

Python Codes

Ques-1:

- num = [1,2,3,4,5,6]
- Write a python code to create a new list that contains, Only the even numbers from the original list.
- Each even number should be multiplied by 2.

Ans-1:

```
num = [1, 2, 3, 4, 5, 6]
new_list = []
for x in num:
    if x % 2 == 0:
        new_list.append(x * 2)
print(new_list)
```

Ans-2:

```
num = [1, 2, 3, 4, 5, 6]
# Using list comprehension
new_list = [x * 2 for x in num if x % 2 == 0]
print(new_list)
```

Ques-2:

- You have a list of numbers:
- numbers = [10, 25, 30, 45, 25, 60]

Write Python code to:

- Find the index of the first occurrence of '25'
- Insert '35' at index 2
- Remove the last item
- Copy the list
- Clear all items from the original list

Ans:

```
numbers = [10, 25, 30, 45, 25, 60]
# 1. Find the index of the first occurrence of 25
```

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```
index_25 = -1

for i in range(len(numbers)):
    if numbers[i] == 25:
        index_25 = i
        break

print("Index of first 25:", index_25)

# 2. Insert 35 at index 2 (manual reconstruction)

new_list = []

for i in range(len(numbers)):
    if i == 2:
        new_list.append(35) # insert before index 2
        new_list.append(numbers[i])

numbers = new_list

print("After inserting 35 at index 2:", numbers)

# 3. Remove the last item (manual reconstruction)

new_list = []

for i in range(len(numbers) - 1): # skip the last element
    new_list.append(numbers[i])

numbers = new_list

print("After removing the last item:", numbers)

# 4. Copy the list (manual copy)

numbers_copy = []

for i in range(len(numbers)):
    numbers_copy.append(numbers[i])

print("Copied list:", numbers_copy)

# 5. Clear all items from the original list (manual clearing)

numbers = []

print("Original list after clearing:", numbers)
```

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Ques-3:

- You have a list of numbers and need to find the first even number greater than 10:
- numbers = [3, 7, 12, 5, 18, 9, 20]
- Write Python code to find and print the first even number greater than 10.

Ans:

```
numbers = [3, 7, 12, 5, 18, 9, 20]
first_even_gt_10 = None # placeholder
for num in numbers:
    if num % 2 == 0 and num > 10: # check even and > 10
        first_even_gt_10 = num
        break # stop at the first match
print("First even number greater than 10:", first_even_gt_10)
```

Ques-4 Generate the random strings using python.

Ans:

```
# Manual random string generator without built-in random/string modules
# Step 1: Define our "alphabet"
alphabet =
"abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789"
# Step 2: Simple linear congruential generator (LCG)
def lcg(seed, length):
    a = 1664525
    c = 1013904223
    m = 2**32
    numbers = []
    for _ in range(length):
        seed = (a * seed + c) % m
        numbers.append(seed)
    return numbers
```

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```
# Step 3: Map generated numbers to characters in our alphabet

def random_string(seed, size):

    nums = lcg(seed, size)

    result = "".join(alphabet[n % len(alphabet)] for n in nums)

    return result

# Example usage

print("Random string:", random_string(seed=12345, size=8))
```

Output example:

Random string: kJ8pZ2bA

Notes:

- This produces **deterministic “random” strings** based on the seed.
- No built-in random or string modules are used.
- The LCG constants used are standard for demonstration purposes.

Ques-5:

You have a list of fruits and their prices:

- fruits = ['apple', 'banana', 'cherry']
- prices = [100, 200, 300]
- Create a dictionary where keys are fruits and values are prices multiplied by 1.1 (adding 10% tax).

