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# Perface

Annotation are used to provide supplement information about a program. Java Annotation is a tag that represents the metadata (information) for class, interface, methods, fields to indicate some additional information which can be used by java compiler and JVM.

Annotation start with "@", annotation not change action of a compiled program.

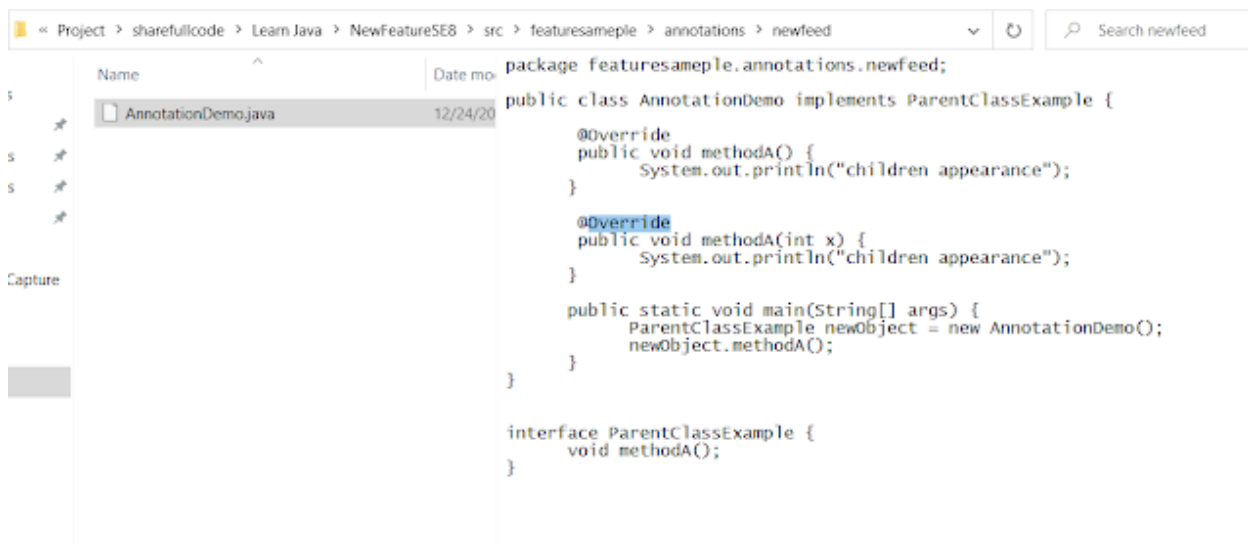
Built-in Java Annotations : Override, SuppressWarnings, Deprecated.

Built-in Java Annotations used in others annotations (customize annotation): Target, Retention, Inherited, Documented.

## Built-in Java Annotation:

### @Override

Annotation assures that the subclass method is overriding the parent method. if it not show, compile time error occurs. it example bellow show error complie with Overload one function not have in interface. if you want to remove error complie, you should remove @Override in function overload.



```
package featuresameple.annotations.newfeed;

public class AnnotationDemo implements ParentClassExample {

    @Override
    public void methodA() {
        System.out.println("children appearance");
    }

    @Override
    public void methodA(int x) {
        System.out.println("children appearance");
    }

    public static void main(String[] args) {
        ParentClassExample newObject = new AnnotationDemo();
        newObject.methodA();
    }

}

interface ParentClassExample {
    void methodA();
}
```

Error during complie Javac,

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java
AnnotationDemo.java:10: error: method does not override or implement a method from a supertype
    @Override
    ^
1 error

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>
```

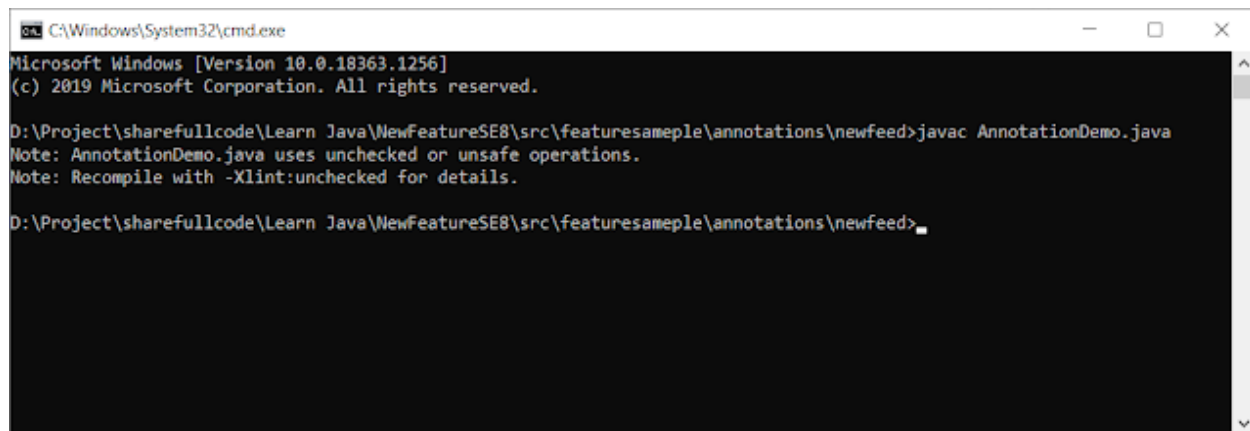
## @SuppressWarnings

Annotation: is used to suppress warnings issued by the compiler. This type of annotation can be applied to any type of declaration.

This example bellow illustration suppress warning during check javac

