Fix undefined behavior in `Objects/genericaliasobject.c`.

Fix the column offsets for f-strings :mod:`ast` nodes surrounded by parentheses and for nodes that spawn multiple lines. Patch by Pablo Galindo.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 16); *backlink*

Unknown interpreted text role "mod".

Fix regression where a single parenthesized starred expression was a valid assignment target.

Improve the error message for failed writes/deletes to property objects. When possible, the attribute name is now shown. Patch provided by Yurii Karabas.

Make the type attribute lookup cache per-interpreter. Patch by Victor Stinner.

Jumps to jumps are not eliminated when it would break PEP 626.

Make sure that the `f_lasti` and `f_lineno` attributes of a frame are set correctly when an exception is raised or re-raised. Required for PEP 626.

The coding cookie (ex: `# coding: latin1`) is now ignored in the command passed to the :option:`-c` command line option. Patch by Victor Stinner.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 77); *backlink*

Unknown interpreted text role "option".

Improve error location in expressions that contain assignments. Patch by Pablo Galindo and Lysandros Nikolaou.

Remove jump commands made redundant by the deletion of unreachable bytecode blocks

Make the :mod:`atexit` module state per-interpreter. It is now safe have more than one :mod:`atexit` module instance. Patch by Dong-hee Na and Victor Stinner.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 107); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 107); *backlink*

Unknown interpreted text role "mod".

Fix encoding name when running a `.pyc` file on Windows: :c:func:`PyRun_SimpleFileExFlags()` now uses the correct encoding to decode the filename.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 118); *backlink*

Unknown interpreted text role "c:func".

The `__args__` of the parameterized generics for :data:`typing.Callable` and :class:`collections.abc.Callable` are now consistent. The `__args__` for :class:`collections.abc.Callable` are now flattened while :data:`typing.Callable`'s have not changed. To allow this change, :class:`types.GenericAlias` can now be subclassed and `collections.abc.Callable`'s `__class_getitem__` will now return a subclass of `types.GenericAlias`. Tests for typing were also updated to not subclass things like `Callable[..., T]` as that is not a valid base class. Finally, both `Callable`s no longer validate their `argtypes`, in `Callable[[argtypes], resulttype]` to prepare for PEP 612. Patch by Ken Jin.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 129); *backlink*

Unknown interpreted text role "data".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 129); *backlink*

Unknown interpreted text role "class".

Convert functools module to use :c:func:`PyType_FromModuleAndSpec`.

Convert :mod:`array` to use heap types, and establish module state for these.

Fix _random.Random() seeding.

Port the :mod:`pyexpat` extension module to multi-phase initialization (PEP 489).

Make the Unicode dictionary of interned strings compatible with subinterpreters. Patch by Victor Stinner.

Make :c:func:`_PyUnicode_FromId` function compatible with subinterpreters. Each interpreter now has an array of identifier objects (interned strings decoded from UTF-8). Patch by Victor Stinner.

Handle empty string in variable executable in platform.libc_ver()

randrange() now raises a TypeError when step is specified without a stop argument. Formerly, it silently ignored the step argument.

Fixed equality comparison of :class:`tkinter.Variable` and :class:`tkinter.font.Font`. Objects which belong to different Tcl interpreters are now always different, even if they have the same name.

Configure LMTP Unix-domain socket to use socket global default timeout when a timeout is not explicitly provided.

Allow / character in username, password fields on _PROXY envars.

:func:`typing.get_args` and :func:`typing.get_origin` now support PEP 604 union types and PEP 612 additions to `Callable`.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 256); *backlink***
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 256); *backlink***
>
> Unknown interpreted text role "func".

:mod:`subprocess` *extra_groups* is now correctly passed into setgroups() system call.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 266); *backlink***
>
> Unknown interpreted text role "mod".

EnumMeta.__prepare__ now accepts **kwds to properly support __init_subclass__

Add optional *weights* to *statistics.harmonic_mean()*.

When simple query dialogs (:mod:`tkinter.simpledialog`), message boxes (:mod:`tkinter.messagebox`) or color choose dialog (:mod:`tkinter.colorchooser`) are created without arguments *master* and *parent*, and the default root window is not yet created, and :func:`~tkinter.NoDefaultRoot` was not called, a new temporal hidden root window will be created automatically. It will not be set as the default root window and will be destroyed right after closing the dialog window. It will help to use these simple dialog windows in programs which do not need other GUI.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 295); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 295); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 295); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 295); *backlink***
>
> Unknown interpreted text role "func".

Optimized :meth:`collections.deque.remove`.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 312); *backlink***
>
> Unknown interpreted text role "meth".

