| | [**Overview**](http://docs.google.com/overview-summary.html) | [**Package**](http://docs.google.com/package-summary.html) | **Class** | [**Use**](http://docs.google.com/class-use/ProcessBuilder.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [**PREV CLASS**](http://docs.google.com/java/lang/Process.html)   [**NEXT CLASS**](http://docs.google.com/java/lang/Readable.html) | [**FRAMES**](http://docs.google.com/index.html?java/lang/ProcessBuilder.html)    [**NO FRAMES**](http://docs.google.com/ProcessBuilder.html)     [**All Classes**](http://docs.google.com/allclasses-noframe.html) |
| SUMMARY: NESTED | FIELD | [CONSTR](#3znysh7) | [METHOD](#2et92p0) | DETAIL: FIELD | [CONSTR](#3dy6vkm) | [METHOD](#2s8eyo1) |

## **java.lang**

Class ProcessBuilder

[java.lang.Object](http://docs.google.com/java/lang/Object.html)  
 **java.lang.ProcessBuilder**

public final class **ProcessBuilder**extends [Object](http://docs.google.com/java/lang/Object.html)

This class is used to create operating system processes.

Each ProcessBuilder instance manages a collection of process attributes. The [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method creates a new [Process](http://docs.google.com/java/lang/Process.html) instance with those attributes. The [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method can be invoked repeatedly from the same instance to create new subprocesses with identical or related attributes.

Each process builder manages these process attributes:

* a *command*, a list of strings which signifies the external program file to be invoked and its arguments, if any. Which string lists represent a valid operating system command is system-dependent. For example, it is common for each conceptual argument to be an element in this list, but there are operating systems where programs are expected to tokenize command line strings themselves - on such a system a Java implementation might require commands to contain exactly two elements.
* an *environment*, which is a system-dependent mapping from *variables* to *values*. The initial value is a copy of the environment of the current process (see [System.getenv()](http://docs.google.com/java/lang/System.html#getenv())).
* a *working directory*. The default value is the current working directory of the current process, usually the directory named by the system property user.dir.
* a *redirectErrorStream* property. Initially, this property is false, meaning that the standard output and error output of a subprocess are sent to two separate streams, which can be accessed using the [Process.getInputStream()](http://docs.google.com/java/lang/Process.html#getInputStream()) and [Process.getErrorStream()](http://docs.google.com/java/lang/Process.html#getErrorStream()) methods. If the value is set to true, the standard error is merged with the standard output. This makes it easier to correlate error messages with the corresponding output. In this case, the merged data can be read from the stream returned by [Process.getInputStream()](http://docs.google.com/java/lang/Process.html#getInputStream()), while reading from the stream returned by [Process.getErrorStream()](http://docs.google.com/java/lang/Process.html#getErrorStream()) will get an immediate end of file.

Modifying a process builder's attributes will affect processes subsequently started by that object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method, but will never affect previously started processes or the Java process itself.

Most error checking is performed by the [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method. It is possible to modify the state of an object so that [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) will fail. For example, setting the command attribute to an empty list will not throw an exception unless [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) is invoked.

**Note that this class is not synchronized.** If multiple threads access a ProcessBuilder instance concurrently, and at least one of the threads modifies one of the attributes structurally, it *must* be synchronized externally.

Starting a new process which uses the default working directory and environment is easy:

Process p = new ProcessBuilder("myCommand", "myArg").start();

Here is an example that starts a process with a modified working directory and environment:

ProcessBuilder pb = new ProcessBuilder("myCommand", "myArg1", "myArg2");  
 Map<String, String> env = pb.environment();  
 env.put("VAR1", "myValue");  
 env.remove("OTHERVAR");  
 env.put("VAR2", env.get("VAR1") + "suffix");  
 pb.directory(new File("myDir"));  
 Process p = pb.start();

To start a process with an explicit set of environment variables, first call [Map.clear()](http://docs.google.com/java/util/Map.html#clear()) before adding environment variables.