```
FlatMapSample.java  AnnotationDemo.java  ParallelStreamSample.java
/
8 public class AnnotationDemo implements ParentClassExample {
9
10     @Override
11     public void methodA() {
12         System.out.println("children appearance");
13     }
14
15     /*
16      * @Override public void methodA(int x) {
17      * System.out.println("children appearance"); }
18      */
19
20     void suppressWarnigsDemo() {
21         List list= new ArrayList();
22         list.add("a1");
23         list.add("a2");
24         list.add("a3");
25         list.add("a4");
26         list.forEach(System.out::println);
27     }
28
29     public static void main(String[] args) {
30         AnnotationDemo newObject = new AnnotationDemo();
31         newObject.suppressWarnigsDemo();
32     }
33 }
```

Compile print warning, but compiler still success

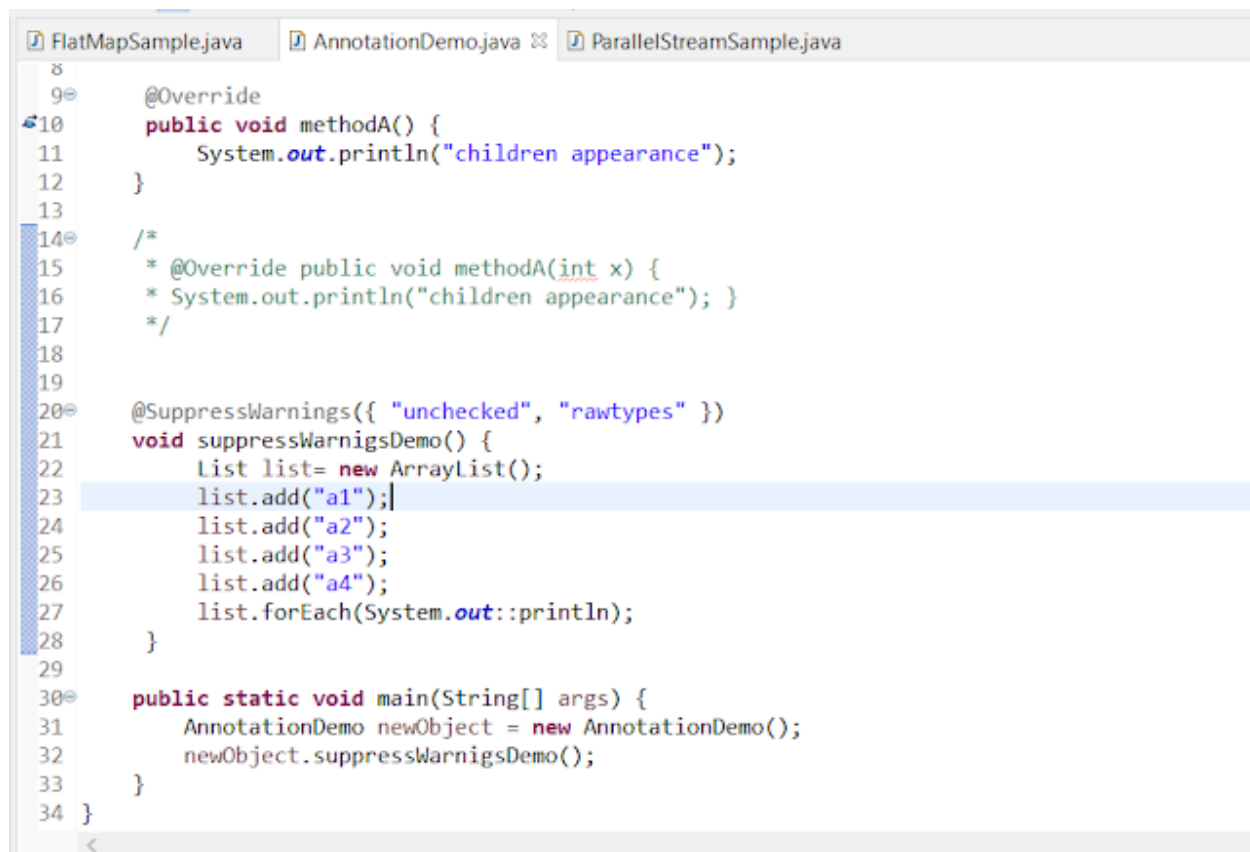


```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java
Note: AnnotationDemo.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.

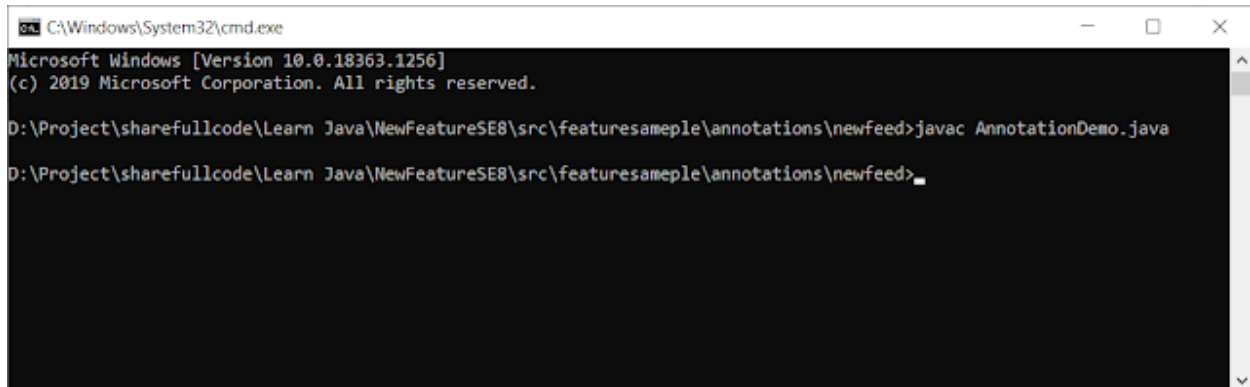
D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>_
```

Add annotation @SuppressWarnings to compile pass not appearance warning



