

## 6. Maven El propósito de la presente sección es introducir al estudiante de la herramienta de desarrollo en Java Maven.

### 6.1. Primer proyecto en Maven

Ejercicio 18. Responda a las siguientes preguntas:

1. ¿Qué es Maven?

Maven es una herramienta de gestión de proyectos de software utilizada para la construcción, gestión y documentación de proyectos Java.

2. ¿Qué es el repositorio central de Maven?, ¿hasta qué punto son fiables las bibliotecas que hay en él?

El repositorio central de Maven es un repositorio en línea que almacena todas las bibliotecas y dependencias que Maven puede descargar automáticamente para un proyecto. Las bibliotecas en el repositorio central de Maven son generalmente fiables, ya que se someten a un proceso de revisión antes de ser aceptadas.

3. ¿Qué es el repositorio local?

El repositorio local de Maven es un directorio en la máquina local donde Maven almacena las dependencias descargadas de internet. Estas dependencias se utilizan en los proyectos Maven locales.

Ejercicio 19. Instale Maven.

Por ejemplo, en OpenSuse, se ejecuta: `sudo zypper install maven` Para comprobar que se ha instalado correctamente: `mvn -version`

```
MINGW64:/c/Users/ivand
ivand@DESKTOP-LAJ70V7 MINGW64 ~/entrega5 (main)
$ rm -r src

ivand@DESKTOP-LAJ70V7 MINGW64 ~/entrega5 (main)
$ rm -r bin

ivand@DESKTOP-LAJ70V7 MINGW64 ~/entrega5 (main)
$ cd ..

ivand@DESKTOP-LAJ70V7 MINGW64 ~
$ sudo zypper install maven
bash: sudo: command not found

ivand@DESKTOP-LAJ70V7 MINGW64 ~
$ mvn -version
Apache Maven 3.9.6 (bc0240f3c744dd6b6ec2920b3cd08dcc295161ae)
Maven home: C:\Users\ivand\Desktop\apache-maven-3.9.6-bin\apache-maven-3.9.6
Java version: 21.0.2, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-21
Default locale: es_ES, platform encoding: UTF-8
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"
```

Ejercicio 20. Realice los siguientes apartados:

1. Cree un proyecto en Maven ejecutando la siguiente instrucción1 : `mvn archetype:generate -DgroupId=org.pr2 -DartifactId= miPrimeraAplicacion -DarchetypeArtifactId=maven-archetype -quickstart -DarchetypeVersion=1.4 -DinteractiveMode= false` y explore el árbol de directorios generado.

```
ivand@DESKTOP-LAJ70V7 MINGW64 ~
$ mvn archetype:generate -DgroupId=org.pr2 -DartifactId=
miPrimeraAplicacion -DarchetypeArtifactId=maven-archetype
-quickstart -DarchetypeVersion=1.4 -DinteractiveMode=
false
[INFO] Scanning for projects...
[INFO] -----< org.apache.maven:standalone-pom >-----
[INFO] Building Maven Stub Project (No POM) 1
[INFO] -----[ pom ]-----
[INFO]
>>> archetype:3.2.1:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO]
<<< archetype:3.2.1:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
--- archetype:3.2.1:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] No archetype defined. Using maven-archetype-quickstart (org.apache.maven.archetypes:maven-archetype-quickstart:1.0)
Choose archetype:
1: remote -> am.ik.archetype:elm-spring-boot-blank-archetype (Blank multi project for Spring Boot + Elm)
2: remote -> am.ik.archetype:graalvm-blank-archetype (Blank project for GraalVM)
3: remote -> am.ik.archetype:graalvm-springmvc-blank-archetype (Blank project for GraalVM + Spring MVC)
4: remote -> am.ik.archetype:graalvm-springwebflux-blank-archetype (Blank project for GraalVM + Spring MVC)
5: remote -> am.ik.archetype:maven-reactjs-blank-archetype (Blank Project for React.js)
6: remote -> am.ik.archetype:msgpack-rpc-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
7: remote -> am.ik.archetype:mvc-1.0-blank-archetype (MVC 1.0 Blank Project)
8: remote -> am.ik.archetype:spring-boot-blank-archetype (Blank Project for Spring Boot)
9: remote -> am.ik.archetype:spring-boot-docker-blank-archetype (Docker Blank Project for Spring Boot)
10: remote -> am.ik.archetype:spring-boot-gae-blank-archetype (GAE Blank Project for Spring Boot)
11: remote -> am.ik.archetype:spring-boot-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
12: remote -> am.ik.archetype:spring-fu-jafu-blank-archetype (Blank project for Vanilla Spring WebFlux.fn)
13: remote -> am.ik.archetype:vanilla-spring-webflux-fn-blank-archetype (Blank project for Vanilla Spring WebFlux.fn)
14: remote -> at.chrl.archetypes:chrl-spring-sample (Archetype for Spring Vaadin Webapps)
15: remote -> at.stderri:archetype-simple (-)
```

