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WEEK: 1

Experiment Number:1
Date:4/5/2021
Aim: To solve allotted week 1(SET3) python exercises

1. A positive integer is called a perfect number if it is equal to the sum of all of its positive divisors,

excluding itself. For example, 6 is the first perfect number, because The next is There are four perfect

numbers less than 10,000. Write a program to find these four numbers.

```
def perfect(n):
    sum = 1
    i = 2
    while i * i <= n:
        if n % i == 0:
            sum = sum + i + n/i
        i += 1
    if sum == n and n != 1:
        return True
    else:
        return False

n = 1
for n in range (7,10000):
    if perfect (n):
        print(n)
```

OUTPUT:-

```
28
496
8128
```

2. (Twin primes) Twin primes are a pair of prime numbers that differ by 2. For example, 3 and 5, 5

and 7, and 11 and 13 are twin primes. Write a program to find all twin primes less than 1,000.

Display the output as follows:

```
def is_prime(n):
  for i in range(2, n):
    if n % i == 0:
      return False
  return True

def twins(start,end):
  for i in range(start, end):
    j = i + 2
    if(is_prime(i) and is_prime(j)):
      print("({:d},{:d})".format(i, j))

twins(2, 1000)
```

OUTPUT:-

```
(3,5)
(5,7)
(11,13)
(17,19)
(29,31)
(41,43)
(59,61)
(71,73)
(101,103)
(107,109)
(137,139)
(149,151)
(179,181)
(191,193)
(197,199)
(227,229)
(239,241)
(269,271)
(281,283)
(311,313)
(347,349)
(419,421)
(431,433)
(461,463)
(521,523)
(569,571)
(599,601)
(617,619)
(641,643)
(659,661)
(809,811)
(821,823)
(827,829)
(857,859)
(881,883)
```

3.A prime number is called a Mersenne prime if it can be written in the form 2^n-1 for some positive

integer p. Write a program that finds all Mersenne primes with and displays the output as follows:

```
def number(n, prime):
  for i in range(0, n + 1):
     prime[i] = True
  p = 2
  while (p * p <= n):
```

```
    if (prime[p] == True):
        for i in range(p * 2, n + 1, p):
            prime[i] = False
    p += 1
def mersennePrimes(n):
  prime = [0] * (n + 1)
  number(n, prime)
  k = 2
  while (((1 << k) - 1) <= n):
    num = (1 << k) - 1
    if (prime[num]):
      print(num, end=" ")
    k += 1
n = 10000
print("Mersenne prime numbers smaller",
   "than or equal to ", n)
mersennePrimes(n)
```

OUTPUT:-

```
Mersenne prime numbers smaller than or equal to  10000
3 7 31 127 8191
```

4. (Financial application: compute future tuition) Suppose that the tuition for a university is $10,000

this year and increases 5% every year. Write a program that computes the tuition in ten years and the

total cost of four years‟ worth of tuition starting ten years from now.

```
price = 10000
```

```
total = 0
for i in range(1,14):
    price += price * 0.05
    if i == 10:
        print("price in 10 yrs :")
        print(price)
    if i > 10 :
        total += price
print("price after 4 years after 10years: ")
print(total)
```

OUTPUT:-

```
price in 10 yrs :
16288.946267774414
price after 4 years after 10years:
53918.448264616774
```

5. (Find the two highest scores) Write a program that prompts the user to enter the number of students

and each student‟s score, and displays the highest and secondhighest scores.

```
lst = []
n = int(input("Enter number of marks : "))

for i in range(0, n):
    ele = int(input())

    lst.append(ele)

for i in range(0, n):
    for j in range(0, n-i-1):
        if lst[j] < lst[j+1] :
```

```
            lst[j],lst[j+1] = lst[j+1], lst[j]


print("highest 2 numbers")

print(lst[0],lst[1])
```

OUTPUT:-

```
Enter number of marks : 5
98
62
74
35
83
highest 2 numbers
98 83
```