In [1]: `#Q1`

In [1]:
```
#Custom exceptions enhance the usability of a class. An exception class should have
#It is completely up to us what we want our custom error class to do.
#In Python, we have the ability to create our own exception classes.
#The construction of custom exception classes can enrich our class design. A custom
#It is up to us what the exception class does, although a custom class will not usu
```

In [2]: `#Q2`

In [3]:
```python
# import inspect module
import inspect

# our treeClass function
def treeClass(cls, ind = 0):

      # print name of the class
    print ('-' * ind, cls.__name__)

    # iterating through subclasses
    for i in cls.__subclasses__():
        treeClass(i, ind + 3)

print("Hierarchy for Built-in exceptions is : ")

# inspect.getmro() Return a tuple
# of class  cls's base classes.

# building a tree hierarchy
inspect.getclasstree(inspect.getmro(BaseException))

# function call
treeClass(BaseException)
```

```
Hierarchy for Built-in exceptions is :
 BaseException
--- Exception
------ TypeError
--------- FloatOperation
--------- MultipartConversionError
------ StopAsyncIteration
------ StopIteration
------ ImportError
--------- ModuleNotFoundError
--------- ZipImportError
------ OSError
--------- ConnectionError
------------ BrokenPipeError
------------ ConnectionAbortedError
------------ ConnectionRefusedError
------------ ConnectionResetError
--------------- RemoteDisconnected
--------- BlockingIOError
--------- ChildProcessError
--------- FileExistsError
--------- FileNotFoundError
--------- IsADirectoryError
--------- NotADirectoryError
--------- InterruptedError
------------ InterruptedSystemCall
--------- PermissionError
--------- ProcessLookupError
--------- TimeoutError
--------- UnsupportedOperation
--------- itimer_error
--------- herror
--------- gaierror
--------- SSLError
------------ SSLCertVerificationError
------------ SSLZeroReturnError
------------ SSLWantWriteError
------------ SSLWantReadError
------------ SSLSyscallError
------------ SSLEOFError
--------- Error
------------ SameFileError
--------- SpecialFileError
--------- ExecError
--------- ReadError
--------- URLError
------------ HTTPError
------------ ContentTooShortError
--------- BadGzipFile
------ EOFError
--------- IncompleteReadError
------ RuntimeError
--------- RecursionError
--------- NotImplementedError
------------ ZMQVersionError
------------ StdinNotImplementedError
```

```
--------- _DeadlockError
--------- BrokenBarrierError
--------- BrokenExecutor
------------ BrokenThreadPool
--------- SendfileNotAvailableError
--------- ExtractionError
--------- VariableError
------ NameError
--------- UnboundLocalError
------ AttributeError
--------- FrozenInstanceError
------ SyntaxError
--------- IndentationError
------------ TabError
------ LookupError
--------- IndexError
--------- KeyError
------------ NoSuchKernel
------------ UnknownBackend
--------- CodecRegistryError
------ ValueError
--------- UnicodeError
------------ UnicodeEncodeError
------------ UnicodeDecodeError
------------ UnicodeTranslateError
--------- UnsupportedOperation
--------- JSONDecodeError
--------- SSLCertVerificationError
--------- Error
--------- UnsupportedDigestmodError
--------- IllegalMonthError
--------- IllegalWeekdayError
--------- ParserError
--------- ClassNotFound
--------- ClipboardEmpty
--------- MessageDefect
------------ NoBoundaryInMultipartDefect
------------ StartBoundaryNotFoundDefect
------------ CloseBoundaryNotFoundDefect
------------ FirstHeaderLineIsContinuationDefect
------------ MisplacedEnvelopeHeaderDefect
------------ MissingHeaderBodySeparatorDefect
------------ MultipartInvariantViolationDefect
------------ InvalidMultipartContentTransferEncodingDefect
------------ UndecodableBytesDefect
------------ InvalidBase64PaddingDefect
------------ InvalidBase64CharactersDefect
------------ InvalidBase64LengthDefect
------------ HeaderDefect
--------------- InvalidHeaderDefect
--------------- HeaderMissingRequiredValue
--------------- NonPrintableDefect
--------------- ObsoleteHeaderDefect
--------------- NonASCIILocalPartDefect
--------------- InvalidDateDefect
--------- MacroToEdit
```

```
--------- InvalidFileException
--------- UnequalIterablesError
--------- InvalidVersion
--------- _InvalidELFFileHeader
--------- InvalidWheelFilename
--------- InvalidSdistFilename
--------- InvalidSpecifier
--------- InvalidMarker
--------- UndefinedComparison
--------- UndefinedEnvironmentName
--------- InvalidRequirement
----------- RequirementParseError
--------- InvalidVersion
------ AssertionError
------ ArithmeticError
--------- FloatingPointError
--------- OverflowError
--------- ZeroDivisionError
----------- DivisionByZero
----------- DivisionUndefined
--------- DecimalException
----------- Clamped
----------- Rounded
-------------- Underflow
-------------- Overflow
----------- Inexact
-------------- Underflow
-------------- Overflow
----------- Subnormal
-------------- Underflow
----------- DivisionByZero
----------- FloatOperation
----------- InvalidOperation
-------------- ConversionSyntax
-------------- DivisionImpossible
-------------- DivisionUndefined
-------------- InvalidContext
------ SystemError
--------- CodecRegistryError
------ ReferenceError
------ MemoryError
------ BufferError
------ Warning
--------- UserWarning
----------- GetPassWarning
----------- FormatterWarning
