PYTHON V3.12.1 *https://www.python.org/doc/versions/*

Quote reuse: in Python 3.11, reusing the same quotes as the enclosing f-string raises a [SyntaxError](https://docs.python.org/release/3.12.1/library/exceptions.html" \l "SyntaxError" \o "SyntaxError), forcing the user to either use other available quotes (like using double quotes or triple quotes if the f-string uses single quotes). In Python 3.12, you can now do things like this:

>>>

**>>>** songs = ['Take me back to Eden', 'Alkaline', 'Ascensionism']

**>>>** f"This is the playlist: **{**", ".join(songs)**}**"

'This is the playlist: Take me back to Eden, Alkaline, Ascensionism'

Multi-line expressions and comments: In Python 3.11, f-string expressions must be defined in a single line, even if the expression within the f-string could normally span multiple lines (like literal lists being defined over multiple lines), making them harder to read. In Python 3.12 you can now define f-strings spanning multiple lines, and add inline comments:

Backslashes and unicode characters: before Python 3.12 f-string expressions couldn’t contain any \ character. This also affected unicode [escape sequences](https://docs.python.org/release/3.12.1/reference/lexical_analysis.html#escape-sequences) (such as \N{snowman}) as these contain the \N part that previously could not be part of expression components of f-strings. Now, you can define expressions like this:

**>>>** print(f"This is the playlist: **{**"**\n**".join(songs)**}**")

This is the playlist: Take me back to Eden

Alkaline

Ascensionism

The bitwise inversion operator (~) on bool is deprecated. It will throw an error in Python 3.14. Use not for logical negation of bools instead. In the rare case that you really need the bitwise inversion of the underlying int, convert to int explicitly: ~int(x).

**Code Generation**

The Retrieval-Augmented Generation model can also be used in code generation tasks. In this case, the retrieval model retrieves the relevant code snippets, and the generation model adapts and extends the code to meet specific project requirements.

The code generation models use RAG to fetch relevant information from the existing code repositories, utilize it to develop accurate code and documentation, and even fix code errors.

**RAG -**

* Converts the natural language descriptions into code implications.
* Predicts the next code bit
* It also converts the code into natural language descriptions
* Generates and runs new code to perform a comprehensive analysis

| **Module** | **Latest Version (as of 2024)** | **Description** |
| --- | --- | --- |

|  |  |  |
| --- | --- | --- |
| numpy | 1.26.x | Numerical computing |

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| --- | --- | --- |
| pandas | 2.2.x | Data analysis and manipulation |

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| matplotlib | 3.8.x | Data visualization |

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| seaborn | 0.13.x | Statistical data visualization |

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| --- | --- | --- |
| scipy | 1.12.x | Scientific computing |

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| --- | --- | --- |
| tensorflow | 2.15.x | Machine learning framework |

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| torch (PyTorch) | 2.2.x | Deep learning framework |

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| --- | --- | --- |
| scikit-learn | 1.4.x | Machine learning library |

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| --- | --- | --- |
| requests | 2.31.x | HTTP requests |

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| --- | --- | --- |
| beautifulsoup4 | 4.12.x | Web scraping |

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| --- | --- | --- |
| lxml | 4.9.x | XML and HTML parsing |

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| flask | 3.0.x | Lightweight web framework |

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| django | 4.2.x | Full-stack web framework |

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| fastapi | 0.110.x | High-performance web API framework |

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| pytest | 8.0.x | Testing framework |

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| sqlalchemy | 2.0.x | Database ORM |

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| pillow | 10.2.x | Image processing |

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| openpyxl | 3.1.x | Excel file handling |

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| pytesseract | 0.3.x | OCR (Optical Character Recognition) |

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| --- | --- | --- |
| opencv-python | 4.9.x | Computer vision |

**NUMPY**

<https://chatgpt.com/share/67ca64c8-2a30-8005-a1dc-d6f48f2e5be9>