Expected Output:

{'apple': 110.0, 'banana': 220.0, 'cherry': 330.0}

Ans:

```
fruits = ['apple', 'banana', 'cherry']

prices = [100, 200, 300]

# Manual dictionary creation (without built-ins like zip or dict comprehension)

fruit_price_dict = {}

for i in range(len(fruits)):

    # calculate price with 10% tax
```

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```
taxed_price = prices[i] * 1.1  
# assign manually  
fruit_price_dict[fruits[i]] = taxed_price  
print(fruit_price_dict)
```

6. How do we check if a string is a palindrome?

- * A **palindrome** is a string that reads the same forwards and backwards.
- * You can check it manually using a **two-pointer approach** without built-in reverse functions.

Example:

```
def is_palindrome_manual_reverse(s):  
    rev = ""  
    i = len(s) - 1  
    while i >= 0:  
        rev += s[i]  
        i -= 1  
    if s == rev:  
        return True  
    else:  
        return False  
print(is_palindrome_manual_reverse("madam")) # True  
print(is_palindrome_manual_reverse("hello")) # False
```

Key point:
“Compare characters from both ends moving towards the center; if all match, it’s a palindrome.”

7. How do you reverse a dictionary in python?

Ans-1 Swap keys and values:

```
my_dict = {'a': 1, 'b': 2, 'c': 3}  
# Create an empty dictionary  
reversed_dict = {}
```

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```
# Iterate manually  
for key in my_dict:  
    value = my_dict[key]  
    reversed_dict[value] = key  
print(reversed_dict) # {1: 'a', 2: 'b', 3: 'c'}
```

Ans-2 Reverse the order of items:

```
my_dict = {'a': 1, 'b': 2, 'c': 3}  
  
# Step 1: Collect items into a list  
items = []  
  
for key in my_dict:  
    items.append((key, my_dict[key]))  
  
# Step 2: Walk backwards and build new dict  
reversed_dict = {}  
  
index = len(items) - 1  
  
while index >= 0:  
    pair = items[index]  
    reversed_dict[pair[0]] = pair[1]  
    index -= 1  
  
print(reversed_dict) # {'c': 3, 'b': 2, 'a': 1}
```

8. Write a program to Count the no. of words in a string in python?

```
def count_words(s):  
    count = 0  
    in_word = False  
    for ch in s:  
        if ch != " " and not in_word:  
            # Starting a new word  
            count += 1  
            in_word = True
```

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```
elif ch == " ":
    in_word = False
return count
text = "Hello world this is python"
print(count_words(text)) # 5
```

9. Count the no.of vowels in a string?

```
def count_vowels(s):
    vowels = "aeiouAEIOU"
    count = 0
    for ch in s:
        # manually check if ch is in vowels
        for v in vowels:
            if ch == v:
                count += 1
                break
    return count
text = "Hello World"
print(count_vowels(text)) # 3
```

10. Find the first Non-Repeating Characters?

```
def first_non_repeating(s):
    freq = {} # manual frequency dict
    # Step 1: Count characters manually
    for ch in s:
        if ch not in freq:
            freq[ch] = 1
        else:
            freq[ch] += 1
```

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```
# Step 2: Find the first character with count = 1
```

```
for ch in s:  
    if freq[ch] == 1:  
        return ch  
return None # if no non-repeating character  
  
text = "aabbcdeff"  
print(first_non_repeating(text)) # c
```

11. Find the missing number from a list(1 to N)?

```
def find_missing_number(arr, N):  
    total = N * (N + 1) // 2  
    sum_arr = 0  
    for num in arr:  
        sum_arr += num  
    return total - sum_arr  
  
numbers = [1, 2, 4, 5, 6] # Missing 3  
N = 6  
print(find_missing_number(numbers, N)) # 3
```

12. Count the frequency of elements in list?

```
def count_frequency(lst):  
    freq = {} # empty dictionary  
    for item in lst:  
        if item not in freq:  
            freq[item] = 1  
        else:  
            freq[item] += 1  
    return freq  
  
# Example
```

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```
my_list = [1, 2, 2, 3, 1, 4, 2]
print(count_frequency(my_list))
# Output: {1: 2, 2: 3, 3: 1, 4: 1}
```

13. Check if two strings are anagrams?

