# Assignment-9

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Question 1
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Given an integer n, return true if it is a power of two. Otherwise, return false.

An integer n is a power of two, if there exists an integer x such that n == 2x.

```
Example 1: Input: n = 1
Output: true
Example 2: Input: n = 16
Output: true
Example 3: Input: n = 3
Output: false
class Solution(object):
  def isPowerOfTwo(self, n):
```

```
if n<=0:
  return False
cnt=0
```

while(n!=0): if(n & 1):

> cnt+=1 n=n>>1

return cnt==1

## Question 2

Given a number n, find the sum of the first natural numbers.

### Example 1:

Input: n = 3 Output: 6

Example 2: Input:5 Output: 15 def findSum(n): if (n % 2 == 0): return (n / 2) \* (n + 1) else:

return ((n + 1) / 2) \* n

Question 3

Given a positive integer, N. Find the factorial of N.

Example 1: Input: N = 5

```
Output: 120

Example 2:
Input: N = 4

Output: 24

class Solution:

def factorial (self, N):

# code here

fact=1

while N!=0:

fact=fact*N

N-=1

return fact
```

## Question 4

Given a number N and a power P, the task is to find the exponent of this number raised to the given power, i.e. N^P.

#### Example 1:

```
Input: N = 5, P = 2
Output: 25
Example 2 : Input: N = 2, P = 5
Output: 32
def calc_power(N, p):
    if p == 0:
        return 1
    return N * calc_power(N, p-1)
```

## Question 5

Given an array of integers arr, the task is to find maximum element of that array using recursion.

#### Example 1:

```
Input: arr = {1, 4, 3, -5, -4, 8, 6}; Output: 8
Example 2:
Input: arr = {1, 4, 45, 6, 10, -8}; Output: 45
def find_max_recursive(arr):
    if len(arr) == 1:
        return arr[0]
    else:
        return max(arr[0], find_max_recursive(arr[1:]))
```

## Question 6

Given first term (a), common difference (d) and a integer N of the Arithmetic Progression series, the task is to find Nth term of the series.

#### Example 1:

```
Input: a = 2 d = 1 N = 5 Output: 6 The 5th term of the series is: 6
Example 2:
Input: a = 5 d = 2 N = 10 Output: 23 The 10th term of the series is: 23
def Nth of AP(a, d, N):
 return (a + (N - 1) * d)
Question 7
Given a string S, the task is to write a program to print all permutations of a given string.
Example 1:
Input:
S = "ABC"
Output:
"ABC", "ACB", "BAC", "BCA", "CBA", "CAB"
Example 2:
Input:
S = "XY"
Output:
"XY", "YX"
from itertools import permutations
class Solution:
  def find_permutation(self, S):
    def permute(S):
       if len(S) == 0:
        return []
       elif len(S) == 1:
        return [S]
       else:
        new = []
        for i in range(len(S)):
          x = S[i]
          xs = S[:i] + S[i+1:]
           R = permute(xs)
           for j in R:
             new.append(x + j)
      return new
    a = permute(S)
    b = sorted(set(a))
    return b
Question 8
Given an array, find a product of all array elements.
Example 1:
```

```
Input : arr[] = {1, 2, 3, 4, 5} Output : 120 Example 2:
Input : arr[] = {1, 6, 3} Output : 18

MOD = 1000000007

def product(ar, n):
    result = 1
    for i in range(0, n):
    result = (result * ar[i]) % MOD
    return result
```