# Python Programming Language

## Lecture 12: Function and Problem Solving

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# Today's Learning Objectives

- Function
- Practical Exercises
- Exam

# Function

- Let's GO W3Schools

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# Practical Exercise 1

- **Reverse a String**
- Write a function that takes a string and returns the string reversed.
- **Solution:**
- def reverse_string(s):

    ```
    reversed_s = ''
    for char in s:
            reversed_s = char + reversed_s
    return reversed_s
    ```

**# Test cases**

```
print(reverse_string("hello")) # Output: "olleh"
print(reverse_string("world")) # Output: "dlrow"
print(reverse_string("Python"))# Output: "nohtyP"
```

# Practical Example 2

- **Find the Maximum Number in a List**
- Write a function that takes a list of integers and returns the maximum number in the list.
- Solution:

```python
def find_max(nums):
    max_num = nums[0]
    for num in nums:
        if num > max_num:
            max_num = num
    return max_num


# Test cases
print(find_max([1, 2, 3, 4, 5]))   # Output: 5
print(find_max([-1, -2, -3, -4]))  # Output: -1
print(find_max([5, 4, 3, 2, 1]))   # Output: 5
```

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# Practical Example 3

- **Check if a Number is Prime**
- Write a function that takes an integer and returns True if the number is prime, and False otherwise.
- Solution:

```python
def is_prime(n):
    if n <= 1:
        return False
    for i in range(2,n):        # limit = int(n**0.5) + 1 / int(n/2) + 1
        if n % i == 0:
            return False
    return True


# Test cases
print(is_prime(5))  # Output: True
print(is_prime(4))  # Output: False
print(is_prime(13)) # Output: True
```

# Practical Exercise 4

- **Sum of Digits of a Number**
- Write a function that takes an integer and returns the sum of its digits.
- **Sotution:**

```python
def sum_of_digits(n):
    sum_digits = 0
    while n > 0:
        digit = n % 10
        sum_digits += digit
        n //= 10
    return sum_digits


# Test cases
print(sum_of_digits(123))   # Output: 6
print(sum_of_digits(456))   # Output: 15
print(sum_of_digits(789))   # Output: 24
```

# Any Question?

# References

- https://www.w3schools.com/python/
- https://www.tutorialspoint.com/python/

# EXAM-3

# Problem 1

**common_end**

Given 2 arrays of ints, a and b, Print True if they have the same first element or they have the same last element. Both arrays will be length 1 or more.

common_end([1, 2, 3], [7, 3]) → True

common_end([1, 2, 3], [7, 3, 2]) → False

common_end([1, 2, 3], [1, 3]) → True

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# Problem 2

**array_count9**

Given an array of ints, Print the number of 9's in the array.

array_count9([1, 2, 9]) → 1
array_count9([1, 9, 9]) → 2
array_count9([1, 9, 9, 3, 9]) → 3

# Problem 3

**sum_even_numbers**

Write a Python program to find the sum of even numbers in a list using a for loop and a while loop.

(sum_even_numbers([1, 2, 3, 4, 5, 6])) → 12

(sum_even_numbers([2, 4, 6, 8])) → 20

(sum_even_numbers([1, 3, 5, 7]) → 0

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