



# Advanced Libraries in Python

Featuring Snake Ladder Game using tkinter & NumPy

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# Introduction to Python Libraries



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- Python has a wide range of libraries that extend its functionality.
- Libraries help with tasks like data manipulation, visualization, machine learning, web development, automation, and more.
- Built-in vs. third-party libraries.

## Examples:

- Built-in: math, datetime
- Third-party: numpy, pandas, matplotlib, scikit-learn, etc.

# Why Use Advanced Libraries?

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- Save development time and effort.
- Offer powerful pre-built functions.
- Efficient performance for handling large-scale tasks (data, ML, etc.)
- Community support and active development.

# NumPy – Numerical Python



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- Core library for numerical and scientific computing in Python.
- Supports large, multi-dimensional arrays and matrices.
- Provides high-performance mathematical functions like linear algebra, Fourier transforms, etc.

# Tkinter As TK

- The tkinter package (“Tk interface”) is the standard Python interface to the Tcl/Tk GUI toolkit.
- Both Tk and tkinter are available on most Unix platforms, including macOS, as well as on Windows systems.
- Tkinter is the Python interface to the Tk GUI toolkit shipped with Python

# pandas – Data Handling

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- Offers powerful and easy-to-use data structures like Series and DataFrame.
- Helps in cleaning, transforming, and analyzing structured data.
- Can read/write data from different file formats like CSV, Excel, JSON, SQL, etc.
- Used heavily in data science and analytics projects.

# matplotlib – Visualization

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- Comprehensive library for creating static, animated, and interactive plots.
- Useful in presenting data insights visually.
- Common plots: Line, Bar, Histogram, Scatter, Pie, etc.
- Integrates well with NumPy and pandas.

# Pillow – Image Processing

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- Fork of Python Imaging Library (PIL) for image processing.
- Supports image file manipulation including filtering, cropping, resizing, and format conversion.
- Can generate image-based visual effects or overlays.
- Helpful in games or media projects requiring image control.



# TensorFlow – ML Framework

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- Open-source library developed by Google for deep learning applications.
- Enables training and deployment of machine learning models on various platforms.
- Uses data flow graphs for computation and model training.
- Supports CPU, GPU, and TPU execution for scalability

# Keras – High-Level ML API

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- Runs on top of TensorFlow for easy neural network development.
- Offers a user-friendly interface with modularity and extensibility.
- Includes tools for building convolutional networks, LSTMs, and autoencoders.
- Quickly prototype deep learning models with minimal code.

# Python Frameworks



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- Frameworks are pre-built packages and libraries designed to simplify development.
- Django: Full-stack web framework used for complex web apps.
- Flask: Lightweight micro-framework ideal for small web services.
- Tkinter: GUI framework included in Python (used in our game project).
- PyTorch: ML framework focused on flexibility and research.

# Mini Project: Snake Ladder Game

**A classic 2-player board game played on a 10x10 grid (1 to 100).**

Players take turns rolling a dice to move forward.

Snakes send the player back, ladders move them ahead.

First player to reach 100 **wins**.

## **Game UI Design (Using tkinter)**

- 10x10 grid drawn using a **Canvas** for the board.
- **Colored tokens** (circles) for Player 1 (Red) and Player 2 (Blue).
- **“Roll Dice”** button to simulate a dice roll.
- **Label** displays turn info and dice result.
- **Reset Game** button to restart from position 1.
- Snakes and Ladders drawn as colored **arrows**
- with labels ("S", "L").

## **Game Logic (Using Python)**

- Player positions tracked as numbers (1–100).

### **After each move:**

- **Update GUI** token positions.
- **Check for win:** Display popup if reaches 100.
- **Switch turn:** Update labels to show current player.
- **Reset:** Resets positions, re-enables dice button.

# GitHub Project Link



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Project Code and Documentation available at:

<https://github.com/vedantvyas1016/Python>

Feel free to explore my project.



# Thank you

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