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Malaiarasu GRaj
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Primary Inputs

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Topic/Subject:

list in python

Familiarity Level:

Intermediate

Learning Mode:

- Select...
- Lesson
- Quiz

Time Available (Minutes):

30

5 120

Additional Inputs

Preferred Language (Optional):

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Sum of number dig... 28.0KB

Additional Instructions (Optional):

focus both on the coding and theory part

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Welcome to our 30-minute session on exploring the key concepts of 'list in Python'! As an educator, I'll guide you through the topic using relatable storytelling, real-world examples, and practical applications.

Story Time: Imagine you're a store manager, and you need to keep track of the total number of digits in a list of product codes. You have a list of codes, and each code has multiple digits. Your task is to calculate the sum of digits for each code and store the results in a new list.

Key Concepts:

1. **Lists in Python:** A list is a collection of items that can be of any data type, including strings, integers, floats, and other lists. Lists are denoted by square brackets `[]` and are ordered, meaning that the order of the items matters.
2. **List Comprehensions:** A list comprehension is a concise way to create a new list by performing an operation on each item in an existing list.
3. **Map, Filter, and Reduce:** These are three important functions in Python that can be used to process lists. `map()` applies a function to each item in a list, `filter()` filters out items that don't meet a condition, and `reduce()` applies a function to all items in a list to produce a single output.

Code Examples:

Example 1: Sum of Number Digits in List using Loop

```
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = []
for ele in test_list:
    sum = 0
    for digit in str(ele):
        sum += int(digit)
    res.append(sum)
print("List integer summation : " + str(res))
```

Example 2: Sum of Number Digits in List using List Comprehension

```
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = [sum(int(sub) for sub in str(ele)) for ele in test_list]
print("List integer summation : " + str(res))
```

Example 3: Sum of Number Digits in List using Map, Filter, and Reduce

```
from functools import reduce
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = list(map(lambda ele: sum(int(sub) for sub in str(ele)), test_list))
print("List integer summation : " + str(res))
```

Example 4: Sum of Number Digits in List using NumPy

```
import numpy as np
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = np.sum([list(map(int, str(ele))) for ele in test_list], axis=1)
print("List integer summation : " + str(list(res)))
```

Example 5: Sum of Number Digits in List using itertools Library

```
import itertools
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = sum(map(int, list(itertools.chain(*[str(ele) for ele in test_list]))))
print("List integer summation : " + str(res))
```

Example 6: Sum of Number Digits in List using Function

```
def digit_sum(num):
    digit_sum = 0
    while num > 0:
        digit_sum += num % 10
        num //= 10
    return digit_sum

def sum_of_digits_list(lst):
    return list(map(digit_sum, lst))

test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = sum_of_digits_list(test_list)
print("List integer summation : " + str(res))
```

Example 7: Sum of Number Digits in List using Expression

```
test_list = [12, 67, 98, 34]
print("The original list is : " + str(test_list))
res = [sum(int(digit) for digit in str(num)) for num in test_list]
print("List integer summation : " + str(res))
```

Practical Applications:

1. **Data Analysis:** Summing digits in a list can be useful in data analysis, such as calculating the total number of digits in a list of numerical data.
2. **Cryptography:** Summing digits in a list can be used in cryptographic applications, such as encrypting and decrypting messages.
3. **Game Development:** Summing digits in a list can be used in game development, such as calculating the total score in a game.

Free Online Courses:

1. **Python for Everybody** by Coursera: This course covers the basics of Python programming, including lists and list comprehensions.
2. **Python Data Structures** by Coursera: This course covers advanced topics in Python programming, including data structures such as lists and dictionaries.
3. **Python Programming** by edX: This course covers the basics of Python programming, including lists and list comprehensions.

YouTube Lectures:

1. **Python Lists** by Corey Schafer: This video covers the basics of lists in Python, including list comprehensions and indexing.
2. **Python List Comprehensions** by Traversy Media: This video covers list comprehensions in Python, including examples and use cases.
3. **Python Data Structures** by freeCodeCamp: This video covers data structures in Python, including lists, dictionaries, and sets.

Hands-on Practice:

1. **Project 1:** Write a Python program to calculate the sum of digits in a list of numerical data.
2. **Project 2:** Write a Python program to encrypt and decrypt a message using the sum of digits in a list.

I hope this helps! Let me know if you have any questions or need further clarification.