```
FlatMapSample.java  AnnotationDemo.java  ParallelStreamSample.java
8
9  @Override
10 public void methodA() {
11     System.out.println("children appearance");
12 }
13
14 /*
15  * @Override public void methodA(int x) {
16  * System.out.println("children appearance"); }
17  */
18
19
20 @SuppressWarnings({ "unchecked", "rawtypes" })
21 void suppressWarnigsDemo() {
22     List list= new ArrayList();
23     list.add("a1");
24     list.add("a2");
25     list.add("a3");
26     list.add("a4");
27     list.forEach(System.out::println);
28 }
29
30 public static void main(String[] args) {
31     AnnotationDemo newObject = new AnnotationDemo();
32     newObject.suppressWarnigsDemo();
33 }
34 }
```

## Compile Successful



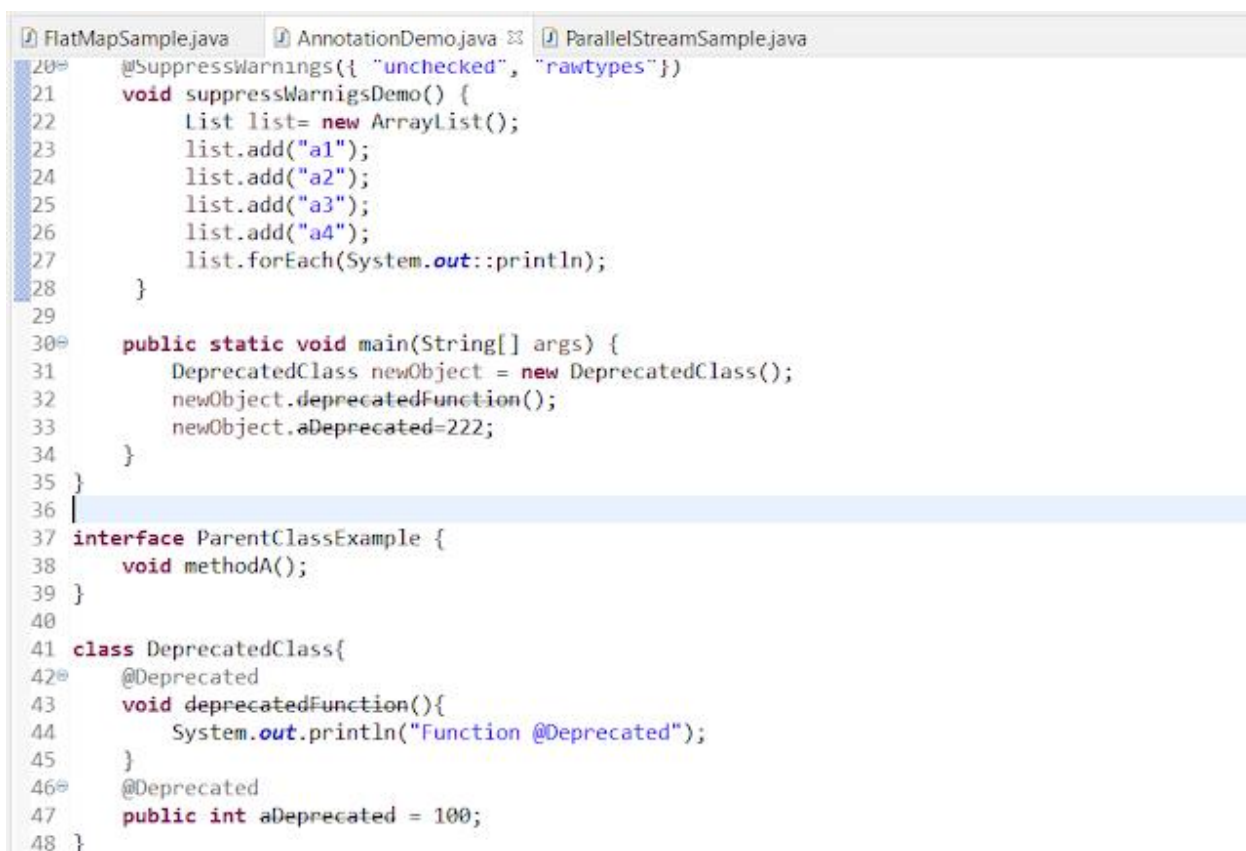
```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>
```

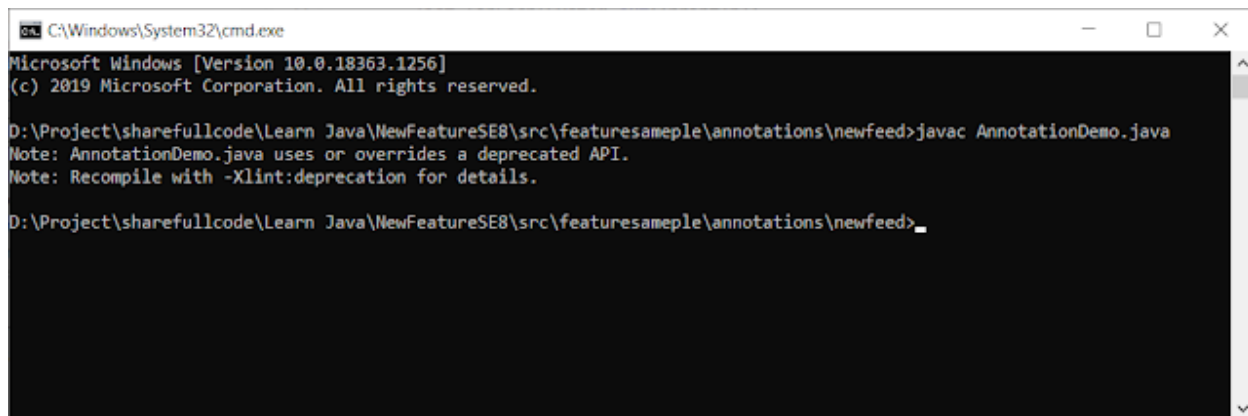
## @Deprecated

Annotation marks that this method, field deprecated so compiler print warning. in the Future method, filed not use so that now you do not use it.



