

1. Write a Python program to check all values are same in a dictionary

Solution:

```
>>> def value_check(students, n):
>>>     result = all(x == n for x in students.values())
>>>     return result
>>>
>>> students = {'Cierra Vega': 12, 'Alden Cantrell': 12, 'Kierra Gentry': 12, 'Pierre Cox': 12}
>>> print("Original Dictionary:")
>>> print(students)
>>> n = 12
>>> print("\nCheck all are ",n,"in the dictionary.")
>>> print(value_check(students, n))
>>> n = 10
>>> print("\nCheck all are ",n,"in the dictionary.")
>>> print(value_check(students, n))
```

2. Write a Python program to filter the height and width of students, which are stored in a dictionary.

Solution:

```
>>> def filter_data(students):
>>>     result = {k: s for k, s in students.items() if s[0] >=6.0 and s[1] >=70}
>>>     return result
>>>
>>> students = {'jashan': (6.2, 70), 'rahul': (5.9, 65), 'sonia': (6.0, 68), 'anayra': (5.8, 66)}
>>> print("Original Dictionary:")
>>> print(students)
>>> print("\nHeight > 6ft and Weight> 70kg:")
>>> print(filter_data(students))
```

3. Write a Python program to clear the list values in the said dictionary

Solution:

```
>>> def test(dictionary):
>>>     for key in dictionary:
>>>         dictionary[key].clear()
```

```

>>> return dictionary
>>>
>>> dictionary = {
>>>     'C1' : [10,20,30],
>>>     'C2' : [20,30,40],
>>>     'C3' : [12,34]
>>> }
>>> print("\nOriginal Dictionary:")
>>> print(dictionary)
>>> print("\nClear the list values in the said dictionary:")
>>> print(test(dictionary))

```

4. Write a Python program to convert string values of a given dictionary, into integer/float datatypes.

Solution:

```

>>> def convert_to_int(lst):
>>>     result = [dict([a, int(x)] for a, x in b.items()) for b in lst]
>>>     return result

>>> def convert_to_float(lst):
>>>     result = [dict([a, float(x)] for a, x in b.items()) for b in lst]
>>>     return result

>>> nums = [{ 'x': '10' , 'y': '20' , 'z': '30' }, { 'p': '40', 'q': '50', 'r': '60' }]
>>> print("Original list:")
>>> print(nums)
>>> print("\nString values of a given dictionary, into integer types:")
>>> print(convert_to_int(nums))
>>> nums = [{ 'x': '10.12', 'y': '20.23', 'z': '30' }, { 'p': '40.00', 'q': '50.19', 'r': '60.99' }]
>>> print("\nOriginal list:")
>>> print(nums)
>>> print("\nString values of a given dictionary, into float types:")
>>> print(convert_to_float(nums))

```

5. Write a Python program to get the length of an array.

Solution:

```
>>> from array import array
>>> num_array = array('i', [10,20,30,40,50])
>>> print("Length of the array is:")
>>> print(len(num_array))
```

6. Write a Python program to find all n-digit integers that start or end with 2?

Solution:

```
>>> def test(n):
>>>     ans = []
>>>     for i in range(10 ** (n - 1), 10 ** n):
>>>         assert len(str(i)) == n
>>>         if str(i).startswith("2") or str(i).endswith("2"):
>>>             ans.append(i)
>>>     return ans
>>> n = 1
>>> print("Number:",n)
>>> print("All",n,"- digit integers that start or end with 2:")
>>> print(test(n))
>>> n = 2
>>> print("\nNumber:",n)
>>> print("All",n,"- digit integers that start or end with 2:")
>>> print(test(n))
>>> n = 3
>>> print("\nNumber:",n)
>>> print("All",n,"- digit integers that start or end with 2:")
>>> print(test(n))
```

7. write a program For each triple of eaten, need, stock write a Python program to get a pair of total appetite and remaining.

