Exception Handling

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## (Class version)

SPICE "Errors"

- **Most "errors" made while using SPICE result from a mistake in how you are trying to use SPICE code, or in how you are trying to use SPICE files**
  - **It's rare that a SPICE user finds an error within SPICE Toolkit code**

- **The SPICE "exception handling subsystem" helps detect user's errors**

- **All "errors" detected by SPICE result in a SPICE error message**
  - **Such errors will never make your program crash**

- **A program crash indicates an error in your own code, a corrupted SPICE kernel, or (rarely) a SPICE bug**
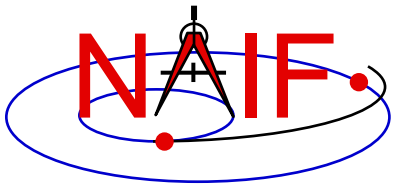
What is "Exception Handling"?

- **Most SPICE APIs contain code designed to detect and act on what appear to be erroneous inputs, or unanswerable requests for SPICE data**
    - **Some examples:**
        - » **A request to obtain spacecraft trajectory data from outside the time bounds (the coverage) of a loaded SPK file**
        - » **A request to obtain orientation for a body (e.g. a newly discovered satellite) for which such data does not exist in a loaded PCK file**
        - » **A request to rotate a vector into a reference frame that is unknown to, or not fully defined, in a user's program**
        - » **Divide by zero, or take the square root of a negative number**
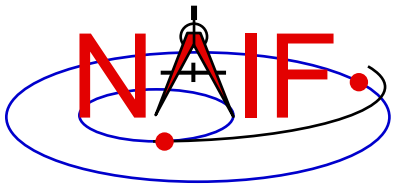
Navigation and Ancillary Information Facility

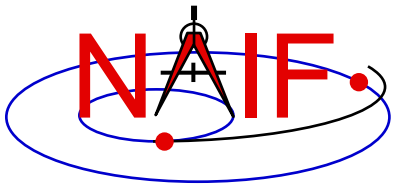- **When such "errors" occur, SPICE will normally display details about the problem.**

- **Example when reading an SPK file:**

```
SPICE(SPKINSUFFDATA)

Insufficient ephemeris data has been loaded to compute the
state of 301 (MOON) relative to 399 (EARTH) at the ephemeris
epoch 2060 JAN 01 00:00:00.000.

"user's routine" --> spkezr_c --> SPKEZR --> SPKEZ --> SPKGEO
```
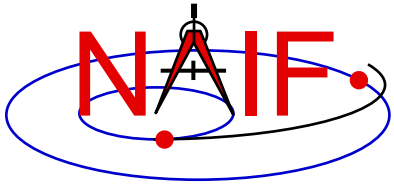
- **As shown above, you see both an "error" description and a traceback showing where the "error" was detected**

  – **In this example, the loaded ephemeris file did not extend all the way forward to (did not have coverage for) the beginning of year 2060**

- **With some experience and thought you can often understand and correct a SPICE-related problem by yourself**

- **Some of the more common problems are described in the BACKUP sections of the on-line SPK and CK tutorials, in the "Common Problems" tutorial, and in the "Problems" Required Reading technical reference document**

  - **That Problems Required Reading document is also available at this website:**

    https://naif.jpl.nasa.gov/pub/naif/toolkit_docs/FORTRAN/req/problems.html

What to do?

- **If you are unable to resolve a problem indicated by a SPICE error message, use email to contact a SPICE specialist for your space agency for help**
  - **Send him or her the SPICE error message you've encountered**
  - **It's usually necessary to also identify the kernels being used, and perhaps even provide copies of them if they are not readily available to the specialist**
  - **You may also be asked for your code where the problem seems to occur and identification of the compiler, operating system and Toolkit version being used**