**Since:** 1.5

| **Constructor Summary** | |
| --- | --- |
| [**ProcessBuilder**](http://docs.google.com/java/lang/ProcessBuilder.html#ProcessBuilder(java.util.List))([List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> command)            Constructs a process builder with the specified operating system program and arguments. |
| [**ProcessBuilder**](http://docs.google.com/java/lang/ProcessBuilder.html#ProcessBuilder(java.lang.String...))([String](http://docs.google.com/java/lang/String.html)... command)            Constructs a process builder with the specified operating system program and arguments. |

| **Method Summary** | |
| --- | --- |
| [List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> | [**command**](http://docs.google.com/java/lang/ProcessBuilder.html#command())()            Returns this process builder's operating system program and arguments. |
| [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) | [**command**](http://docs.google.com/java/lang/ProcessBuilder.html#command(java.util.List))([List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> command)            Sets this process builder's operating system program and arguments. |
| [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) | [**command**](http://docs.google.com/java/lang/ProcessBuilder.html#command(java.lang.String...))([String](http://docs.google.com/java/lang/String.html)... command)            Sets this process builder's operating system program and arguments. |
| [File](http://docs.google.com/java/io/File.html) | [**directory**](http://docs.google.com/java/lang/ProcessBuilder.html#directory())()            Returns this process builder's working directory. |
| [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) | [**directory**](http://docs.google.com/java/lang/ProcessBuilder.html#directory(java.io.File))([File](http://docs.google.com/java/io/File.html) directory)            Sets this process builder's working directory. |
| [Map](http://docs.google.com/java/util/Map.html)<[String](http://docs.google.com/java/lang/String.html),[String](http://docs.google.com/java/lang/String.html)> | [**environment**](http://docs.google.com/java/lang/ProcessBuilder.html#environment())()            Returns a string map view of this process builder's environment. |
| boolean | [**redirectErrorStream**](http://docs.google.com/java/lang/ProcessBuilder.html#redirectErrorStream())()            Tells whether this process builder merges standard error and standard output. |
| [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) | [**redirectErrorStream**](http://docs.google.com/java/lang/ProcessBuilder.html#redirectErrorStream(boolean))(boolean redirectErrorStream)            Sets this process builder's redirectErrorStream property. |
| [Process](http://docs.google.com/java/lang/Process.html) | [**start**](http://docs.google.com/java/lang/ProcessBuilder.html#start())()            Starts a new process using the attributes of this process builder. |

| **Methods inherited from class java.lang.**[**Object**](http://docs.google.com/java/lang/Object.html) |
| --- |
| [clone](http://docs.google.com/java/lang/Object.html#clone()), [equals](http://docs.google.com/java/lang/Object.html#equals(java.lang.Object)), [finalize](http://docs.google.com/java/lang/Object.html#finalize()), [getClass](http://docs.google.com/java/lang/Object.html#getClass()), [hashCode](http://docs.google.com/java/lang/Object.html#hashCode()), [notify](http://docs.google.com/java/lang/Object.html#notify()), [notifyAll](http://docs.google.com/java/lang/Object.html#notifyAll()), [toString](http://docs.google.com/java/lang/Object.html#toString()), [wait](http://docs.google.com/java/lang/Object.html#wait()), [wait](http://docs.google.com/java/lang/Object.html#wait(long)), [wait](http://docs.google.com/java/lang/Object.html#wait(long,%20int)) |

| **Constructor Detail** |
| --- |

### ProcessBuilder

public **ProcessBuilder**([List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> command)

Constructs a process builder with the specified operating system program and arguments. This constructor does *not* make a copy of the command list. Subsequent updates to the list will be reflected in the state of the process builder. It is not checked whether command corresponds to a valid operating system command.

**Parameters:**command - The list containing the program and its arguments **Throws:** [NullPointerException](http://docs.google.com/java/lang/NullPointerException.html) - If the argument is null

### ProcessBuilder

public **ProcessBuilder**([String](http://docs.google.com/java/lang/String.html)... command)

Constructs a process builder with the specified operating system program and arguments. This is a convenience constructor that sets the process builder's command to a string list containing the same strings as the command array, in the same order. It is not checked whether command corresponds to a valid operating system command.

**Parameters:**command - A string array containing the program and its arguments

| **Method Detail** |
| --- |

### command

public [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) **command**([List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> command)

Sets this process builder's operating system program and arguments. This method does *not* make a copy of the command list. Subsequent updates to the list will be reflected in the state of the process builder. It is not checked whether command corresponds to a valid operating system command.

**Parameters:**command - The list containing the program and its arguments **Returns:**This process builder **Throws:** [NullPointerException](http://docs.google.com/java/lang/NullPointerException.html) - If the argument is null

### command

public [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) **command**([String](http://docs.google.com/java/lang/String.html)... command)

Sets this process builder's operating system program and arguments. This is a convenience method that sets the command to a string list containing the same strings as the command array, in the same order. It is not checked whether command corresponds to a valid operating system command.