```
FlatMapSample.java  AnnotationDemo.java  ParallelStreamSample.java
20  @SuppressWarnings({ "unchecked", "rawtypes" })
21  void suppressWarnigsDemo() {
22      List list= new ArrayList();
23      list.add("a1");
24      list.add("a2");
25      list.add("a3");
26      list.add("a4");
27      list.forEach(System.out::println);
28  }
29
30  public static void main(String[] args) {
31      DeprecatedClass newObject = new DeprecatedClass();
32      newObject.deprecatedFunction();
33      newObject.aDeprecated=222;
34  }
35  }
36
37  interface ParentClassExample {
38      void methodA();
39  }
40
41  class DeprecatedClass{
42  @  @Deprecated
43      void deprecatedFunction(){
44          System.out.println("Function @Deprecated");
45      }
46  @  @Deprecated
47      public int aDeprecated = 100;
48  }
```

## Compile print warning

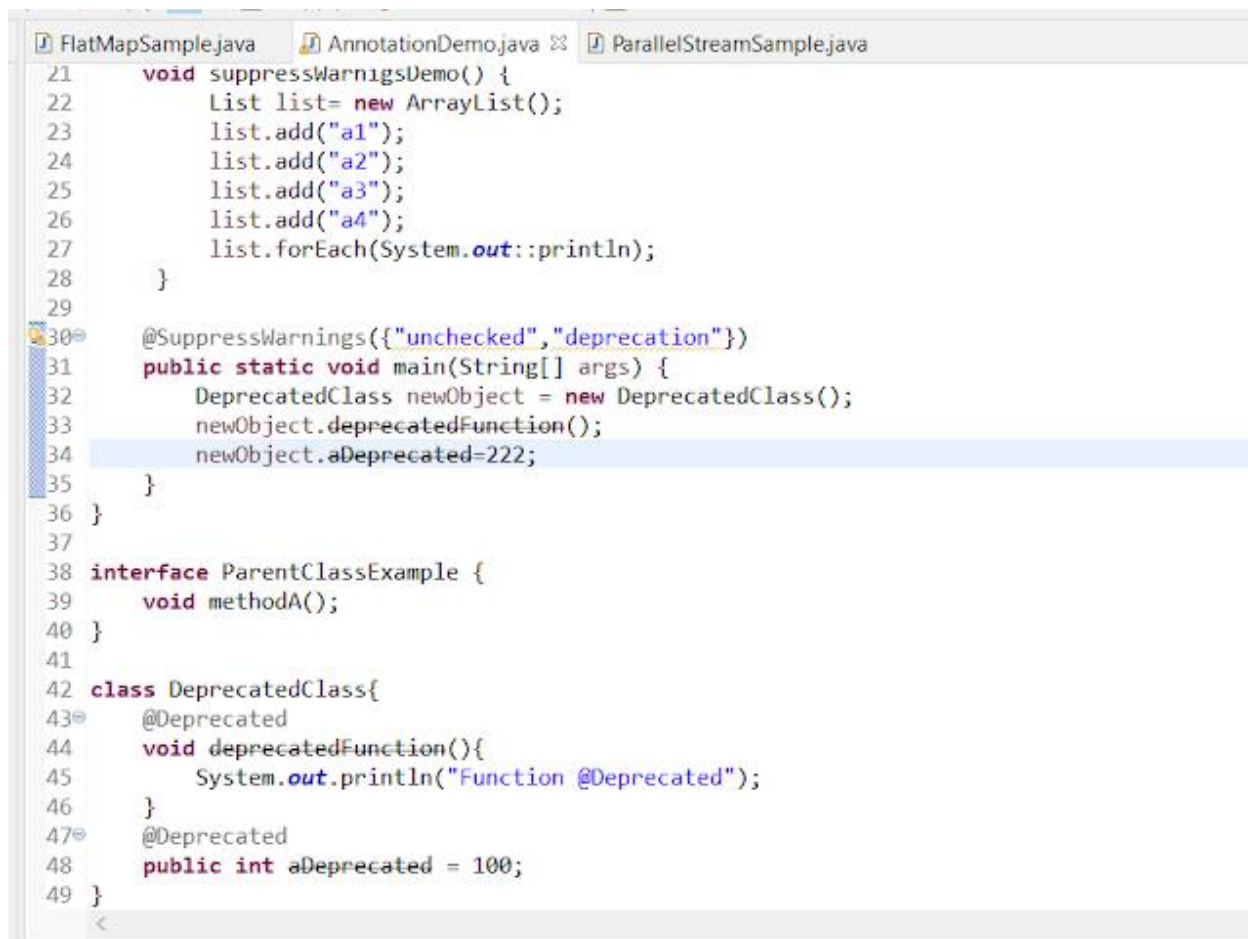


```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java
Note: AnnotationDemo.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>_
```

To fix not appearance warning to add `@SuppressWarnings` in functions are using Deprecate function. But it waring in source in Eclipse IDE it said "remove `@SuppressWarnings`" it not importain , but the best not use Deprecated for your source.



```
FlatMapSample.java  AnnotationDemo.java  ParallelStreamSample.java
21  void suppressWarningsDemo() {
22      List list= new ArrayList();
23      list.add("a1");
24      list.add("a2");
25      list.add("a3");
26      list.add("a4");
27      list.forEach(System.out::println);
28  }
29
30  @SuppressWarnings({"unchecked","deprecation"})
31  public static void main(String[] args) {
32      DeprecatedClass newObject = new DeprecatedClass();
33      newObject.deprecatedFunction();
34      newObject.aDeprecated=222;
35  }
36  }
37
38  interface ParentClassExample {
39      void methodA();
40  }
41
42  class DeprecatedClass{
43      @Deprecated
44      void deprecatedFunction(){
45          System.out.println("Function @Deprecated");
46      }
47      @Deprecated
48      public int aDeprecated = 100;
49  }
```

Compile not print warning

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java
Note: AnnotationDemo.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>javac AnnotationDemo.java

D:\Project\sharefullcode\Learn Java\NewFeatureSE8\src\featuresameple\annotations\newfeed>_
```

## Use Library The Checker Framwork

Introduce :

<https://checkerframework.org> Last Update (1 Dec 2020)

Features : Check null exception, unintended side effects, SQL injections, concurrent error, mistaken equality tests.