2. ¿Qué es un arquetipo en Maven?

Un arquetipo en Maven es una plantilla o modelo para la creación de nuevos proyectos. Define la estructura inicial del proyecto y los archivos necesarios.

3. Entre el el directorio miPrimeraAplicacion: `cd miPrimeraAplicacion`

```
ivand@DESKTOP-LAJ70V7 MINGW64 ~  
$ cd miPrimeraAplicacion/  
  
ivand@DESKTOP-LAJ70V7 MINGW64 ~/miPrimeraAplicacion  
$
```

4. Explique el fichero pom.xml.

El archivo pom.xml (Project Object Model) es un archivo XML que contiene información sobre el proyecto Maven. Define la configuración del proyecto, las dependencias, los plugins utilizados y otra información relevante.

5. Explore el árbol de directorios.

```
$ ls -R  
.:  
pom.xml src/  
./src:  
main/ test/  
./src/main:  
java/  
./src/main/java:  
org/  
./src/main/java/org:  
pr2/  
./src/main/java/org/pr2:  
App.java  
./src/test:  
java/  
./src/test/java:  
org/  
./src/test/java/org:  
pr2/  
./src/test/java/org/pr2:  
AppTest.java
```

6. Compile el programa: `mvn compile`

```
[INFO] Scanning for projects...
[INFO]
[INFO] <org.pr2.miPrimerApplication>
[INFO] Building miPrimerApplication 1.0-SNAPSHOT
[INFO] From pom.xml
[INFO]
[INFO] --- maven-dependency-plugin:3.6.0:analyze (default-analyze) @ miPrimerApplication ---
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-resources-plugin/3.0.2/maven-resources-plugin-3.0.2.pom (7.1 kB at 24 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-plugins/30/maven-plugins-30.pom (10 kB at 221 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-resources-plugin/3.0.2/maven-resources-plugin-3.0.2.jar (32 kB at 566 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-compiler-plugin/3.8.0/maven-compiler-plugin-3.8.0.pom (12 kB at 829 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-compiler-plugin/3.8.0/maven-compiler-plugin-3.8.0.jar (62 kB at 2.0 MB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-parent/32/maven-parent-32.pom (11 kB at 227 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-parent/32/maven-parent-32.jar (62 kB at 2.0 MB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-compiler-plugin/3.8.0/maven-compiler-plugin-3.8.0.jar (62 kB at 2.0 MB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-compiler-plugin/3.8.0/maven-compiler-plugin-3.8.0.jar (62 kB at 2.0 MB/s)
Downloading from central: https://repo.maven.apache.org/maven2/junit/junit4/4.11/junit4-4.11.pom (2.3 kB at 76 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/hamcrest/hamcrest-core/1.3/hamcrest-core-1.3.pom (766 B at 48 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/hamcrest/hamcrest-core/1.3/hamcrest-core-1.3.jar (40 kB at 131 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/hamcrest/hamcrest-parent/1.3/hamcrest-parent-1.3.pom (2.0 kB at 131 kb/s)
[INFO] --- resources:3.0.2:resources (default-resources) @ miPrimerApplication ---
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-component-annotations/1.6/plexus-component-annotations-1.6.pom (748 B at 24 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-component-annotations/1.6/plexus-component-annotations-1.6.jar (7.1 kB at 241 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-containers/1.6/plexus-containers-1.6.pom (3.8 kB at 121 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-containers/1.6/plexus-containers-1.6.jar (11.1 kB at 351 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0.24/plexus-utils-3.0.24.pom (4.1 kB at 133 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0.24/plexus-utils-3.0.24.jar (222 kB at 501 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-filtering/3.1.1/maven-filtering-3.1.1.pom (5.7 kB at 172 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.0/maven-shared-utils-3.0.0.pom (5.6 kB at 186 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-shared-utils/3.0.0/maven-shared-utils-3.0.0.jar (5.1 kB at 119 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/commons-io/commons-io/2.4/commons-io-2.4.pom (10 kB at 216 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/commons-io/commons-io/2.4/commons-io-2.4.jar (235 kB at 600 kb/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-parent/23/commons-parent-23.pom (48 kB at 1.0 MB/s)
```

