

Tutorial 1: Python Refresher & Best Practices

Objective

This tutorial reviews Python syntax, indentation, and PEP8 coding conventions with short exercises. By the end, you should write clean, readable Python code and follow best practices.

1. Python Basics

Variables and Data Types

- Variables store values: `x = 10`
- Common data types: int, float, str, bool, list, tuple, dict

Exercise 1:

```
# Create variables
name = "Krishna"
age = 28
grades = [85, 90, 78]

# Print a formatted message using f-string
print(f"{name} is {age} years old and scored {grades[1]} in the test.")
```

2. Control Flow

Conditional Statements

```
if condition:
    # code
elif condition2:
    # code
else:
    # code
```

Loops

- for loops for iteration
- while loops for repeated conditions

Exercise 2:

```
grades = [85, 45, 78]
```

```
for g in grades:  
    if g >= 50:  
        print(f"Grade {g}: Pass")  
    else:  
        print(f"Grade {g}: Fail")
```

3. Functions

- Use def to define a function
- Functions can have parameters and return values

Exercise 3:

```
def average(nums):  
    return sum(nums) / len(nums)
```

```
grades = [85, 90, 78]  
print("Average:", average(grades))
```

4. Data Structures

Lists

```
fruits = ["apple", "banana"]  
fruits.append("mango")  
print(fruits)
```

Tuples

```
dims = (10, 20)  
print(dims)
```

Dictionaries

```
person = {"name": "Krishna", "age": 28}  
print(person["name"])
```

5. Strings and Formatting

- Use f-strings for readable output:

```
name = "Alice"  
score = 95  
print(f"{name} scored {score} marks.")
```

6. Exception Handling

- Handle errors to avoid program crashes

```
try:  
    x = 10 / 0  
except ZeroDivisionError:  
    print("Cannot divide by zero")
```

7. Indentation & PEP8 Best Practices

Key Points

- Use 4 spaces per indentation
- Limit lines to 79 characters
- Variable names: lowercase with underscores (my_var)
- Function names: lowercase with underscores (def my_function()):)
- Constants: all caps (PI = 3.14)
- Separate functions/classes with one blank line

Exercise 4:

```
# Fix PEP8 issues  
def greet(name):  
    print(f"Hello, {name}!")  
  
greet("Krishna")
```

8. Combined Exercise

Task: Create a dictionary of 3 students and their grades. Print students who passed (>50) using a function.

```
students = {"Ram": 45, "Hari": 78, "Sita": 90}  
  
def print_passed(students):  
    for name, grade in students.items():  
        if grade >= 50:  
            print(f"{name} passed with {grade}")  
        else:  
            print(f"{name} failed with {grade}")  
  
print_passed(students)
```

Practice Questions

1. What is the difference between a list and a tuple?
2. How do you define a function in Python?
3. Write a for loop to iterate over a list of numbers.
4. How do you handle division by zero in Python?
5. What is a dictionary in Python?
6. Give an example of an f-string.
7. Explain the purpose of `__init__` in a class.
8. How do you comment a single line in Python?
9. What is the difference between `==` and `=?`
10. Write a Python code to check if a number is even or odd.
11. How many spaces should you use per indentation according to PEP8?
12. What is the difference between `append()` and `extend()` in a list?
13. How can you import only one function from a module?
14. Write a lambda function to add two numbers.
15. What are `*args` and `**kwargs`?
16. Explain the difference between `try-except` and `if-else`.
17. How do you print all keys of a dictionary?
18. What is the use of the `pass` statement?
19. Give an example of a Python constant.
20. Write a Python program to print the square of each number in a list using a loop.