

CS1110 Introduction to Systematic Programming

Ada Exceptions

This hand-out gives a brief description of the most common Ada run-time exceptions. When a run-time error occurs, an **exception is raised**. Normally this causes the program to terminate (unless the program includes code for error recovery or **exception handling**). The type of exception raised gives some clues as to the cause of the run-time error.

<code>Program_Error</code>	raised when an attempt is made to violate proper program control. For example running into the <code>END</code> statement of a function (see Unit 14) -- execution of a function must terminate with a <code>RETURN</code> statement. Can also occur during program elaboration by the bind file, if a procedure from a package is called before the package is elaborated.
<code>Constraint_Error</code>	raised when a value goes out of its allowed range. For example an array subscript is out of bounds, that is too large or too small for the specified range (see Unit 11) or when an attempt is made to assign an out-of-range value to a <code>SUBTYPE</code> variable (see Unit 15). It is also raised when there are problems in integer arithmetic for example a division by zero error or an overflow error raised when an integer result is too large to be stored as a 32 bit twos-complement value.
<code>Storage_Error</code>	raised when the program runs out of available memory, for example when large numbers of massive arrays (see Unit 11) are declared or when dynamic storage allocation is used (see DSA course CS1210).

Exceptions from the package `Ada.IO_Exceptions`

The following may be raised when calling procedure and functions exported by the packages `Ada.Text_IO`, `CS_Int_IO`, `CS_Float_IO` and `CS_File_IO` (and other I/O packages).

<code>Data_Error</code>	raised during input when a value encountered in the input stream is of the wrong type. For example a character value when a number is expected.
<code>End_Error</code>	raised during input when there is an attempt to input data after the end of the input file has been reached.
<code>Name_Error</code>	raised when opening a file for input or output when there is an error in the file-name supplied or when the file permissions do not permit the requested access.
<code>Mode_Error</code>	raised when attempting to input from a file which has been opened for output or attempting to output to a file which has been opened for input. Unlikely to occur with file I/O using the package <code>CS_File_IO</code> , but may occur when using the facilities for opening files in <code>Ada.Text_IO</code> .
<code>Status_Error</code>	raised when a file is open when it should be closed or vice-versa. For example attempting to open a file which is already open or attempting to close a file which is not open. May occur with file I/O using the package <code>CS_File_IO</code> if <code>CloseInput/CloseOutput</code> is called more than once without an intervening <code>OpenInput/OpenOutput</code> call. May also occur when using the facilities for opening files in <code>Ada.Text_IO</code> .