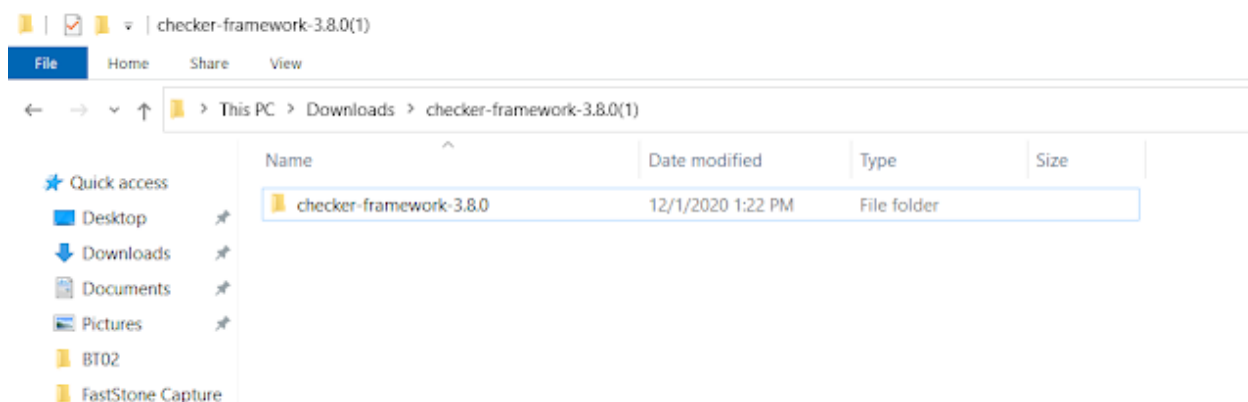
Summary : The checker framwork help programmer detect and prevent errors in their java programs.

Requiment: JDK 8, JDK 11.

## Install

Download file zip : <https://checkerframework.org/checker-framework-3.8.0.zip>

Unzip it to create a checker-framework-3.8.9 directory

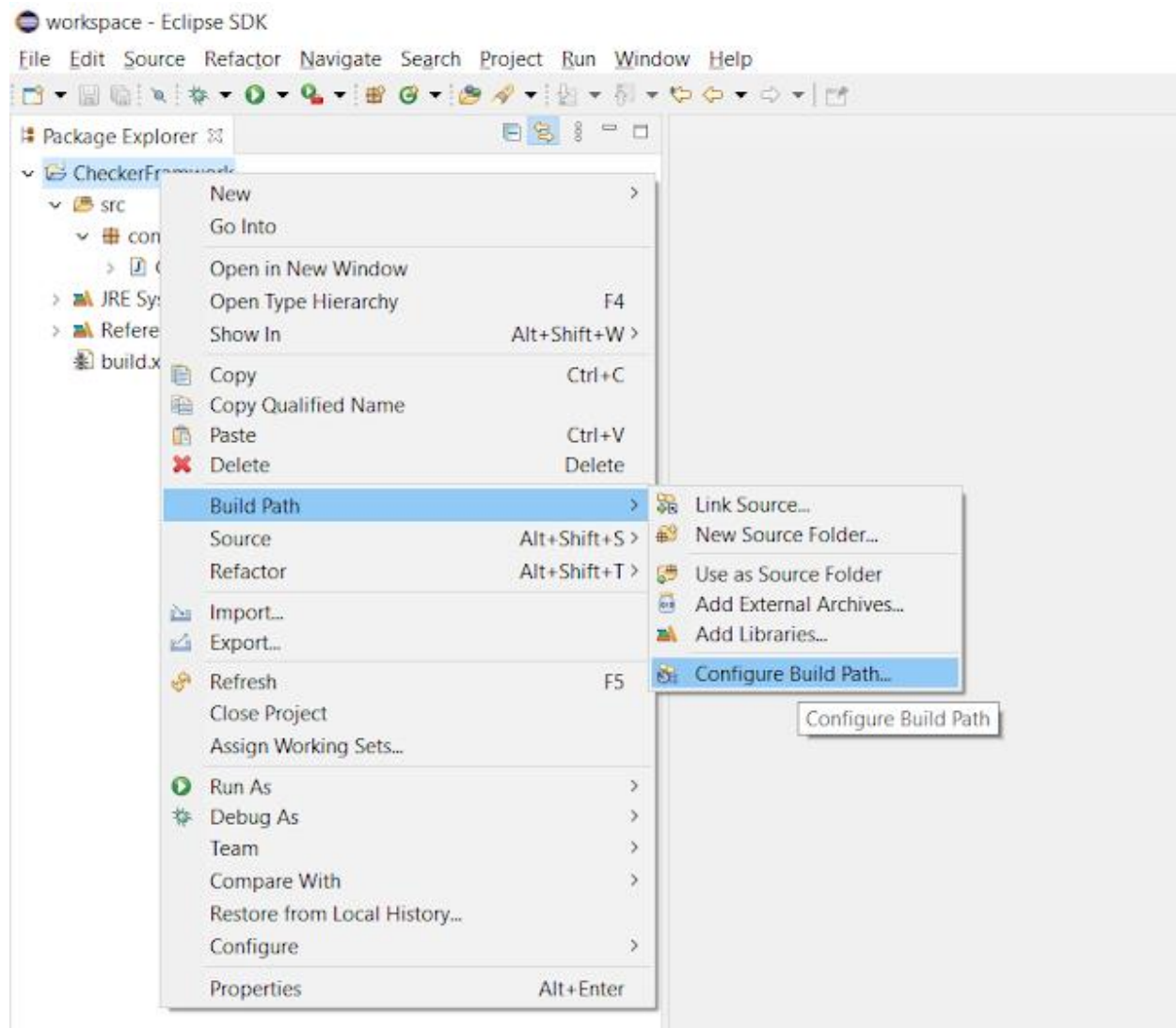


## Config your IDE

Build System, or command shell to include the Checker Framework on the classpath. In this use Eclipse if you other you can ref

