

Python Programming Language

1

Lecture 13: File read write and Problem Solving

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Today's Learning Objectives

- File read write
- Tuple
- Set
- Format
- Date
- Practical Exercises
- Exam solution

File read write and others

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3

Practical Example 1

- **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:

```
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 2

- **Sum of Digits of a Number**

- Write a function that takes an integer and returns the sum of its digits.

- **Solution:**

```
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
```

Practical Exercise 3

- **Find the Longest Line in a File**

- Write a function that reads a text file and returns the longest line in the file.

- **Solution:**

```
def find_longest_line(input_file):  
    longest_line = ""  
  
    with open(input_file, 'r') as file:  
        for line in file:  
            if len(line) > len(longest_line):  
                longest_line = line.strip()  
  
    return longest_line  
  
# Example usage  
print(find_longest_line('input.txt'))
```

Any Question?

References

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

EXAM-Solution

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.

10

`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`

Solution 1

```
def common_end(a, b):  
    if a[0]==b[0] or a[len(a)-1]==b[len(b)-1]:  
        return True  
    else:  
        return False
```

11

```
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
```

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

Solution 2

```
def array_count9(nums):  
    count=0  
    for i in range(0,len(nums)):  
        if nums[i]==9:  
            count+=1  
    return count
```

13

```
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`

Solution 3

```
def sum_even_numbers(arr):  
    sum_even = 0  
    for num in arr:  
        if num % 2 == 0:  
            sum_even += num  
    return sum_even
```

15

(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