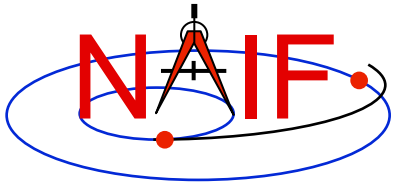


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Exception Handling

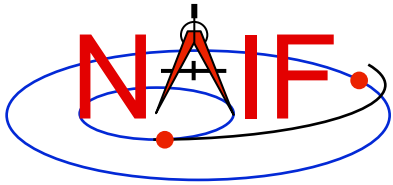
April 2016



SPICE “Errors”

Navigation and Ancillary Information Facility

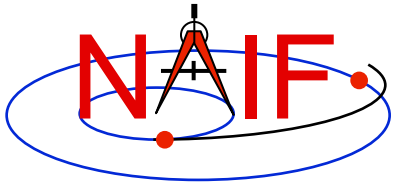
- **Most “errors” made while using SPICE result from a mistake in how you are trying to use SPICE code, or in how you are trying to use SPICE files**
 - It’s pretty rare that a SPICE user finds an error within SPICE code
- **The SPICE “exception handling subsystem” helps detect user’s errors**
- **All “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”?

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- **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**
- **Several actions are possible; here we describe only the most common**
 - **The Error Required Reading document covers all the details**



What Happens?

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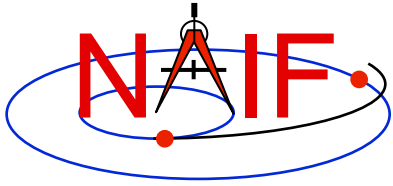
- When such “errors” occur, SPICE will normally display details about the problem.
- Example when reading an SPK file:

```
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.
```

```
computeState --> spkezr_c --> SPKEZR --> SPKEZ --> SPKGEO
```

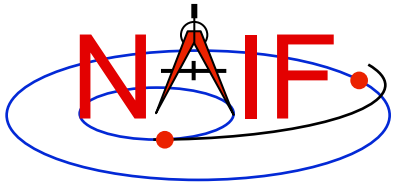
- As shown above, you see both an “error” description and a traceback showing where the “error” was detected
 - In this example, the loaded ephemeris file did not extend all the way to the year 2060



Understanding Error Messages

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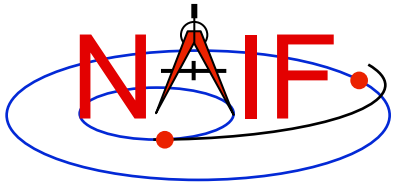
- **With some experience and thought you can often understand and correct the problem by yourself**
- **Some of the more common problems are described in the BACKUP sections of the on-line SPK and CK tutorials, and in the “Common Problems” tutorial and the “Common Problems” Required Reading technical reference document**



What to do?

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- **If you are unable to resolve a problem indicated by a SPICE error message you can contact a SPICE specialist for help**
 - Send him 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



Additional Information on Exception Handling

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- **For more information look at the following:**
 - The on-line (full) Exceptions tutorial
 - Error Required Reading document
 - Headers of the subroutines `ERRACT`, `ERRDEV`, `ERRPRT` (Fortran and C only)
 - » These routines can be used to configure error handling behavior