

file `x10-<version>_<platform>.tgz` is renamed to simply `x10.tgz`. `cd` into the directory where you have downloaded `x10.tgz` file and use the following commands to extract it:

```
1 $ mkdir x10; mv x10.tgz x10
2 $ cd x10; tar -xvf x10.tgz
```

This will result in a directory named `x10` (inside the directory where you downloaded the archive) which contains a directory named `bin` that contains the executables to invoke the X10 Java and C++ compilers. We recommend that you add this `bin` directory to your system's `PATH` environment variable (The following examples to invoke the X10 compiler assume that the `PATH` contains this `bin` directory).

The following set of commands show how to compile the `drv_bubble_x10.x10` generated for our example by the `MIX10` compiler. We assume that you have completed the required steps described in section 1.3.5 and your present working directory is the `output` directory containing the `.x10` file.

Compiling and executing the `.x10` file using the Java backend:

```
1 #compiling
2 $ x10c -O drv_bubble_x10.x10
3 #executing
4 $ x10 drv_bubble_x10
```

Compiling and executing the `.x10` file using the C++ backend:

```
1 #compiling
2 $ x10c++ -O drv_bubble_x10.x10 -o drv_bubble_x10
3 #executing
4 $ ./drv_bubble_x10
```

3. **Using the column-major layout for the arrays:** As described in the section 4.1.1 of the paper, we made changes to the X10 source code to use column-major indexing in place of the default row-major indexing. Note that all the X10 programs, except those that explicitly rely on the internal row-major ordering of the arrays, would work correctly with both the default X10 that uses row-major indexing and our modified version that uses column-major indexing.

In order to use our modification, you need to first download the X10 compiler source code available from the SVN repository and can be downloaded with the following command:

```
1 $ svn co https://svn.code.sourceforge.net/p/x10/code/trunk x10-trunk
```

To apply the changes to use column-major indexing, replace the `Array_2.x10` and `Array_3.x10` files present in the `x10-trunk/x10.runtime/src-x10/x10/array` directory of the X10 compiler source code, by our version of these files available from our website: http://www.sable.mcgill.ca/mclab/mix10/x10_update/. Then Compile the X10 source code as per the detailed instructions given on the X10 webpage: <http://x10-lang.org/x10-development/building-x10-from-source.html>. After compilation, the `bin` directory containing the compiler executables is located inside the directory `x10-trunk/x10.dist/`. Add this `bin` directory to the path (in place of the previous one described above) and use the same commands to compile and run the `.x10` files as described above.