--------- EncodingWarning
--------- DeprecationWarning
----------- ProvisionalWarning
--------- PendingDeprecationWarning
--------- SyntaxWarning
--------- RuntimeWarning
----------- ProactorSelectorThreadWarning
----------- UnknownTimezoneWarning
----------- PEP440Warning
--------- FutureWarning
```

```
------------ ProvisionalCompleterWarning
--------- ImportWarning
--------- UnicodeWarning
--------- BytesWarning
--------- ResourceWarning
--------- DeprecatedTzFormatWarning
--------- PkgResourcesDeprecationWarning
------ _OptionError
------ _Error
------ error
------ Verbose
------ Error
------ SubprocessError
--------- CalledProcessError
--------- TimeoutExpired
------ TokenError
------ StopTokenizing
------ ClassFoundException
------ EndOfBlock
------ TraitError
------ Error
------ Error
--------- CancelledError
--------- TimeoutError
--------- InvalidStateError
------ _GiveupOnSendfile
------ error
------ Incomplete
------ TimeoutError
------ InvalidStateError
------ LimitOverrunError
------ QueueEmpty
------ QueueFull
------ Empty
------ Full
------ ArgumentError
------ ZMQBaseError
--------- ZMQError
------------ ContextTerminated
------------ Again
------------ InterruptedSystemCall
--------- ZMQBindError
--------- NotDone
------ PickleError
--------- PicklingError
--------- UnpicklingError
------ _Stop
------ ArgumentError
------ ArgumentTypeError
------ ConfigError
--------- ConfigLoaderError
------------ ArgumentError
--------- ConfigFileNotFound
------ ConfigurableError
--------- MultipleInstanceError
------ ApplicationError
```

```
------ error
------ TimeoutError
------ error
------ ReturnValueIgnoredError
------ KeyReuseError
------ UnknownKeyError
------ LeakedCallbackError
------ BadYieldError
------ ReturnValueIgnoredError
------ Return
------ InvalidPortNumber
------ error
------ LZMAError
------ RegistryError
------ _GiveupOnFastCopy
------ Error
--------- NoSectionError
--------- DuplicateSectionError
--------- DuplicateOptionError
--------- NoOptionError
--------- InterpolationError
------------ InterpolationMissingOptionError
------------ InterpolationSyntaxError
------------ InterpolationDepthError
--------- ParsingError
------------ MissingSectionHeaderError
------ NoIPAddresses
------ BadZipFile
------ LargeZipFile
------ BadEntryPoint
------ NoSuchEntryPoint
------ DuplicateKernelError
------ ErrorDuringImport
------ NotOneValueFound
------ CannotEval
------ OptionError
------ BdbQuit
------ Restart
------ ExceptionPexpect
--------- EOF
--------- TIMEOUT
------ PtyProcessError
------ FindCmdError
------ HomeDirError
------ ProfileDirError
------ IPythonCoreError
--------- TryNext
--------- UsageError
--------- StdinNotImplementedError
------ InputRejected
------ GetoptError
------ ErrorToken
------ PrefilterError
------ AliasError
--------- InvalidAliasError
------ Error
```

```
--------- InterfaceError
--------- DatabaseError
------------ InternalError
------------ OperationalError
------------ ProgrammingError
------------ IntegrityError
------------ DataError
------------ NotSupportedError
------ Warning
------ SpaceInInput
------ DOMException
--------- IndexSizeErr
--------- DomstringSizeErr
--------- HierarchyRequestErr
--------- WrongDocumentErr
--------- InvalidCharacterErr
--------- NoDataAllowedErr
--------- NoModificationAllowedErr
--------- NotFoundErr
--------- NotSupportedErr
--------- InuseAttributeErr
--------- InvalidStateErr
--------- SyntaxErr
--------- InvalidModificationErr
--------- NamespaceErr
--------- InvalidAccessErr
--------- ValidationErr
------ ValidationError
------ EditReadOnlyBuffer
------ _Retry
------ InvalidLayoutError
------ HeightIsUnknownError
------ ParserSyntaxError
------ InternalParseError
------ _PositionUpdatingFinished
------ SimpleGetItemNotFound
------ UncaughtAttributeError
------ HasNoContext
------ ParamIssue
------ _JediError
--------- InternalError
--------- WrongVersion
--------- RefactoringError
------ OnErrorLeaf
------ InvalidPythonEnvironment
------ MessageError
--------- MessageParseError
------------ HeaderParseError
------------ BoundaryError
--------- MultipartConversionError
--------- CharsetError
------ Error
------ HTTPException
--------- NotConnected
--------- InvalidURL
--------- UnknownProtocol
```

```
--------- UnknownTransferEncoding
--------- UnimplementedFileMode
--------- IncompleteRead
--------- ImproperConnectionState
------------ CannotSendRequest
------------ CannotSendHeader
------------ ResponseNotReady
--------- BadStatusLine
------------ RemoteDisconnected
--------- LineTooLong
------ InteractivelyDefined
------ KillEmbedded
------ Error
--------- NoSuchProcess
------------ ZombieProcess
--------- AccessDenied
--------- TimeoutExpired
------ _Ipv6UnsupportedError
------ QueueEmpty
------ QueueFull
------ DebuggerInitializationError
------ ExpatError
------ Error
--------- ProtocolError
--------- ResponseError
--------- Fault
------ ParseBaseException
--------- ParseException
--------- ParseFatalException
------------ ParseSyntaxException
------ RecursiveGrammarException
------ ResolutionError
--------- VersionConflict
------------ ContextualVersionConflict
--------- DistributionNotFound
--------- UnknownExtra
------ _Error
------ UnableToResolveVariableException
------ InvalidTypeInArgsException
--- GeneratorExit
--- SystemExit
--- KeyboardInterrupt
--- CancelledError
--- AbortThread
```

