

→ Programs

WAP for the following number theory

- 99 is such a number, if you add the digits and add the sum to the product of the digits you get the same number

Find such numbers upto 10000

```
In [7]: 1 for i in range(1,10001):
        2     temp = i
        3     add = 0
        4     product = 1
        5     while temp>0 :
        6         r = temp%10
        7         add += r
        8         product *= r
        9         temp = temp//10
       10     if(add+product==i):
       11         print(i)
       12     else :
       13         continue
```

```
19
29
39
49
59
69
79
89
99
```

```
In [12]: 1 for i in range(1,6):
        2     print(i * "*" )
```

```
*
* *
* * *
* * * *
* * * * *
```

```

In [18]: 1 def upside(digit):
2         if digit == 0 : return 0
3         if digit == 1 : return 1
4         if digit == 6 : return 9
5         if digit == 9 : return 6
6         if digit == 8 :return 8
7         else: return -1
8 def is_upside(num):
9     original = num
10    flipped = 0
11    while num>0 :
12        digit = num%10
13        flipdigit = upside(digit)
14        if flipdigit== -1:
15            return False
16        flipped = flipped*10+flipdigit
17        num //= 10
18    return flipped==original
19
20
21 for num in range(1,1001):
22     if is_upside(num):
23         print(num)

```

```

1
8
11
69
88
96
101
111
181
609
619
689
808
818
888
906
916
986

```

WAP to find happy numbers upto 100

- Start with any positive number replace the number by the sum of the square of its digit and repeat the process untill the number is equal to 1

```
In [26]: 1 def happy (num):
2         remaining = 0
3         add = 0
4         while(num>0) :
5             remaining = num%10
6             add += (remaining*remaining)
7             num //= 10
8         return add
9     for i in range(1,101):
10        result = i
11        while result!=1 and result!=4:
12            result = happy(result)
13        if result == 1:
14            print(i)
```

```
1
7
10
13
19
23
28
31
32
44
49
68
70
79
82
86
91
94
97
100
```

Ramanujan numbers are the numbers that can be expressed as sum of two cubes in two diff ways, wap to find those 2 numbers

```
In [32]: 1 def rambhai(limit):
2         result = " "
3         for a in range(1,limit):
4             for b in range(a,limit):
5                 for c in range(a,limit):
6                     for d in range(c,limit):
7                         x = a**3 + b**3
8                         y = c**3 + d**3
9                         if x==y and (a!=c or b!=d):
10                            number = a**3 + b**3
11                            result += f'{number}:{a,b,c,d}\n'
12     return result
13 print(rambhai(20))
```

```
1729:(1, 12, 9, 10)
4104:(2, 16, 9, 15)
```