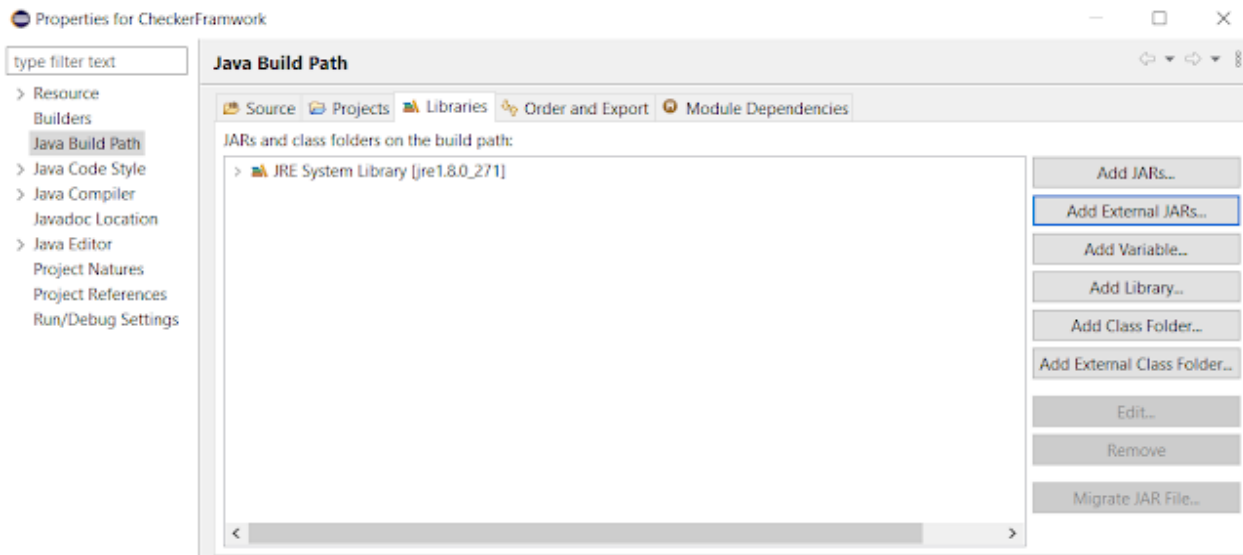
<https://checkerframework.org/manual/#external-tools>