Solution:

```
>>> def test(nums):
>>>     return [[a+min(b, c), max(0, c-b)] for a, b, c in nums]
>>>
>>> nums = [[2, 5, 6], [3, 9, 22]]
>>> print("Original list (triple) of lists:")
>>> print(nums)
>>> print("Each triple of eaten, need, stock return a pair of total appetite and remaining:")
```

```

>>> print(test(nums))
>>> nums = [[2, 3, 18], [4, 9, 2], [2, 5, 7], [3, 8, 12], [4, 9, 106]]
>>> print("\nOriginal list (triple) of lists:")
>>> print(nums)
>>> print("Each triple of eaten, need, stock return a pair of total appetite and remaining:")
>>> print(test(nums))
>>> nums = [[1, 2, 3], [4, 5, 6]]
>>> print("\nOriginal list (triple) of lists:")
>>> print(nums)
>>> print("Each triple of eaten, need, stock return a pair of total appetite and remaining:")
>>> print(test(nums))

```

8. Write a Python program to find all integers ≤ 1000 that are the product of exactly three primes. Each integer should represent as the list of its three prime factors.

Solution:

```

>>> def test(n):
>>>     ps = [p for p in range(2,n) if all(p % sat != 0 for sat in range(2, p))]
>>>     return [[p, q, r] for p in ps for q in ps for r in ps if p*q*r <= n]
>>> n = 10
>>> print("Number:",n)
>>> print("Find all integers <= said number that are the product of exactly three primes:")
>>> print(test(n))
>>> n = 50
>>> print("\nNumber:",n)
>>> print("Find all integers <= said number that are the product of exactly three primes:")
>>> print(test(n))
>>> n = 1000
>>> print("\nNumber:",n)
>>> print("Find all integers <= said number that are the product of exactly three primes:")
>>> print(test(n))

```

9. Write a Python program to find the sum of the magnitudes of the elements in the array with a sign that is equal to the product of the signs of the entries

Solution:

```

>>> def test(nums):
>>>     tot = sum(abs(i) for i in nums)
>>>     if all(nums):

```

```

>>>     return tot if sum(i < 0 for i in nums) % 2 == 0 else -tot
>>>     return 0

>>> nums = [1, 3, -2]
>>> print("Original list of numbers:")
>>> print(nums)
>>> print("Sum of the magnitudes of the elements in the array with a sign that is equal to the
product of the signs of the entries:")
>>> print(test(nums))
>>> nums = [1, -3, 3]
>>> print("\nOriginal list of numbers:")
>>> print(nums)
>>> print("Sum of the magnitudes of the elements in the array with a sign that is equal to the
product of the signs of the entries:")
>>> print(test(nums))
>>> nums = [10, 32, 3]
>>> print("\nOriginal list of numbers:")
>>> print(nums)
>>> print("Sum of the magnitudes of the elements in the array with a sign that is equal to the
product of the signs of the entries:")
>>> print(test(nums))
>>> nums = [-25, -12, -23]
>>> print("\nOriginal list of numbers:")
>>> print(nums)
>>> print("Sum of the magnitudes of the elements in the array with a sign that is equal to the
product of the signs of the entries:")
>>> print(test(nums))

```

10. Write a Python program to find an integer exponent x such that $a^x = n$.

Solution:

```

>>> a = 2
>>> n = 1024
>>> print("a = ", a, ": n = ", n)
>>> print("Find an integer exponent x such that a^x = n:")
>>> print(test(n, a))
>>> a = 3
>>> n = 81
>>> print("a = ", a, ": n = ", n)
>>> print("\nFind an integer exponent x such that a^x = n:")
>>> print(test(n, a))
>>> a = 3

```

```
>>> n =  
1290070078170102666248196035845070394933441741644993085810116441344597492  
642263849  
>>> print("a = ",a,": n = ",n)  
>>> print("\nFind an integer exponent x such that a^x = n:")  
>>> print(test(n,a))
```