Assignment -1
Python Programming

Assignment Date	19 September 2022
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Maximum Marks	2 Marks

Question-1:

Write a Python program to find the number of combinations that satisfy $p + q + r + s = n$ where n is a given number $<= 4000$ and p, q, r, s in the range of 0 to 1000.

Solution:

```python
from collections import Counter

print("Input a positive integer: (ctrl+d to exit)")

pair_dict = Counter()

for i in range(2001):

    pair_dict[i] = min(i, 2000 - i) + 1


while True:

    try:

        n = int(input())

        ans = 0

        for i in range(n + 1):

            ans += pair_dict[i] * pair_dict[n - i]

        print("Number of combinations of a,b,c,d:",ans)

    except EOFError:

        break
```

Output:

```
Input a positive integer: (ctrl+d to exit)
  252
Number of combinations of a,b,c,d: 2731135
```

Question-2:

Write a Python program to count the number of prime numbers less than a given non-negative number.

Solution:

```python
def count_Primes_nums(n):
    ctr = 0

    for num in range(n):
        if num <= 1:
            continue
        for i in range(2, num):
            if (num % i) == 0:
                break
        else:
            ctr += 1

    return ctr

print(count_Primes_nums(10))
print(count_Primes_nums(100))
```

Output:

```
4
25
```

Question-3:

Write a Python program to remove the duplicate elements of a given array of numbers such that each element appear only once and return the new length of the given array.

Solution:

```python
def remove_duplicates(nums):

    for i in range (len(nums)-1, 0, -1):

        if nums[i] == nums[i-1]:

            del nums[i-1]

    return len(nums)


print(remove_duplicates([0,0,1,1,2,2,3,3,4,4,4]))

print(remove_duplicates([1, 2, 2, 3, 4, 4]))
```

Output:

```
5
4
```

Question-4:

Write a Python program to compute the largest product of three integers from a given list of integers.

Solution:

```python
def largest_product_of_three(nums):

    max_val = nums[1]


    for i in range(len(nums)):
```

```python
            for j  in range(i+1,  len(nums)):

                for k in range(j+1, len(nums)):

                    max_val = max(nums[i] * nums[j] * nums[k], max_val)


        return max_val



print(largest_product_of_three([-10, -20, 20, 1]))

print(largest_product_of_three([-1, -1, 4, 2, 1]))

print(largest_product_of_three([1, 2, 3, 4, 5, 6]))
```

Output:

```
4000
8
120
```

Question-5:

Write a Python program to test whether a given number is symmetrical or not.
A number is symmetrical when it is equal of its reverse.

For example- 121 is the symmetric number.

Solution:

```python
def is_symmetrical_num(n):

    return str(n) == str(n)[::-1]

print(is_symmetrical_num(121))

print(is_symmetrical_num(0))

print(is_symmetrical_num(122))

print(is_symmetrical_num(990099))
```

Output:

```
True
True
False
True
```