7. Ejecute el programa: `mvn exec:java -D exec.mainClass=org.pr2.App`

```
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/mojo/exec-maven-plugin/3.2.0/exec-maven-plugin-3.2.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/mojo/exec-maven-plugin/3.2.0/exec-maven-plugin-3.2.0.jar (84 kb at 2.7 MB/s)
[INFO]
[INFO] ----- org.pr2:mPrimerApplication -----
[INFO] building mPrimerApplication 1.0-SNAPSHOT
[INFO] from pom.xml
[INFO] [ jar ]
Downloaded from central: https://repo.maven.apache.org/maven2/junit/junit/4.11/junit-4.11.jar
Downloaded from central: https://repo.maven.apache.org/maven2/junit/junit/4.11/junit-4.11.jar (249 kb at 4.0 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/hamcrest/hamcrest-core/1.3/hamcrest-core-1.3.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/hamcrest/hamcrest-core/1.3/hamcrest-core-1.3.jar (45 kb at 662 KB/s)
[INFO] --- exec:3.2.0:java (default-cli) @ mPrimerApplication ---
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-util/1.4.1/maven-resolver-util-1.4.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-util/1.4.1/maven-resolver-util-1.4.1.pom (2.8 kb at 88 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver/1.4.1/maven-resolver-1.4.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver/1.4.1/maven-resolver-1.4.1.pom (18 kb at 586 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-api/1.4.1/maven-resolver-api-1.4.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-api/1.4.1/maven-resolver-api-1.4.1.pom (2.6 kb at 85 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-xml/3.0.0/plexus-xml-3.0.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-xml/3.0.0/plexus-xml-3.0.0.pom (3.7 kb at 59 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.4.0/commons-exec-1.4.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.4.0/commons-exec-1.4.0.pom (9.5 kb at 298 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-parent/65/commons-parent-65.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-parent/65/commons-parent-65.pom (78 kb at 2.5 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/apache/31/apache-31.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/apache/31/apache-31.pom (24 kb at 1.5 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/junit/junit-bom/5.10.1/junit-bom-5.10.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/junit/junit-bom/5.10.1/junit-bom-5.10.1.pom (5.6 kb at 377 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/9.6/asm-commons-9.6.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/9.6/asm-commons-9.6.pom (2.8 kb at 65 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/9.6/asm-tree-9.6.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/9.6/asm-tree-9.6.pom (2.8 kb at 84 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-util/1.4.1/maven-resolver-util-1.4.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-util/1.4.1/maven-resolver-util-1.4.1.jar (168 kb at 5.4 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/resolver/maven-resolver-api/1.4.1/maven-resolver-api-1.4.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/9.6/asm-commons-9.6.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-xml/3.0.0/plexus-xml-3.0.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-xml/3.0.0/plexus-xml-3.0.0.jar (4.0 kb at 124 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/4.0.0/plexus-utils-4.0.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/4.0.0/plexus-utils-4.0.0.jar (92 kb at 3.9 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.4.0/commons-exec-1.4.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/commons/commons-exec/1.4.0/commons-exec-1.4.0.jar (96 kb at 3.4 MB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/9.6/asm-commons-9.6.jar (7.2 kb at 512 KB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-commons/9.6/asm-commons-9.6.jar (7.2 kb at 512 KB/s)
Hello world!
[INFO] ----- BUILD SUCCESS -----
[INFO] Total time: 2.669 s
[INFO] Finished at: 2024-03-14T20:14:38+01:00
```

8. Elimine los artefactos generados anteriormente, vuelva a compilar y ejecute de nuevo: `mvn clean compile mvn exec:java -D exec.mainClass=org.pr2.App`



site: Genera documentación y reportes sobre el proyecto, como documentación del código y análisis de calidad del software.