**Parameters:**command - A string array containing the program and its arguments **Returns:**This process builder

### command

public [List](http://docs.google.com/java/util/List.html)<[String](http://docs.google.com/java/lang/String.html)> **command**()

Returns this process builder's operating system program and arguments. The returned list is *not* a copy. Subsequent updates to the list will be reflected in the state of this process builder.

**Returns:**This process builder's program and its arguments

### environment

public [Map](http://docs.google.com/java/util/Map.html)<[String](http://docs.google.com/java/lang/String.html),[String](http://docs.google.com/java/lang/String.html)> **environment**()

Returns a string map view of this process builder's environment. Whenever a process builder is created, the environment is initialized to a copy of the current process environment (see [System.getenv()](http://docs.google.com/java/lang/System.html#getenv())). Subprocesses subsequently started by this object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method will use this map as their environment.

The returned object may be modified using ordinary [Map](http://docs.google.com/java/util/Map.html) operations. These modifications will be visible to subprocesses started via the [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method. Two ProcessBuilder instances always contain independent process environments, so changes to the returned map will never be reflected in any other ProcessBuilder instance or the values returned by [System.getenv](http://docs.google.com/java/lang/System.html#getenv(java.lang.String)).

If the system does not support environment variables, an empty map is returned.

The returned map does not permit null keys or values. Attempting to insert or query the presence of a null key or value will throw a [NullPointerException](http://docs.google.com/java/lang/NullPointerException.html). Attempting to query the presence of a key or value which is not of type [String](http://docs.google.com/java/lang/String.html) will throw a [ClassCastException](http://docs.google.com/java/lang/ClassCastException.html).

The behavior of the returned map is system-dependent. A system may not allow modifications to environment variables or may forbid certain variable names or values. For this reason, attempts to modify the map may fail with [UnsupportedOperationException](http://docs.google.com/java/lang/UnsupportedOperationException.html) or [IllegalArgumentException](http://docs.google.com/java/lang/IllegalArgumentException.html) if the modification is not permitted by the operating system.

Since the external format of environment variable names and values is system-dependent, there may not be a one-to-one mapping between them and Java's Unicode strings. Nevertheless, the map is implemented in such a way that environment variables which are not modified by Java code will have an unmodified native representation in the subprocess.

The returned map and its collection views may not obey the general contract of the [Object.equals(java.lang.Object)](http://docs.google.com/java/lang/Object.html#equals(java.lang.Object)) and [Object.hashCode()](http://docs.google.com/java/lang/Object.html#hashCode()) methods.

The returned map is typically case-sensitive on all platforms.

If a security manager exists, its [checkPermission](http://docs.google.com/java/lang/SecurityManager.html#checkPermission(java.security.Permission)) method is called with a [RuntimePermission](http://docs.google.com/java/lang/RuntimePermission.html)("getenv.\*") permission. This may result in a [SecurityException](http://docs.google.com/java/lang/SecurityException.html) being thrown.

When passing information to a Java subprocess, [system properties](http://docs.google.com/System.html#EnvironmentVSSystemProperties) are generally preferred over environment variables.

**Returns:**This process builder's environment **Throws:** [SecurityException](http://docs.google.com/java/lang/SecurityException.html) - If a security manager exists and its [checkPermission](http://docs.google.com/java/lang/SecurityManager.html#checkPermission(java.security.Permission)) method doesn't allow access to the process environment**See Also:**[Runtime.exec(String[],String[],java.io.File)](http://docs.google.com/java/lang/Runtime.html#exec(java.lang.String%5B%5D,%20java.lang.String%5B%5D,%20java.io.File)), [System.getenv()](http://docs.google.com/java/lang/System.html#getenv())

### directory

public [File](http://docs.google.com/java/io/File.html) **directory**()

Returns this process builder's working directory. Subprocesses subsequently started by this object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method will use this as their working directory. The returned value may be null -- this means to use the working directory of the current Java process, usually the directory named by the system property user.dir, as the working directory of the child process.

