

07 September 2016

Dear SPICE class participants,

This note announces the availability of the “hands-on” programming lessons that will be used during the upcoming SPICE class at ESAC on September 12-15. In past classes the students have found that doing these programming lessons is the most useful part of the class.

It is important that, before coming to the class, you download the appropriate set of lessons and place lesson instruction documents within your SPICE Toolkit as described below. Doing it this way will make the lessons much easier to use during the class by enabling hyperlinks found in the lessons.

We provide eight lessons, with separate versions for Unix (including Mac), as .tar files, and for Windows, as .zip files. Thus there are sixteen packages available, of which you should download only eight—eight .tar or eight .zip. The packages are available here:

ftp://spiftp.esac.esa.int/workshops/2016_09_ESAC_BASIC_TRAINING/Lessons/

The coding part of the “Remote Sensing” and “Events Finding” lessons provided at this location is done using ExoMars 2016 as the example. (The versions of these lessons that are available at the NAIF website use Cassini and MEX as the examples.)

You can download and un-tar/un-zip the packages at any location of your choice on your computer. Un-taring/un-zipping a lesson package will create a directory with that lesson’s name with lesson files and all needed kernels. We recommend that you make that directory your working directory in which you will write your code and create meta-kernel files for this lesson.

Each lesson package contains the lesson files for all four programming languages—you’ll use just the ones for your language of choice, ignoring the versions for the other three languages.

The instructions files are provided in both plain text and HTML. The plain text versions may be used from anywhere on your computer, but NAIF strongly suggests you use the HTML versions as these include many convenient hyperlinks to Toolkit documentation and module headers. In order to have these hyperlinks work you must create a “lessons” subdirectory under the “/doc/html” directory of your Toolkit and copy each lesson file for your language of choice to that “lessons” subdirectory. Having done that, to view the instructions for any particular lesson, simply open the lesson HTML file in your web browser.

The lessons are all “open book” in nature. We present a problem overview, provide some tips about doing it, and then state the specific questions. After that, we provide our answers, including, where applicable, our code and the numeric results from executing the code. The lessons also contain the kernels needed for the lessons. We suggest you not look ahead to our

answers, but instead use the tutorials and various Toolkit resources to help you come up with your own answers. If you get stuck the instructors will be available to give you suggestions about how to proceed: don't hesitate to raise your hand for some help if you are struggling.

The first two lessons, "Navigating Through the SPICE Components" and "Basics: Building SPICE Applications" are introductory exercises designed to acquaint you with working with Toolkit components and related resources.

The third lesson, "Remote Sensing," is the one where you will try writing code. This lesson is broken up into five pieces ("tasks") interleaved with tutorial lectures. Each "task" contains the problem statement, a diagram illustrating the problem, some tips, and the SPICE kernels needed. After all that comes our own code solutions and numeric answers.

We include four additional lessons: "Binary PCK," "Event Finding," "Other Stuff," and "Toolkit Programs" that you'll not be asked to do during the class, but you can do these during any free time or later on.

One additional lesson, "Lessons WGC," contains instructions for doing many of the lessons using the WebGeocalc tool.

During the class you are welcome to do the lessons on your own, or to work as a team with one or two colleagues—whatever works best for you.

We have allocated 60 minutes for most of the coding tasks. Some of you will find this to be too long, and some may find it not enough. We tried to pick a happy medium. Don't let yourself get totally hung up on any task: first ask an instructor for some help, and if that doesn't work, go ahead and peak at the included answers as much as needed to keep going. At the end of the 60 minutes we have to move on to the next lecture.

If you finish a task early we have now included some "extra credit" questions that should keep you busy a bit longer. Or you could use "Lessons WGC" to try to do the task using WebGeocalc. And of course you're free to experiment yourselves by changing the task statement a bit and seeing what is the result.

If you finish a task and the extra credit work or WGC version early and are at loose ends, please keep any conversations as quiet as possible so as not to disturb the other students. You could also begin filling out the optional feedback form, intended to help ESA and NASA improve the SPICE system and future SPICE training classes.