

Q1. Explain why we have to use the Exception class while creating a Custom Exception.

```
In [1]: # Ans- Built-in exceptions offer information about Python-related problems,
# and custom exceptions will add information about project-related problems.
# That means you can design your code (and traceback, if an exception is raised)
# in a way that combines Python code with the language of the project.
```

Q2. Write a python program to print Python Exception Hierarchy.

```
In [2]: # Ans--To print the tree hierarchy, we can use inspect module of Python.
# The inspect module is used for getting information about objects like modules,
# classes, methods, functions, and objects of the program.
# Such as, the users can use it for examining the contents of a class, extracting,
# and formatting the argument list for a function.
```

python program to print Python Exception Hierarchy

```
In [3]: import inspect as ipt

def tree_class(cls, ind = 0):
    print ('-' * ind, cls.__name__)
    for K in cls.__subclasses__():
        tree_class(K, ind + 3)

print ("The Hierarchy for inbuilt exceptions is: ")

ipt.getclasstree(ipt.getmro(BaseException))

tree_class(BaseException)

The Hierarchy for inbuilt 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
-- error
-- gaierror
-- timeout
-- SSLError
-- SSLCertVerificationError
-- SSLZeroReturnError
-- SSLWantReadError
-- SSLWantWriteError
-- SSLSyscallError
-- SSLEOFError
-- Error
-- SameFileError
-- SpecialFileError
-- ExecError
-- ReadError
-- URLError
-- HTTPError
-- ContentTooShortError
-- BadGzipFile
-- EOFError
-- IncompleteReadError
-- RuntimeError
-- RecursionError
-- NotImplementedError
-- ZMQVersionError
-- StdinNotImplementedError
-- DeadlineError
-- BrokenBarrierError
-- BrokenExecutor
-- BrokenThreadPool
-- SendfileNotAvailableError
-- ExtractionError
-- VariableError
-- NameError
-- UnboundLocalError
-- AttributeError
-- FrozenInstanceError
-- SyntaxError
-- IndentationError
-- TabError
-- LookupError
-- IndexError
-- KeyError
-- NoSuchKernel
-- UnknownBackend
-- CodecRegistryError
-- ValueError
-- UnicodeError
-- UnicodeDecodeError
-- UnicodeDecodeError
-- UnicodeTranslateError
-- UnsupportedOperation
-- JSONDecodeError
-- SSLCertVerificationError
-- Error
-- IllegalMonthError
-- IllegalWeekdayError
-- ParserError
-- ClassNotFound
-- ClipboardEmpty
-- MessageDefect
-- NoBoundaryInMultipartDefect
-- StartBoundaryNotFoundDefect
-- CloseBoundaryNotFoundDefect
-- FirstHeaderLineContinuationDefect
-- MisplacedEnvelopeHeaderDefect
-- MissingHeaderBodySeparatorDefect
-- MultipartInvariantViolationDefect
-- InvalidMultipartContentTransferEncodingDefect
-- UndecodableBytesDefect
-- InvalidBase64PaddingDefect
-- InvalidBase64CharactersDefect
-- InvalidBase64LengthDefect
-- HeaderDefect
-- InvalidHeaderDefect
-- HeaderMissingRequiredValue
-- NonPrintableDefect
-- ObsoleteHeaderDefect
-- NonASCIILocalPartDefect
-- MacroToEdit
-- InvalidFileException
-- UnequalIterablesError
-- InvalidVersion
-- _InvalidELFFileHeader
-- InvalidWheelFilename
-- InvalidDistFilename
-- 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
-- DeprecationWarning
-- ProvisionalWarning
-- PendingDeprecationWarning
-- SyntaxWarning
-- RuntimeWarning
-- ProactorSelectorThreadWarning
-- UnknownTimezoneWarning
-- Pep4Warning
-- FutureWarning
-- ProvisionalCompleterWarning
-- ImportWarning
-- UnicodeWarning
-- BytesWarning
-- ResourceWarning
-- DeprecatedTzFormatWarning
-- PkgResourcesDeprecationWarning
-- Error
-- _OptionError
-- error
-- Verbose
-- _Error
-- SubprocessError
-- CalledProcessError
-- TimeoutExpired
-- TokenError
-- StopTokenizing
-- ClassFoundException
-- EndOfBlock
-- TraitError
-- Error
-- Error
-- CancelledError
-- TimeoutError
-- InvalidStateError
-- GiveupOnSendfile
-- error
-- Incomplete
-- TimeoutError
-- InvalidStateError
-- LimitOverrunError
-- QueueEmpty
-- QueueFull
-- error
-- LZMAError
-- RegistryError
-- GiveupOnFastCopy
-- Empty
-- Full
-- ZMQBaseError
-- ZMQError
-- ContextTerminated
-- Again
-- InterruptedSystemCall
-- ZMQBindError
-- NotDone
-- PickleError
-- PicklingError
-- UnpicklingError
-- _Stop
-- ArgumentError
-- ArgumentTypeError
-- ConfigError
-- ConfigLoaderError
-- ArgumentError
-- ConfigFileNotFound
-- ConfigurableError
-- MultipleInstanceError
-- ApplicationError
-- TimeoutError
-- COMError
-- ArgumentError
-- ReturnValueIgnoredError
-- KeyReuseError
-- UnknownKeyError
-- LeakedCallbackError
-- BadYieldError
-- ReturnValueIgnoredError
-- Return
-- InvalidPortNumber
-- NotIPAddresses
-- BadZipFile
-- LargeZipFile
-- Error
-- NoSectionError
-- DuplicateSectionError
-- DuplicateOptionError
-- NoOptionError
-- InterpolationError
-- InterpolationMissingOptionError
-- InterpolationSyntaxError
-- InterpolationDepthError
-- ParsingError
-- MissingSectionHeaderError
-- BadEntryPoint
-- NoSuchEntryPoint
-- DuplicateKernelError
-- ErrorDuringImport
-- BadQuit
-- Restart
-- FindCmdError
-- HomeDirError
-- ProfileDirError
-- IPythonCoreError
-- TryNext
-- UsageError
-- StdinNotImplementedError
-- InputRejected
-- GetoptError
-- OptparseError
-- ErrorToken
-- PrefilterError
-- AliasError
-- InvalidAliasError
-- Error
-- InterfaceError
-- DatabaseError
-- InternalError
-- OperationalError
-- ProgrammingError
-- IntegrityError
-- DataError
-- NotSupportedError
-- Warning
-- SpaceInInput
-- DOMException
-- IndexError
-- 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
-- NoSubProcess
-- AccessDenied
-- TimeoutExpired
-- Error
-- TimeoutExpired
-- TimeoutAbandoned
-- QueueEmpty
-- QueueFull
-- ExpatError
-- Error
-- ProtocolError
-- ResponseError
-- Fault
-- error
-- com_error
-- internal_error
-- ParseBaseException
-- ParseFatalException
-- ParseSyntaxException
-- RecursiveCommaException
-- ResolutionError
-- VersionConflict
-- ContextualVersionConflict
-- DistributionNotFound
-- UnknownExtra
-- UnableToResolveVariableException
-- InvalidTypeInArgsException
-- GeneratorExit
-- SystemExit
-- KeyboardInterrupt
-- CancelledError
-- DebuggerInitializationError
-- AbortThread
```

