

Ten Simple Rules for Making Research Software More Robust: The Checklist

- Use version control.**
 - Put everything that you write or make into version control as soon as it is created.
 - Use a feature branch workflow.
- Document your code and usage.**
 - Write a good README file.
 - Print usage information.
- Make common operations easy to control.**
 - Allow the most commonly changed parameters to be configured from the command line.
 - Check that all input values are in a reasonable range at startup.
 - Choose reasonable defaults where they exist.
 - Set no defaults at all when there aren't any reasonable ones.
- Version your releases.**
 - Increment your version number every time you release your software to other people.
 - Make the version of your software easily available by supplying `--version` or `-v` on the command line.
 - Include the version number in all of the program's output.
 - Ensure that old released versions continue to be available.
- Reuse software (within reason).**
 - Make sure that you really need the auxiliary program.
 - Ensure the appropriate software and version is available.
 - Ensure that reused software is robust.
- Rely on build tools and package managers for installation.**
 - Document all dependencies in a machine-readable form.
 - Avoid depending on scripts and tools which are not available as packages.
- Do not require root or other special privileges to install or run.**
 - Do not require root privileges to set up or use packages.
 - Allow packages to be installed in an arbitrary location.
 - Ask another person to try and build your software before releasing it.
- Eliminate hard-coded paths.**
 - Set the names and locations of input and output files as command-line parameters.
 - Do not require users to navigate to a particular directory to do their work.
- Include a small test set that can be run to ensure the software is actually working.**
 - Make the tests easy to find and run.
 - Make the test script's output easy to interpret.
- Produce identical results when given identical inputs.**
 - Echo all parameters and software versions to standard out or a log file alongside the results.
 - Produce the same results each time the same version of the program is run with the same inputs.
 - Allow the user to optionally provide the random seed as an input parameter.
 - Make sure acceptable tolerances are known and detailed in documentation and tests.