Added a root parameter to :func:`tkinter.font.nametofont`.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 321); *backlink***
>
> Unknown interpreted text role "func".

:mod:`tkinter` supports now widgets with boolean value False.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 330); *backlink*
>
> Unknown interpreted text role "mod".

Fixed range checks for color and pair numbers in :mod:`curses`.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 339); *backlink*
>
> Unknown interpreted text role "mod".

Improved placing of simple query windows in Tkinter (such as :func:`tkinter.simpledialog.askinteger`). They are now centered at the center of the parent window if it is specified and shown, otherwise at the center of the screen.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 348); *backlink*
>
> Unknown interpreted text role "func".

Argparse help no longer uses the confusing phrase, "optional arguments". It uses "options" instead.

Port the :mod:`_thread` extension module to the multiphase initialization API (PEP 489) and convert its static types to heap types.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 370); *backlink*
>
> Unknown interpreted text role "mod".

Fix crash in :func:`tracemalloc.Traceback.__repr__` (regressed in Python 3.9).

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 380); *backlink*
>
> Unknown interpreted text role "func".

:mod:`tkinter` functions and constructors which need a default root window raise now :exc:`RuntimeError` with descriptive message instead of obscure :exc:`AttributeError` or :exc:`NameError` if it is not created yet or cannot be created automatically.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 390); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 390); *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 390); *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 390); *backlink*
>
> Unknown interpreted text role "exc".

:func:`atexit._run_exitfuncs` now logs callback exceptions using :data:`sys.unraisablehook`, rather than logging them directly into :data:`sys.stderr` and raise the last exception.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 402); *backlink*

Unknown interpreted text role "func".

`logging.disable` will now validate the types and value of its parameter. It also now accepts strings representing the levels (as does `loging.setLevel`) instead of only the numerical values.

At Python exit, if a callback registered with :func:`atexit.register` fails, its exception is now logged. Previously, only some exceptions were logged, and the last exception was always silently ignored.

Fixed lib2to3.pgen2 to be able to parse PEP-570 positional only argument syntax.

In `importlib.metadata`: - `EntryPoint` objects now expose a `.dist` object referencing the `Distribution` when constructed from a `Distribution`. - Add support for package discovery under package normalization rules. - The object returned by `metadata()` now has a formally-defined protocol called `PackageMetadata` with declared support for the `.get_all()` method. - Synced with importlib_metadata 3.3.

A check is added against misspellings of autospect, auto_spec and set_spec being passed as arguments to patch, patch.object and create_autospec.

[tarfile] update nested exception raising to use `from None` or `from e`

AttributeError for suspected misspellings of assertions on mocks are now pointing out that the cause are misspelled assertions and also what to do if the misspelling is actually an intended attribute name. The unittest.mock document is also updated to reflect the current set of recognised misspellings.

Implemented PEP 612: added `ParamSpec` and `Concatenate` to :mod:`typing`. Patch by Ken Jin.

StrEnum: fix _generate_next_value_ to return a str

Define THREAD_STACK_SIZE for VxWorks.

[Enum] _EnumDict.update() is now supported

Enum: private names do not become members / do not generate errors -- they remain normal attributes

`Enum`: call `__init_subclass__` after members have been added

:func:`ast.literal_eval` adds line number information (if available) in error message for malformed nodes.

:func:`random.sample` no longer warns on a sequence which is also a set.

:func:`posixpath.expanduser` returns the input *path* unchanged if user home directory is None on VxWorks.

Fix subprocess.check_output(..., input=None) behavior when text=True to be consistent with that of the documentation and universal_newlines=True.

Fixed discrepancy between :mod:`traceback` and the interpreter in formatting of SyntaxError with lineno not set (:mod:`traceback` was changed to match interpreter).

Raise :exc:`OverflowError` instead of silent truncation in :meth:`socket.ntohs` and :meth:`socket.htons`. Silent truncation was deprecated in Python 3.7. Patch by Erlend E. Aasland

Harmonized :func:`random.randrange` argument handling to match :func:`range`.

- The integer test and conversion in `randrange()` now uses :func:`operator.index`.

- Non-integer arguments to `randrange()` are deprecated.
- The `ValueError` is deprecated in favor of a `TypeError`.
- It now runs a little faster than before.

(Contributed by Raymond Hettinger and Serhiy Storchaka.)

Restore compatibility for `uname_result` around deepcopy and _replace.

`zipfile.Path.joinpath` now accepts arbitrary arguments, same as `pathlib.Path.joinpath`.

Port the _csv module to the multi-phase initialization API ([PEP 489](#)).

:class:`typing.TypedDict` types created using the alternative call-style syntax now correctly respect the `total` keyword argument when setting their `__required_keys__` and `__optional_keys__` class attributes.