Add buildPath in project

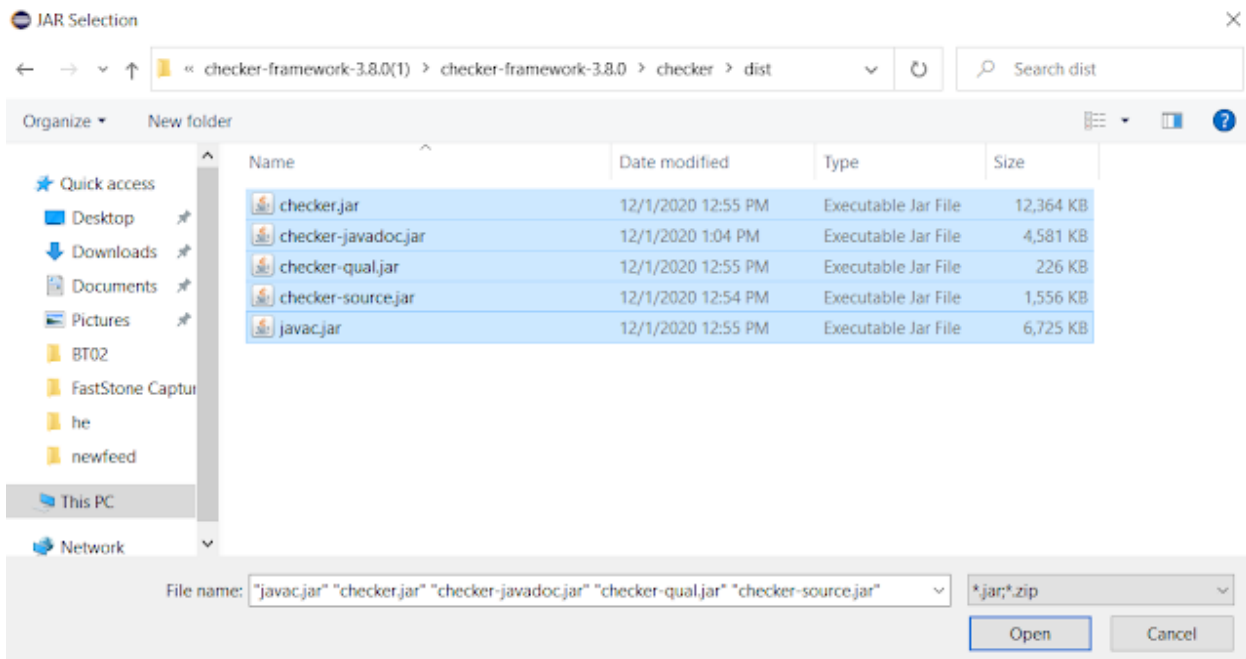




## Choice Add External JARs that add File JAR



Ctrl + A and Open all



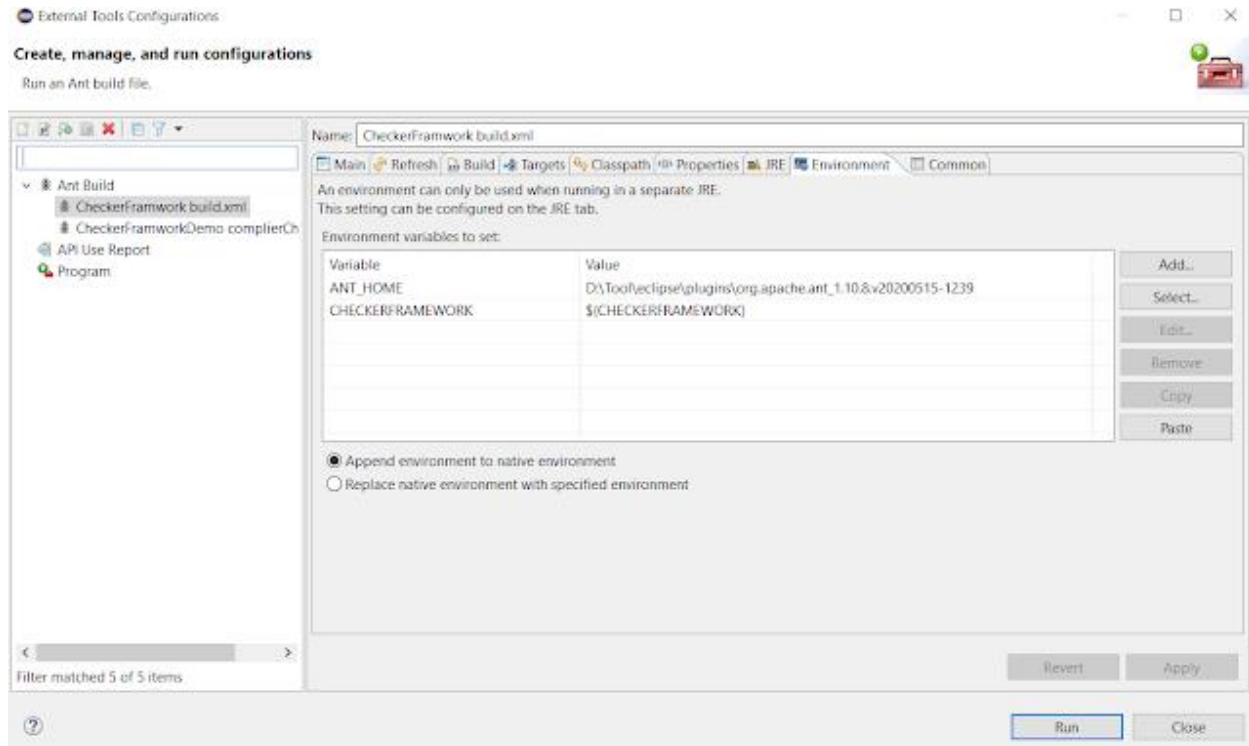
## File Compiled

Config file Ant That source is compiled here i use Ant to compile . I create file build.xml and run it by Ant

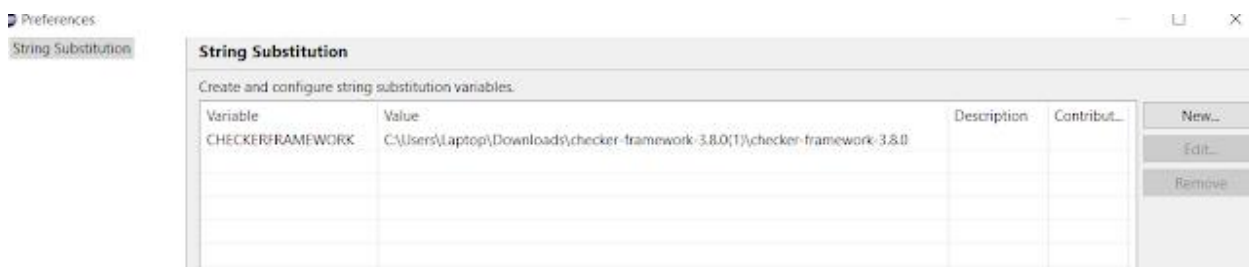
```
CheckerDemoBasic.java build.xml
1 <?xml version="1.0" encoding="UTF-8"?>
2 <project name="CheckerFramework" default="CheckerFramework" basedir=".">
3
4   <!-- 1.0 config path enviroment for javac in checkerframework -->
5   <property environment="env"/>
6   <property name="checkerframework" value="${env.CHECKERFRAMEWORK}" />
7   <condition property="cfJavac" value="javac.bat" else="javac">
8     <os family="windows" />
9   </condition>
10
11   <!-- 2.0 pre set defination of tag -->
12   <presetdef name="jsr308.javac">
13     <javac fork="yes" executable="${checkerframework}\checker\bin\${cfJavac}" >
14       <compilerarg value="-version"/>
15       <compilerarg value="-implicit:class"/>
16     </javac>
17   </presetdef>
18
19   <!-- 3.0 default run with ant run clean then run check-nullness -->
20   <target name="CheckerFramework" depends="clean, check-nullness">
21     <echo>${checkerframework}</echo>
22   </target>
23
24   <target name="clean">
25     <delete dir="build"/>
26   </target>
27
28   <!-- 4.0 compile check-nullness -->
29   <target name="check-nullness"
30     description="Check for null pointer dereferences"
31     depends="clean">
32     <!-- use jsr308.javac instead of javac -->
33     <jsr308.javac srcdir=".">
34       <compilerarg line="-processor org.checkerframework.checker.nullness.NullnessChecker"/>
35       <!-- optional, to not check uses of library methods:
36       <compilerarg value="-AskipUses=^(java\.awt\.|javax\.swing\.)" />
37     -->
38       <compilerarg line="-Xmaxerrs 10000"/>
39     </jsr308.javac>
40   </target>
41 </project>
```

