



Jar files

Package your classes in one file



What is a JAR file?

A file with an archive (like a zip file) of Java class files (and other files), which can be used by some application.

With a JAR file on the classpath, we can import packages and classes from the archive and use them in an application.

JAR files let us ship Java stuff in one file, rather than many files and many directories.

How to create a JAR file

Simplest way:

```
jar cvf some-file-name.jar some-directory
```

- The cvf directive stands for Create Verbose File
- some-file-name.jar will be created
- some-directory contains the files to be included

Example

We have a class Student, which we want to package in a JAR file:

```
src/  
└─ se  
    └─ itu  
        └─ students  
            └─ domain  
                └─ Student.java
```

```
package se.itu.students.domain;

public class Student {
    private String name;
    private String email;

    public Student(String name, String email) {
        this.name = name;
        this.email = email;
    }

    public String name() {
        return name;
    }

    public String email() {
        return email;
    }

    @Override
    public String toString() {
        return new StringBuilder("Student with name <")
            .append(name).append("> and email <")
            .append(email).append(">").toString();
    }
}
```

Compile the file to bin/

```
$ javac -d bin src/se/itu/students/domain/Student.java
```

```
bin/
```

```
└─ se
    └─ itu
        └─ students
            └─ domain
                └─ Student.class
```

Create the JAR from se/

```
$ cd bin
```

```
$ jar cvf students.jar se
```

```
added manifest
```

```
adding: se/(in = 0) (out= 0) (stored 0%)
```

```
adding: se/itu/(in = 0) (out= 0) (stored 0%)
```

```
adding: se/itu/students/(in = 0) (out= 0) (stored 0%)
```

```
adding: se/itu/students/domain/(in = 0) (out= 0) (stored 0%)
```

```
adding: se/itu/students/domain/Student.class(in = 745) (out=
424) (deflated 43%)
```

Application using the JAR

```
test/  
└─ TestStudents.java
```

```
# Uses se.itu.students.domain.Student  
# But where does it get it from?
```


Application using the JAR

```
package test;

import se.itu.students.domain.Student;

public class TestStudents {
    public static void main(String[] args) {
        Student[] students = {
            new Student("Henrik", "henke@gu.se"),
            new Student("Rikard", "rille@gu.se"),
            new Student("Aida", "aida@gu.se"),
            new Student("Urban", "ubbe@gu.se")
        };
        for (Student stud : students) {
            System.out.println(stud);
        }
    }
}
```

Application using the JAR

```
$ javac -cp .:students.jar test/TestStudents.java
```

```
# On windows: javac -cp .;students.jar test/TestStudents.java (semicolon)
```

```
$ java -cp .:students.jar test.TestStudents
```

```
# Both compilation and running requires the JAR on the classpath!
```

Further reading

<https://docs.oracle.com/javase/tutorial/deployment/jar/basicsindex.html>

<https://docs.oracle.com/javase/8/docs/technotes/guides/jar/jarGuide.html>

[https://en.wikipedia.org/wiki/JAR_\(file_format\)](https://en.wikipedia.org/wiki/JAR_(file_format))