

# Building Android

Follow these instructions to begin building Android.

## Setting up the environment

Initialize the environment with the `envsetup.sh` script:

```
cd ~/aosp

source build/envsetup.sh
```

or

```
. build/envsetup.sh
```

See the script at [platform/build/envsetup.sh](https://source.android.com/setup/build/envsetup.sh)

You need to reissue this command after every `repo sync` to pick up any changes to that script. Note that replacing `source` (a single dot) saves a few characters, and the short form is more commonly used in documentation.

The `envsetup.sh` script imports several commands that enable you to work with the Android source code, including the commands used in this exercise.

To see the full list of available commands, run:

```
hmm
```

## Choosing a target

### lunch

Choose which target to build with `lunch`. `lunch product_name-build_variant` selects `product_name` as the product to build, and `build_variant` as the variant to build, and stores those selections in the environment to be read by subsequent invocations of `m` and other similar commands.

The exact configuration can be passed as an argument. For example, the following command refers to a complete build for the emulator, with all debugging enabled:

```
lunch aosp_car_x86-userdebug
```

If run with no arguments, `lunch` prompts you to choose a target from the menu. See [Selecting a device build] for the build configurations of all existing devices.

All build targets take the form `BUILD-BUILDTYPE`, where `BUILD` is a codename referring to the particular feature combination. `BUILDTYPE` is one of the following.

Buildtype	Use
user	Limited access; suited for production
userdebug	Like user but with root access and debug capability; preferred for debugging
eng	Development configuration with additional debugging tools

The userdebug build should behave the same as the user build, with the ability to enable additional debugging that normally violates the security model of the platform. This makes the userdebug build good for user testing with greater diagnosis capabilities..

The eng build prioritizes engineering productivity for engineers who work on the platform. The eng build turns off various optimizations used to provide a good user experience. Otherwise, the eng build has behavior similar to the user and userdebug builds so that device developers can see how the code behaves in those environments.

## tapas

The `tapas` command configures the build of unbundled apps. It selects individual apps to be built by the Android build system. Unlike `lunch`, `tapas` does not request the building of images for a device.

Run `tapas help` for more information on the command.

## Building the code

This section is a quick summary to ensure that setup is complete.

Build everything with `m`. `m` can handle parallel tasks with a `-jN` argument. If you don't provide a `-j` argument, the build system automatically selects a parallel task count that it thinks is optimal for your system.

```
m
```

As explained above, you can build specific modules instead of the full device image by listing their names in your `m` command line. In addition, `m` provides some pseudotargets for special purposes. Some examples are:

- **droid** - `m droid` is the normal build. This target is here because the default target requires a name.
- **all** - `m all` builds everything that `m droid` does, plus everything that doesn't have the `droid` tag. The build server runs this to make sure that everything that is in the tree and has an `Android.mk` file builds.
- **m** - Runs builds from the top of the tree. This is useful because you can run `make` from within subdirectories. If you have the `TOP` environment variable set, it uses that. If you don't, it looks up the tree from the current directory, trying to find the top of the tree. You can either build the whole source code tree by running `m` without arguments or build specific targets by specifying their names.
- **mma** - Builds all of the modules in the current directory, and their dependencies.
- **mma** - Builds all of the modules in the supplied directories, and their dependencies.
- **croot** - `cd` to the top of the tree.\* - `m clean` {translate="no" deletes all of the output and intermediate files for this configuration. This is the same as `rm -rf out/`.

Run `m help` to see what other pseudotargets `m` provides.

## Running the build

You can either run your build on an emulator or flash it on a device. Because you've already selected your build target with `lunch`, it's unlikely to run on a different target than it was built for.

### Emulating an Android device

The emulator is added to your path automatically by the build process. To run the emulator, type:

```
emulator
```