

Features Business Explore Marketplace Pricing Search GitHub Sign in or Sign up

Built for developers

GitHub is a development platform inspired by the way you work. From **open source** to **business**, you can host and review code, manage projects, and build software alongside millions of other developers.

Username
Pick a username

Email
you@example.com

Password
Create a password

Use at least one letter, one numeral, and seven characters.

Sign up for GitHub

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy policy](#). We'll occasionally send you account related emails.

Github

Github registration

- 팀 프로젝트를 위해 Respository 생성, 이름 기입 후 Create repository 클릭

Create a new repository

A repository contains all the files for your project, including the revision history.

Owner

 sssoyoung ▾

Repository name

Great repository names are short and memorable. Need inspiration? How about **urban-octo-rotary-phone**.

Description (optional)



Public

Anyone can see this repository. You choose who can commit.



Private

You choose who can see and commit to this repository.



Initialize this repository with a README

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

Add .gitignore: **None** ▾

Add a license: **None** ▾

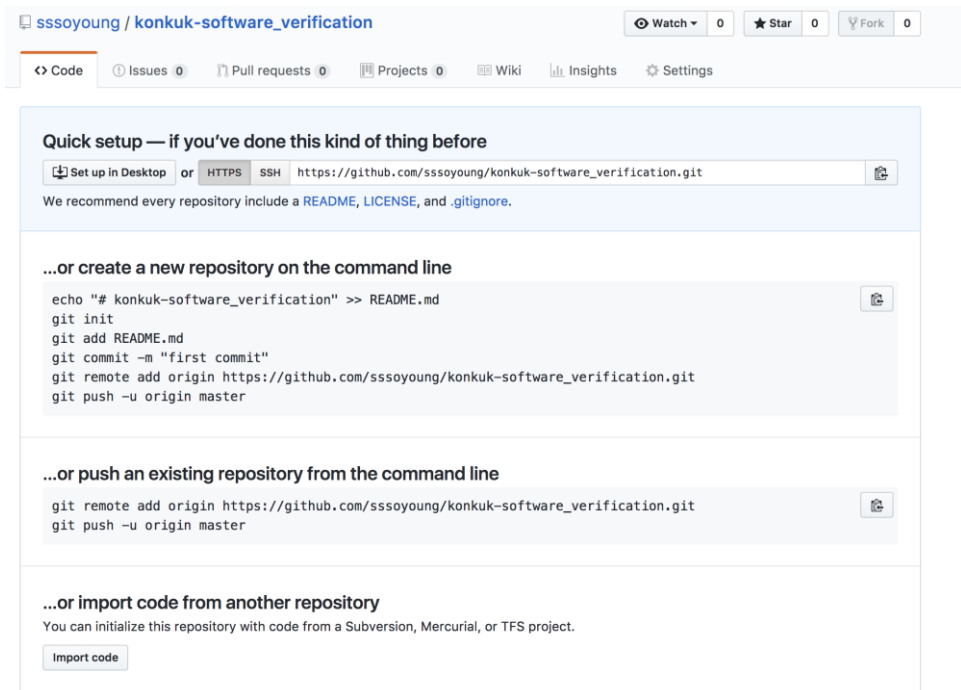


Create repository

Github

Github registration

- 생성 완료



sssyoung / konkuk-software_verification

Watch 0 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

Quick setup — if you've done this kind of thing before

Set up in Desktop or **HTTPS** SSH `https://github.com/sssyoung/konkuk-software_verification.git`

We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

...or create a new repository on the command line

```
echo "# konkuk-software_verification" >> README.md
git init
git add README.md
git commit -m "first commit"
git remote add origin https://github.com/sssyoung/konkuk-software_verification.git
git push -u origin master
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/sssyoung/konkuk-software_verification.git
git push -u origin master
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

Import code

A large circular graphic with a gradient from orange to teal, surrounded by white lines, containing the text "Thank you".

Thank you