## 6.2. La libreta de contactos

Ejercicio 21. El propósito del presente ejercicio es la realización de una aplicación sencilla (una libreta de contactos) utilizando Maven. Se pide realizar los apartados que se muestran a continuación:

1. Genere el proyecto: `mvn archetype:generate -DgroupId=org.pr2 -DartifactId=libreta -DarchetypeArtifactId=maven-archetype-quickstart -DarchetypeVersion=1.4 -DinteractiveMode=false`

```
ivand@DESKTOP-LA170V7 MINGW64 ~
$ mvn archetype:generate -DgroupId=org.pr2 -DartifactId=libreta
  -contactos -DarchetypeArtifactId=maven-archetype-quickstart -DarchetypeVersion=1.4 -DinteractiveMode=false
[INFO] Scanning for projects...
[INFO]
[INFO] -----< org.apache.maven:standalone-pom >-----
[INFO] Building Maven Stub Project (No POM) 1
[INFO] -----[ pom ]-----
[INFO]
[INFO] >>> archetype:3.2.1:generate (default-cli) > generate-sources @ standalone-pom >>>
[INFO] <<< archetype:3.2.1:generate (default-cli) < generate-sources @ standalone-pom <<<
[INFO]
[INFO] --- archetype:3.2.1:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[INFO] No archetype defined. Using maven-archetype-quickstart (org.apache.maven.archetypes:maven-archetype-quickstart:1.0)
Choose archetype:
1: remote -> am.ik.archetype:elm-spring-boot-blank-archetype (Blank multi project for Spring Boot + Elm)
2: remote -> am.ik.archetype:graalvm-blank-archetype (Blank project for GraalVM)
3: remote -> am.ik.archetype:graalvm-springmvc-blank-archetype (Blank project for GraalVM + Spring MVC)
4: remote -> am.ik.archetype:graalvm-springwebflux-blank-archetype (Blank project for GraalVM + Spring MVC)
5: remote -> am.ik.archetype:maven-reactjs-blank-archetype (Blank Project for React.js)
6: remote -> am.ik.archetype:msgpack-rpc-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
7: remote -> am.ik.archetype:mvc-1.0-blank-archetype (MVC 1.0 Blank Project)
8: remote -> am.ik.archetype:spring-boot-blank-archetype (Blank Project for Spring Boot)
9: remote -> am.ik.archetype:spring-boot-docker-blank-archetype (Docker Blank Project for Spring Boot)
10: remote -> am.ik.archetype:spring-boot-gae-blank-archetype (GAE Blank Project for Spring Boot)
11: remote -> am.ik.archetype:spring-boot-jersey-blank-archetype (Blank Project for Spring Boot + Jersey)
12: remote -> am.ik.archetype:spring-fu-jafu-blank-archetype (Blank project for Vanilla Spring WebFlux.fn)
13: remote -> am.ik.archetype:vanilla-spring-webflux-fn-blank-archetype (Blank project for Vanilla Spring WebFlux.fn)
14: remote -> at.chrl.archetypes:chrl-spring-sample (Archetype for Spring Vaadin Webapps)
15: remote -> at.stderr:archetype-simple (-)
16: remote -> be.cloudway:gramba-aws-lambda-archetype (-)
17: remote -> biz.turnonline.ecosystem:turnonline-ecosystem-microservice-archetype (TurnOnline.biz Ecosystem: Serverless Microservice)
18: remote -> br.com.address.archetypes:struts2-archetype (an archetype web 3.0 + struts2 (bootstrap + jquery) + JPA 2.1 with struts2)
19: remote -> br.com.address.archetypes:struts2-base-archetype (An Archetype with JPA 2.1; Struts2 core 2.3.28.1; JQuery struts2)
20: remote -> br.com.ateros:Anteros-Archetype (Anteros Archetype for Java Web projects.)
21: remote -> br.com.codecode:vlocadora-json (Modelos com Anotações Gson)
22: remote -> br.com.diogoko:maven-doclet-archetype (A Maven archetype to create Doclets for Javadoc)
23: remote -> br.com.ingenieux:elasticbeanstalk-docker-dropwizard-webapp-archetype (A Maven Archetype for Publishing Dropwizard)
```