Q3. What errors are defined in the ArithmeticError class? Explain any two with an example.

```
In [1]: # Ans- The arithmetic error occurs when an error is encountered during numeric calculations in Python.
# This includes ZeroDivision Error and Floating point error.
```

```
In [2]: # example of arithmetic error class
try:
    arithmetic = 5/0
    print(arithmetic)
except ArithmeticError:
    print('You have just made an Arithmetic error!')

You have just made an Arithmetic error
```

Q4. Why LookupError class is used? Explain with an example KeyError and IndexError.

```
In [1]: # ans- The LookupError exception in Python forms the base class for all exceptions that are raised
# when an index or a key is not found for a sequence or dictionary respectively.
# A Python KeyError exception is what is raised when you try to access a key that isn't in a dictionary (dict).
# The Python KeyError is a type of LookupError exception and denotes that there was an issue
# retrieving the key you were looking for. When you see a KeyError,
# the semantic meaning is that the key being looked for could not be found.
```

Q5. Explain ImportError. What is ModuleNotFoundError?

```
In [2]: # Ans- ImportError occurs when the Python program tries to import module which does not exist in the private table.
# this error occurs when you're trying to access or use a module that cannot be found.
```

Q6. List down some best practices for exception handling in python.

```
In [3]: def process_positive_integer(number):
#         if number <= 0:
#             raise ValueError("Input must be a positive integer.")
#         return number * 2

try:
    result = process_positive_integer(-5)
except ValueError as e:
    print(f"An error occurred: {e}")
```

An error occurred: Input must be a positive integer.

```
In [4]: numbers = [1, 2, 3]

try:
    value = numbers[5]
except IndexError as e:
    print(f"An error occurred: {e}")
```

An error occurred: list index out of range

```
In [ ]: # there are many exception error in library
```