<div style="border:1px solid">

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 653**); *backlink*

Unknown interpreted text role "class".

</div>

Add `globalns` and `localns` parameters to the :func:`inspect.signature` and :meth:`inspect.Signature.from_callable`.

<div style="border:1px solid">

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 664**); *backlink*

Unknown interpreted text role "func".

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 664**); *backlink*

Unknown interpreted text role "meth".

</div>

fix `format()` behavior for `IntFlag`

Ensure asyncio.wait_for waits for task completion

Fixed bug where :mod:`zipimporter` sometimes reports an incorrect cause of import errors.

<div style="border:1px solid">

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 692**); *backlink*

Unknown interpreted text role "mod".

</div>

Fix site and sysconfig modules for VxWorks RTOS which has no home directories.

Add :func:`os.set_blocking()` support for VxWorks RTOS.

<div style="border:1px solid">

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 712**); *backlink*

Unknown interpreted text role "func".

</div>

Lowered :class:`tkinter.ttk.LabeledScale` dummy widget to prevent hiding part of the content label.

<div style="border:1px solid">

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 721**); *backlink*

Unknown interpreted text role "class".

</div>

Fixed memory leak in `socketserver.ThreadingMixIn` introduced in Python 3.7.

Fix initialization race condition in :func:`a85encode` and :func:`b85encode` in :mod:`base64`. Patch by Brandon Stansbury.

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 741**); *backlink*

Unknown interpreted text role "func".

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 741**); *backlink*

Unknown interpreted text role "func".

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System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main)(Misc)(NEWS.d)3.10.0a4.rst`, **line 741**); *backlink*

Unknown interpreted text role "mod".

</div>

Add documentation for the :class:`multiprocessing.pool.ThreadPool` class.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 751);** *backlink*
>
> Unknown interpreted text role "class".

Prominently feature listings from the glossary in documentation search results. Patch by Ammar Askar.

Update test_nntplib to use official group name of news.aioe.org for testing. Patch by Dong-hee Na.

Skip some asyncio tests on VxWorks.

Enhance `test_select.test_select()`: it now takes 500 milliseconds rather than 10 seconds. Use Python rather than a shell to make the test more portable.

Skip some tests in _test_all_chown_common() on VxWorks.

Fix bytecode helper assertNotInBytecode.

Add more attribute checking in test_posix.py

Disable os.popen and impacted tests on VxWorks

Port test_ssl and test_uuid to VxWorks RTOS.

Fix __builtin_available check on older compilers. Patch by Joshua Root.

Added `--disable-test-modules` option to the `configure` script: don't build nor install test modules. Patch by Xavier de Gaye, Thomas Petazzoni and Peixing Xin.

Now all platforms use a value for the "EXT_SUFFIX" build variable derived from SOABI (for instance in freeBSD, "EXT_SUFFIX" is now ".cpython-310d.so" instead of ".so"). Previously only Linux, Mac and VxWorks were using a value for "EXT_SUFFIX" that included "SOABI".

Fix implicit function declarations in configure which could have resulted in incorrect configuration checks. Patch contributed by Joshua Root.

Enable libpython3.so for VxWorks.

Add fish shell support to macOS installer.

Update macOS installer build to use Tcl/Tk 8.6.11 (rc2, expected to be final release).

Update macOS installer build to use OpenSSL 1.1.1i.

Update macOS installer to use SQLite 3.34.0.

Fixed Python 3 compatibility issue with gdb/libpython.py handling of attribute dictionaries.

Fix `freeze.py` tool to use the prope config and library directories. Patch by Victor Stinner.

Export the :c:func:`Py_FrozenMain` function: fix a Python 3.9.0 regression. Python 3.9 uses `-fvisibility=hidden` and the function was not exported explicitly and so not exported.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 952);** *backlink*
>
> Unknown interpreted text role "c:func".

Remove the private :c:func:`_Py_fopen` function which is no longer needed. Use :c:func:`_Py_wfopen` or :c:func:`_Py_fopen_obj` instead. Patch by Victor Stinner.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 963);** *backlink*
>
> Unknown interpreted text role "c:func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 963);** *backlink*
>
> Unknown interpreted text role "c:func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\(cpython-main) (Misc) (NEWS.d) 3.10.0a4.rst`, line 963);** *backlink*
>
> Unknown interpreted text role "c:func".

Port :mod:`resource` extension module to module state

Update the `xxlimited` module to be a better example of how to use the limited C API.

Fix an alignment build warning/error in function `PyVectorcall_Function()`. Patch by Andreas Schneider, Antoine Pitrou and Petr Viktorin.