```
def are_anagrams(str1, str2):
    # Step 1: Check length
    length1 = length2 = 0
    for _ in str1:
        length1 += 1
    for _ in str2:
        length2 += 1
    if length1 != length2:
        return False
    # Step 2: Count frequency for str1
    freq1 = {}
    for ch in str1:
        if ch not in freq1:
            freq1[ch] = 1
        else:
            freq1[ch] += 1
    # Step 3: Count frequency for str2
    freq2 = {}
    for ch in str2:
        if ch not in freq2:
            freq2[ch] = 1
        else:
            freq2[ch] += 1
    # Step 4: Compare frequencies
```

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```
for ch in freq1:  
    if ch not in freq2 or freq1[ch] != freq2[ch]:  
        return False  
    return True  
  
print(are_anagrams("listen", "silent")) # True  
print(are_anagrams("hello", "world")) # False
```

14. Remove duplicates from a list?

```
def remove_duplicates(lst):  
    unique = []  
    for item in lst:  
        is_present = False  
        # Check if item already in unique list  
        for u in unique:  
            if item == u:  
                is_present = True  
                break  
        if not is_present:  
            unique.append(item)  
    return unique  
  
my_list = [1, 2, 2, 3, 1, 4, 2]  
print(remove_duplicates(my_list)) # [1, 2, 3, 4]
```

15. Find the max value in a list?

```
def find_max(lst):  
    if not lst: # handle empty list  
        return None  
    max_val = lst[0]  
    for item in lst:
```

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```
if item > max_val:  
    max_val = item  
  
return max_val  
  
my_list = [3, 7, 2, 9, 4]  
  
print(find_max(my_list)) # 9
```

16. Convert numeric strings to corresponding numeric words and integers

```
def num_to_words(num):  
  
    ones = ["Zero", "One", "Two", "Three", "Four", "Five", "Six", "Seven", "Eight", "Nine"]  
    tens = ["", "", "Twenty", "Thirty", "Forty", "Fifty", "Sixty", "Seventy", "Eighty", "Ninety"]  
    teens =  
    ["Ten", "Eleven", "Twelve", "Thirteen", "Fourteen", "Fifteen", "Sixteen", "Seventeen", "Eighteen", "Nineteen"]  
  
    num = int(num) # Convert string to integer  
  
    if 0 <= num < 10:  
        return ones[num]  
    elif 10 <= num < 20:  
        return teens[num-10]  
    elif 20 <= num < 100:  
        return tens[num // 10] + (" " if num % 10 == 0 else "-" + ones[num % 10])  
    else:  
        return str(num) # For numbers >= 100, return as string (can extend logic)  
  
    numeric_strings = ["5", "12", "45", "99"]  
  
    for s in numeric_strings:  
        integer_value = int(s)  
        word_value = num_to_words(s)  
        print(f"String: {s} -> Integer: {integer_value}, Word: {word_value}")
```

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17. Fibonacci Series

```
def fibonacci(n):  
    fib_sequence = [0, 1]  
    while len(fib_sequence) < n:  
        fib_sequence.append(fib_sequence[-1] + fib_sequence[-2])  
    return fib_sequence  
print(fibonacci(10))
```

18. Count the number of strings in input

```
def count_strings(lst):  
    count = 0  
    for item in lst:  
        if type(item) == str:  
            count += 1  
    return count  
data = [10, "hello", 3.5, "world", True, "python"]  
print("Number of strings:", count_strings(data))
```

19. Repeated digit summation

55555=5+5+5+5+5=25=2+5=7 (Loop has to continue till the outcome becomes a single digit)

```
num = 55555  
while num >= 10:      # repeat until single digit  
    total = 0  
    while num > 0:  
        digit = num % 10 # get last digit  
        total += digit  
        num //= 10       # remove last digit
```

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```
num = total  
print(num)
```

Output: 7

20. Reverse a String Using Function (Without Built-in Functions)

```
def reverse_string(s):  
    rev = ""  
    i = len(s) - 1  
    while i >= 0:  
        rev += s[i]  
        i -= 1  
    return rev  
  
print(reverse_string("python"))
```