

# Python Practice Overview

## 1. Palindrome Checker

### Purpose:

- Check whether a given string (from user input) is a palindrome.

### How it works:

- Reads a string from the user.
- Compares the string with its reverse.
- Returns whether the string is a palindrome.

### Concepts Demonstrated:

- String manipulation
- Conditional statements
- User input handling

### Output:

```
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python palindrome.py
Enter a string: madam
Palindrome
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python palindrome.py
Enter a string: MOM
Palindrome
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python palindrome.py
Enter a string: hello
Not a palindrome
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> |
```

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## 2. List Comprehension – Squares

### Purpose:

- Generate a list of squares from a given list of numbers.

### How it works:

- Uses list comprehension to iterate over numbers and calculate their squares.
- Returns a new list containing the squared values.

### Concepts Demonstrated:

- List comprehension

- Loops and iteration
- Mathematical operations

### Output:

```
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python list_of_squares.py
Enter numbers separated by space: 1 2 3
Original List: [1, 2, 3]
Squares: [1, 4, 9]
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> |
```

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## 3. Students DataFrame

### Purpose:

- Create a DataFrame of 5 students with marks and analyze their scores.

### How it works:

- Uses pandas.DataFrame to store student names and marks.
- Filters and displays students who scored more than 80.

### Concepts Demonstrated:

- pandas DataFrame creation and manipulation
- Filtering data
- Conditional selection

### Output:

```
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python dataframe_students
.py
Student DataFrame:
   Name  Marks
0  Aarav    72
1   Diya    95
2   Rohan    67
3  Sneha    89
4  Karthik    83

Students who scored more than 80:
   Name  Marks
1   Diya    95
3  Sneha    89
4  Karthik    83
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> |
```

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## 4. Random 5x5 NumPy Array

### Purpose:

- Generate a 5x5 array with random integers between 1 and 100.

### How it works:

- Uses `numpy.random.randint` to create the array.
- Displays the array for analysis.

### Concepts Demonstrated:

- NumPy arrays
- Random number generation
- Array manipulation

### Output:

```
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python matrix_randomint.py
5x5 Array with random integers between 1 and 100:
[[78 10 14 14 23]
 [ 9 40 25 70 76]
 [67 93 32 61  9]
 [23 85 77  4 90]
 [ 4 99 27 44 48]]
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python matrix_randomint.py
5x5 Array with random integers between 1 and 100:
[[ 3 16 94 100 24]
 [19 45 35 54 35]
 [54 25 90 89  7]
 [20 37 53 17 17]
 [48 40 26 84 32]]
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> █
```

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## 5. Products DataFrame

### Purpose:

- Create a DataFrame with product details and perform simple calculations.

### How it works:

- Stores product name, price, and category in a pandas DataFrame.
- Adds a new column for discounted price (90% of original price).
- Filters and displays products cheaper than 500.

### Concepts Demonstrated:

- DataFrame operations
- Column calculations

- Data filtering

## Output:

```
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> python dataframe_products.py
Original Products DataFrame:
  Product Name  Price  Category
0      Laptop  60000  Electronics
1      Mobile  15000  Electronics
2  Headphones   2000  Accessories
3      Tablet  25000  Electronics
4    Keyboard    500  Accessories

DataFrame with Discounted Price:
  Product Name  Price  Category  Discounted Price
0      Laptop  60000  Electronics         54000.0
1      Mobile  15000  Electronics         13500.0
2  Headphones   2000  Accessories          1800.0
3      Tablet  25000  Electronics         22500.0
4    Keyboard    500  Accessories           450.0

Products cheaper than 500 after discount:
  Product Name  Price  Category  Discounted Price
4    Keyboard    500  Accessories           450.0
PS C:\Users\Amulya\OneDrive - C-Mart Solutions Ltd\Technical\Python\python practice> |
```

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