

# Install PBC in Ubuntu

## ❖ Installation of Pre-requisite Packages:

- `sudo apt update`
- `sudo apt full-upgrade -y`
- `sudo apt autoremove`
- `sudo apt -y install flex bison libssl-dev libgmp-dev libgmp10`
- `sudo apt -y openssl`

```
Selecting previously unselected package libgmpxx4ldbl:amd64.  
Preparing to unpack .../26-libgmpxx4ldbl_2%3a6.3.0+dfsg-2ubuntu6_amd64.deb ...  
Unpacking libgmpxx4ldbl:amd64 (2:6.3.0+dfsg-2ubuntu6) ...  
Selecting previously unselected package libgmp-dev:amd64.  
Preparing to unpack .../27-libgmp-dev_2%3a6.3.0+dfsg-2ubuntu6_amd64.deb ...  
Unpacking libgmp-dev:amd64 (2:6.3.0+dfsg-2ubuntu6) ...  
Selecting previously unselected package libssl-dev:amd64.  
Preparing to unpack .../28-libssl-dev_3.0.13-0ubuntu3.1_amd64.deb ...  
Unpacking libssl-dev:amd64 (3.0.13-0ubuntu3.1) ...  
Setting up binutils-common:amd64 (2.42-4ubuntu2) ...  
Setting up libctf-nobfd0:amd64 (2.42-4ubuntu2) ...  
Setting up m4 (1.4.19-4build1) ...  
Setting up libsframe1:amd64 (2.42-4ubuntu2) ...  
Setting up libgmpxx4ldbl:amd64 (2:6.3.0+dfsg-2ubuntu6) ...  
Setting up libquadmath0:amd64 (14-20240412-0ubuntu1) ...  
Setting up libssl-dev:amd64 (3.0.13-0ubuntu3.1) ...  
Setting up libfl2:amd64 (2.6.4-8.2build1) ...  
Setting up libubsan1:amd64 (14-20240412-0ubuntu1) ...  
Setting up libhwasa0:amd64 (14-20240412-0ubuntu1) ...  
Setting up libasan8:amd64 (14-20240412-0ubuntu1) ...  
Setting up bison (2:3.8.2+dfsg-1build2) ...  
update-alternatives: using /usr/bin/bison.yacc to provide /usr/bin/yacc (yacc) in auto mode  
Setting up libtsan2:amd64 (14-20240412-0ubuntu1) ...  
Setting up libbinutils:amd64 (2.42-4ubuntu2) ...  
Setting up libcc1-0:amd64 (14-20240412-0ubuntu1) ...  
Setting up liblsan0:amd64 (14-20240412-0ubuntu1) ...  
Setting up libitm1:amd64 (14-20240412-0ubuntu1) ...  
Setting up libctf0:amd64 (2.42-4ubuntu2) ...  
Setting up flex (2.6.4-8.2build1) ...  
Setting up libgmp-dev:amd64 (2:6.3.0+dfsg-2ubuntu6) ...  
Setting up libfl-dev:amd64 (2.6.4-8.2build1) ...  
Setting up libgprofng0:amd64 (2.42-4ubuntu2) ...  
Setting up libgcc-13-dev:amd64 (13.2.0-23ubuntu4) ...  
Setting up binutils-x86-64-linux-gnu (2.42-4ubuntu2) ...  
Setting up gcc-13-x86-64-linux-gnu (13.2.0-23ubuntu4) ...  
Setting up binutils (2.42-4ubuntu2) ...  
Setting up gcc-13 (13.2.0-23ubuntu4) ...  
Setting up gcc-x86-64-linux-gnu (4:13.2.0-7ubuntu1) ...  
Setting up gcc (4:13.2.0-7ubuntu1) ...  
Processing triggers for libc-bin (2.39-0ubuntu8.2) ...  
Processing triggers for man-db (2.12.0-4build2) ...  
Processing triggers for install-info (7.1-3build2) ...  
deva@deva-star:~$
```

## ❖ Installation of Stanford PBC library:

- wget <http://crypto.stanford.edu/pbc/files/pbc-0.5.14.tar.gz>
- Tar xf pbc-0.5.14.tar.gz
- cd pbc-0.5.14
- sudo ./configure
- sudo make
- sudo make install

Output for successful installation of PBC library:

```
libtool: install: /usr/bin/install -c .libs/libpbc.lai /usr/local/lib/libpbc.la
libtool: install: /usr/bin/install -c .libs/libpbc.a /usr/local/lib/libpbc.a
libtool: install: chmod 644 /usr/local/lib/libpbc.a
libtool: install: ranlib /usr/local/lib/libpbc.a
libtool: finish: PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/snap/bin:/sbin" ldconfig -n /usr/local/lib
-----
Libraries have been installed in:
  /usr/local/lib

If you ever happen to want to link against installed libraries
in a given directory, LIBDIR, you must either use libtool, and
specify the full pathname of the library, or use the '-LLIBDIR'
flag during linking and do at least one of the following:
- add LIBDIR to the 'LD_LIBRARY_PATH' environment variable
  during execution
- add LIBDIR to the 'LD_RUN_PATH' environment variable
  during linking
- use the '-Wl,-rpath -Wl,LIBDIR' linker flag
- have your system administrator add LIBDIR to '/etc/ld.so.conf'

See any operating system documentation about shared libraries for
more information, such as the ld(1) and ld.so(8) manual pages.
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test -z "/usr/local/include/pbc" || /usr/bin/mkdir -p "/usr/local/include/pbc"
/usr/bin/install -c -m 644 include/pbc_a1_param.h include/pbc_a_param.h include/pbc_curve.h include/pbc_d_param.h include/pbc_e_param.h include/pbc_field.h include/pbc_multiz.h includ
e/pbc_z.h include/pbc_fieldquadratic.h include/pbc_f_param.h include/pbc_g_param.h include/pbc_i_param.h include/pbc_fp.h include/pbc_ternary_extension_field.h include/pbc.h include/pb
c_hilbert.h include/pbc_memory.h include/pbc_mnt.h include/pbc_pairing.h include/pbc_param.h include/pbc_poly.h include/pbc_random.h include/pbc_singular.h include/pbc_test.h include/p
bc_utils.h /usr/local/include/pbc
make[2]: Leaving directory '/home/deva/pbc-0.5.14'
make[1]: Leaving directory '/home/deva/pbc-0.5.14'
Making install in example
make[1]: Entering directory '/home/deva/pbc-0.5.14/example'
make[2]: Entering directory '/home/deva/pbc-0.5.14/example'
make[2]: Nothing to be done for 'install-exec-am'.
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/home/deva/pbc-0.5.14/example'
make[1]: Leaving directory '/home/deva/pbc-0.5.14/example'
Making install in gen
make[1]: Entering directory '/home/deva/pbc-0.5.14/gen'
make[2]: Entering directory '/home/deva/pbc-0.5.14/gen'
make[2]: Nothing to be done for 'install-exec-am'.
make[2]: Nothing to be done for 'install-data-am'.
make[2]: Leaving directory '/home/deva/pbc-0.5.14/gen'
make[1]: Leaving directory '/home/deva/pbc-0.5.14/gen'
deva@deva-star:~/pbc-0.5.14$
```