3. Explore el código de la clase principal: `vi src/main/java/org/pr2/App.java`



```

package org.pr2;

/**
 * Hello world!
 */
public class App
{
    public static void main( String[] args )
    {
        System.out.println( "Hello World!" );
    }
}

```

src/main/java/org/pr2/App.java [dos] (09:46 15/03/2024)  
 "src/main/java/org/pr2/App.java" [dos] 131 . 1838

#### 4. Compile: mvn compile

```

$ mvn compile
[INFO] Scanning for projects...
[INFO] -----< org.pr2:libreta-contactos >-----
[INFO] Building libreta-contactos 1.0-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[INFO] --- resources:3.0.2:resources (default-resources) @ libreta-contactos ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\jta8_\libreta-contactos\src\main\resources
[INFO] --- compiler:3.8.0:compile (default-compile) @ libreta-contactos ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\jta8_\libreta-contactos\target\classes
[INFO] BUILD SUCCESS
[INFO] Total time: 0.911 s
[INFO] Finished at: 2024-03-15T09:53:26+01:00
[INFO]

```

#### 5. Compruebe que la aplicación ejecuta: mvn exec:java -D exec.mainClass=org.pr2.App

6. Cree un directorio para el dominio de la aplicación y otro para la interfaz de usuario: md src/main/java/org/pr2/dominio md src/main/java/org/pr2/interfaces

Mkdir src/main/java/org/pr2/interfaces

7. Escriba las clases Contacto.java en el directorio src/main/java/org/pr2/dominio

```
package org.pr2.dominio; public class Contacto { private String nombre; private
String telefono; public void setNombre(String nombre) { this.nombre = nombre; }
public String getNombre() { return nombre; } public void setTelefono(String
telefono) { this.telefono = telefono; } public String getTelefono() { return telefono; }
@Override public String toString() { return "nombre: " + getNombre() + " " +
"telefono: " + getTelefono(); } public Contacto(String nombre, String telefono) {
this.nombre = nombre; this.telefono = telefono; } public Contacto() { }}
```

8. En el mismo directorio, escriba la clase Libreta.java

```
package org.pr2.dominio;
import java.io.File; import java.io.FileWriter; import java.io.IOException; import
java.util.ArrayList; import java.util.Scanner; public class Libreta { private String
nombreFichero = "contactos.txt"; private ArrayList contactos = new ArrayList<>()
public void addContacto(Contacto contacto) { contactos.add(contacto); }
@Override public String toString() { StringBuilder sb = new StringBuilder();
for(Contacto contacto : contactos) { sb.append(contacto + "\n"); } return
sb.toString(); } public Libreta() { try { File fichero = new File(nombreFichero);
fichero.createNewFile(); Scanner sc = new Scanner(fichero); while(sc.hasNext()) {
Contacto contacto = new Contacto(); contacto.setNombre(sc.nextLine());
contacto.setTelefono(sc.nextLine()); contactos.add(contacto); }
}catch(IOException ex) { System.err.println(ex); } } private void volcarContactos() {
System.out.println(contactos); try { FileWriter fw = new FileWriter(nombreFichero);
for(Contacto contacto : contactos) { fw.write(contacto.getNombre()+"\n");
fw.write(contacto.getTelefono()+"\n"); } fw.close(); }catch(IOException ex) {
System.err.println(ex); } } public void annadirContacto(Contacto contacto){
contactos.add(contacto); this.volcarContactos(); }}
```

9. Escriba la clase Interfaz.java en el directorio src/main/java/org/pr2/interfaces

```
package org.pr2.interfaces; import org.pr2.dominio.*; public class Interfaz { public
static void iniciar(String args[]) { Libreta libreta = new Libreta(); if
(args[0].equals("add")) { Contacto contacto = new Contacto(args[1], args [2]);
libreta.annadirContacto(contacto); } else if (args[0].equals("show"))
System.out.println( libreta); else System.out.println("Opción incorrecta"); } }
```



10. Modifique la clase App.java `package org.pr2; import org.pr2.interfaces.*;`  
`public class App { public static void main( String[] args ) { Interfaz.iniciar(args); }}`

11. compile: `mvn compile`

12. Ejecute: `mvn exec:java -D exec.mainClass=org.pr2.App -D exec.args='add "Juan García Pérez" 65432145'` `mvn exec:java -D exec.mainClass=org.pr2.App -D exec.args=show`