## 1.0 Set enviroment for variable CHECKERFRAMEWORK in Ant config

Choice file build.xml open External Tools Configurations

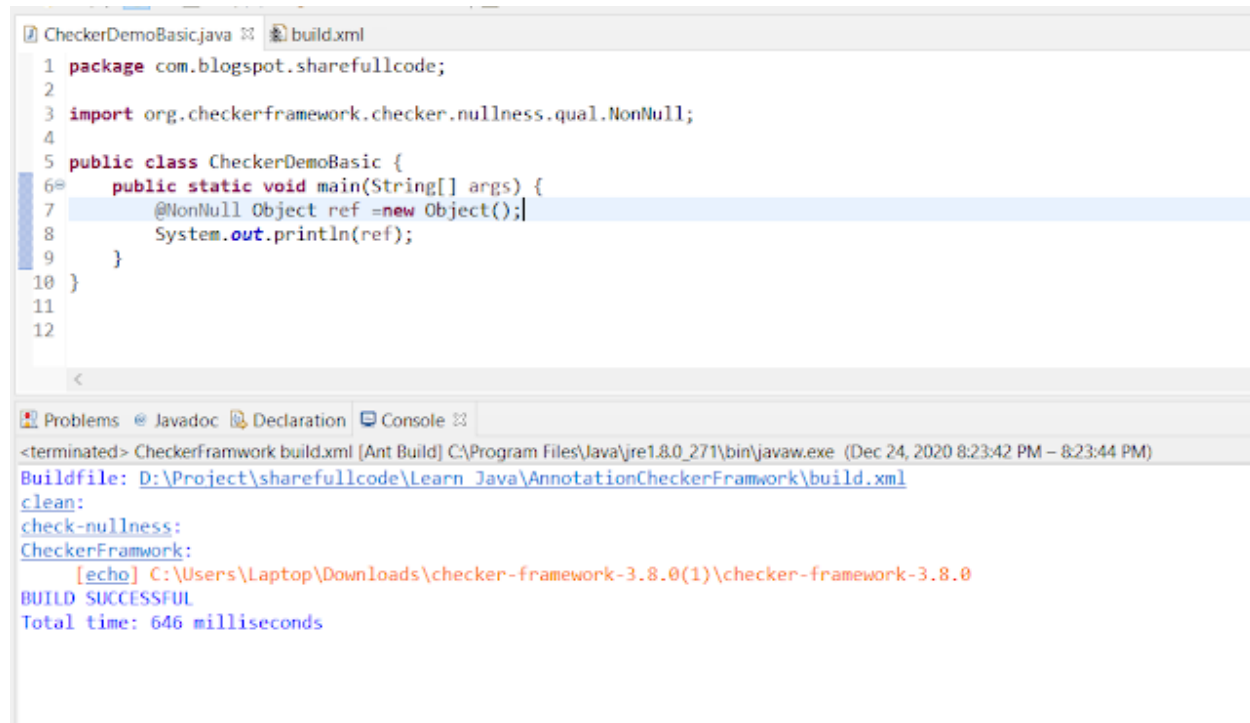


New variable CHECKERFRAMEWORK with path fot it directory checker-framwork was unzip before.



## Test Source

Choice build.xml run with ant and compile successful



```
CheckerDemoBasic.java build.xml
1 package com.blogspot.sharefullcode;
2
3 import org.checkerframework.checker.nullness.qual.NonNull;
4
5 public class CheckerDemoBasic {
6     public static void main(String[] args) {
7         @NonNull Object ref =new Object();
8         System.out.println(ref);
9     }
10 }
11
12

Problems Javadoc Declaration Console
<terminated> CheckerFramework build.xml [Ant Build] C:\Program Files\Java\jre1.8.0_271\bin\javaw.exe (Dec 24, 2020 8:23:42 PM – 8:23:44 PM)
Buildfile: D:\Project\sharefullcode\Learn_Java\AnnotationCheckerFramework\build.xml
clean:
check-nullness:
CheckerFramework:
[echo] C:\Users\Laptop\Downloads\checker-framework-3.8.0(1)\checker-framework-3.8.0
BUILD SUCCESSFUL
Total time: 646 milliseconds
```

But change object = null compile error



```
CheckerDemoBasic.java
1 package com.blogspot.sharefullcode;
2
3 import org.checkerframework.checker.nullness.qual.NonNull;
4
5
6
7 public class CheckerDemoBasic {
8     public static void main(String[] args) {
9         @NonNull Object ref =new Object();
10        System.out.println(ref);
11        ref=null;
12    }
13 }

Problems Javadoc Declaration Console
<terminated> CheckerFramework build.xml [Ant Build] C:\Program Files\Java\jdk1.8.0_271\bin\javaw.exe (Dec 24, 2020 8:50:43 PM – 8:50:50 PM)
Buildfile: D:\Project\sharefullcode\Learn_Java\AnnotationCheckerFramework\build.xml
clean:
check-nullness:
[jsc388.javac] Compiling 1 source file
[jsc388.javac] javac (version info not available)
[jsc388.javac] D:\Project\sharefullcode\Learn_Java\AnnotationCheckerFramework\src\com\blogspot\sharefullcode\CheckerDemoBasic.java:11: error: [assignment.type.incompatible]
[jsc388.javac]         ref=null;
[jsc388.javac]         ^
[jsc388.javac] found   : null
[jsc388.javac] required: @UnknownInitialization @NonNull Object
[jsc388.javac] 1 error
BUILD FAILED
D:\Project\sharefullcode\Learn_Java\AnnotationCheckerFramework\build.xml:34: Compile failed; see the compiler error output for details.
Total time: 5 seconds
```

**This section is non commercial mainly sharing and advance knowlage for java.This tutorials has referenced document from the list below if you has complain for license, i will remove all from internet. Thank you all everything.**

<https://www.javatpoint.com/java-annotation>

<https://www.geeksforgeeks.org/annotations-in-java/>