In [4]:
```python
#Q3
```

In [14]:
```python
#ArithmeticError is simply an error that occurs during numeric calculations. Arithm

#EX1 Zero division error

print (1/0)
```

```
-----------------------------------------------------------------------
ZeroDivisionError                               Traceback (most recent call last)
Cell In[14], line 5
      1 #ArithmeticError is simply an error that occurs during numeric calculation
s. ArithmeticError types in Python include 1) OverFlowError2)ZeroDivisionError 3)F
loating point error
      2
      3 #EX1
----> 5 print (1/0)

ZeroDivisionError: division by zero
```

In [9]:
```python
#EX 2 overflow error

import math
print (math.exp(1000))
```

```
-----------------------------------------------------------------------
OverflowError                                   Traceback (most recent call last)
Cell In[9], line 4
      1 #EX
      3 import math
----> 4 print (math.exp(1000))

OverflowError: math range error
```

In [15]:
```python
#Q4
```

In [16]:
```python
#This is the base class for those exceptions that are raised when a key or index us
#The exceptions raised are :
#1)KeyError
#2)IndexError
#Ex Index error:

try:
    a = [1, 2, 3]
    print (a[3])
except LookupError:
    print ("Index out of bound error.")
else:
    print ("Success")
```

```
Index out of bound error.
```

In [20]:
```python
#Ex key error:-
gender = {"June" : "female", "John" : "male" , "Kim": "female"}
gender["James"]
```

```
-----------------------------------------------------------------------
KeyError                                        Traceback (most recent call last)
Cell In[20], line 2
      1 gender = {"June" : "female", "John" : "male" , "Kim": "female"}
----> 2 gender["James"]

KeyError: 'James'
```

In [21]: #Q5

In [24]:
```
# An ImportError is raised when the import statement is unable to load a module or

# Ex
from exceptions import Userexception
```

```
---------------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
Cell In[24], line 4
      1 # An ImportError is raised when the import statement is unable to load a m
odule or when the "from list" in from … import has a name that cannot be found.
      2
      3 # Ex
----> 4 from exceptions import Userexception

ModuleNotFoundError: No module named 'exceptions'
```

In [23]:
```
#Module not found error:This is the subclass of ImportError which is raised by impo

import module_does_not_exist
```

```
---------------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
Cell In[23], line 3
      1 #Module not found error:This is the subclass of ImportError which is raise
d by import when a module could not be found. It is also raised when None is found
in sys.modules.
----> 3 import module_does_not_exist

ModuleNotFoundError: No module named 'module_does_not_exist'
```

In [25]: #Q6

In [26]:
```
#1.Use Exceptions for Exceptional Cases. ...
#2.Don't Swallow the Exception. ...
#3.Catch Specific Exceptions. ...
#4.Always Clean Up Resources in a Finally Block. ...
#5.Avoid Raising Generic Exceptions. ...
#6.Raise Custom Exceptions. ...
#7.Define Your Own Exception Hierarchy. ...
#8.Document All Exceptions Thrown by a Function.
#9.Provide Contextual Information When Raising an Exception
#10.Write Tests to Ensure That Exceptions Are Raised Correctly
```

In [ ]: