

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

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- ☐ **Use version control.**
 - ☐ Put everything created manually into version control as soon as it is created.
 - ☐ Use a feature branch workflow.
 - ☐ Tag your releases.
- ☐ **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 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 test script 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.