**Returns:**This process builder's working directory

### directory

public [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) **directory**([File](http://docs.google.com/java/io/File.html) directory)

Sets this process builder's working directory. Subprocesses subsequently started by this object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method will use this as their working directory. The argument may be null -- this means to use the working directory of the current Java process, usually the directory named by the system property user.dir, as the working directory of the child process.

**Parameters:**directory - The new working directory **Returns:**This process builder

### redirectErrorStream

public boolean **redirectErrorStream**()

Tells whether this process builder merges standard error and standard output.

If this property is true, then any error output generated by subprocesses subsequently started by this object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method will be merged with the standard output, so that both can be read using the [Process.getInputStream()](http://docs.google.com/java/lang/Process.html#getInputStream()) method. This makes it easier to correlate error messages with the corresponding output. The initial value is false.

**Returns:**This process builder's redirectErrorStream property

### redirectErrorStream

public [ProcessBuilder](http://docs.google.com/java/lang/ProcessBuilder.html) **redirectErrorStream**(boolean redirectErrorStream)

Sets this process builder's redirectErrorStream property.

If this property is true, then any error output generated by subprocesses subsequently started by this object's [start()](http://docs.google.com/java/lang/ProcessBuilder.html#start()) method will be merged with the standard output, so that both can be read using the [Process.getInputStream()](http://docs.google.com/java/lang/Process.html#getInputStream()) method. This makes it easier to correlate error messages with the corresponding output. The initial value is false.

**Parameters:**redirectErrorStream - The new property value **Returns:**This process builder

### start

public [Process](http://docs.google.com/java/lang/Process.html) **start**()  
 throws [IOException](http://docs.google.com/java/io/IOException.html)

Starts a new process using the attributes of this process builder.

The new process will invoke the command and arguments given by [command()](http://docs.google.com/java/lang/ProcessBuilder.html#command()), in a working directory as given by [directory()](http://docs.google.com/java/lang/ProcessBuilder.html#directory()), with a process environment as given by [environment()](http://docs.google.com/java/lang/ProcessBuilder.html#environment()).

This method checks that the command is a valid operating system command. Which commands are valid is system-dependent, but at the very least the command must be a non-empty list of non-null strings.

If there is a security manager, its [checkExec](http://docs.google.com/java/lang/SecurityManager.html#checkExec(java.lang.String)) method is called with the first component of this object's command array as its argument. This may result in a [SecurityException](http://docs.google.com/java/lang/SecurityException.html) being thrown.

Starting an operating system process is highly system-dependent. Among the many things that can go wrong are:

* The operating system program file was not found.
* Access to the program file was denied.
* The working directory does not exist.

In such cases an exception will be thrown. The exact nature of the exception is system-dependent, but it will always be a subclass of [IOException](http://docs.google.com/java/io/IOException.html).

Subsequent modifications to this process builder will not affect the returned [Process](http://docs.google.com/java/lang/Process.html).

**Returns:**A new [Process](http://docs.google.com/java/lang/Process.html) object for managing the subprocess **Throws:** [NullPointerException](http://docs.google.com/java/lang/NullPointerException.html) - If an element of the command list is null [IndexOutOfBoundsException](http://docs.google.com/java/lang/IndexOutOfBoundsException.html) - If the command is an empty list (has size 0) [SecurityException](http://docs.google.com/java/lang/SecurityException.html) - If a security manager exists and its [checkExec](http://docs.google.com/java/lang/SecurityManager.html#checkExec(java.lang.String)) method doesn't allow creation of the subprocess [IOException](http://docs.google.com/java/io/IOException.html) - If an I/O error occurs**See Also:**[Runtime.exec(String[], String[], java.io.File)](http://docs.google.com/java/lang/Runtime.html#exec(java.lang.String%5B%5D,%20java.lang.String%5B%5D,%20java.io.File)), [SecurityManager.checkExec(String)](http://docs.google.com/java/lang/SecurityManager.html#checkExec(java.lang.String))

| | [**Overview**](http://docs.google.com/overview-summary.html) | [**Package**](http://docs.google.com/package-summary.html) | **Class** | [**Use**](http://docs.google.com/class-use/ProcessBuilder.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
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[Submit a bug or feature](http://bugs.sun.com/services/bugreport/index.jsp)

For further API reference and developer documentation, see [Java SE Developer Documentation](http://docs.google.com/webnotes/devdocs-vs-specs.html). That documentation contains more detailed, developer-targeted descriptions, with conceptual overviews, definitions of terms, workarounds, and working code examples.

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