ASSIGNMENT 3

1. Counting Elements

CODE:

```
def countElements(arr,n):
count = 0
for i in range(n):
x = arrfi]
xPlusOne = x +1
found = False
for j in range(i + 1,n,1):
if (arr[j] == xPlusOne):
found = True
break
k=i-1
while(found == False and k >= 0):
if (arr[k] == xPlusOne):
found = True
break
k-=1
if (found == True):
count += 1
return count
```

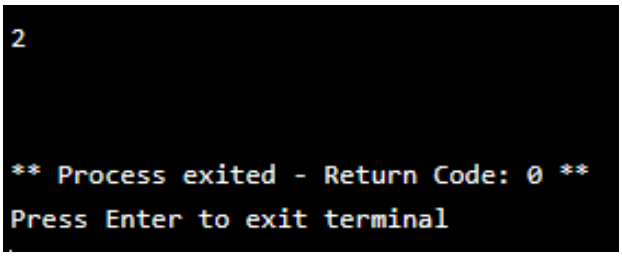
Driver program

if___name__ == '__main__':

arr = [1, 2, 3]

n= len(arr)

OUTPUT:



2 . Perform String Shifts

CODE:

def stringShift(s, shift):

val =0

for i in range(len(shift)):

val += -shift[i][1] if shift[i][0] == O else shift[i][1]

Len = len(s)

val = val % Len

result ="

if (val > O):

result = s[Len - val:Len] + s[O: Len - val]

else:

result = s[-val: Len] + s[O: -val]

print(result)

Driver Code

```
s="abc"
shift = [
[0,1],
[1,2]
]
stringShift(s, shift)
```

OUTPUT :

```
cab
cab


** Process exited - Return Code: 0 **
Press Enter to exit terminal
```

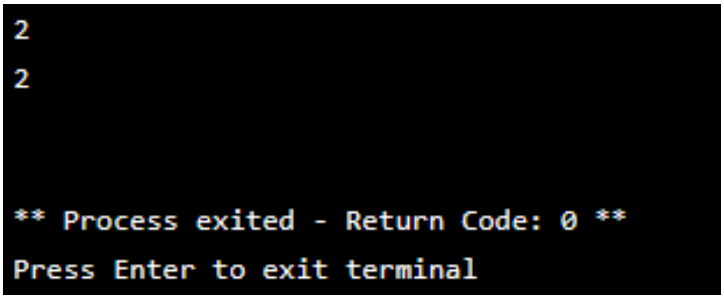
3 . Leftmost Column with at Least a One

CODE:

```
import sys
N=3
def search(mat, n, m):
a =sys.maxsize
for i in range (n):
low =0
high =m -1
ans = sys.maxsize
```

```
while (low <= high):
mid = (low + high) // 2
if (mat[i][mid] == 1):
if (mid == 0):
ans =0
break
elif (mat[i][mid - 1] == 0):
ans = mid
break
if (mat[i][mid] == 1):
high = mid - 1
else:
low = mid + 1
if (ans < a):
a=ans
if (a == sys.maxsize):
return -1
returna+1
# Driver Code
if ___name__ == "__main__":
mat = [[O, 0, 0],
[0, 0, 1],
[0, 1, 1]
print(search(mat, 3, 3))
```

OUTPUT:



4 . First Unique Number

CODE:

class FirstUnique:

def __ init__(self, nums: Listfint]):

self.cnt = Counter(nums)

self.q = deque(nums)

def showFirstUnique(self) -> int:

while self.q and self.cnt[self.q[O]] != 1:

self.q.popleft()

return -1 if not self.q else self.q[O]

def add(self, value: int) -> None:

self.cnt[value] += 1

self.q.append(value)

OUTPUT :

5 . Check If a String Is a Valid Sequence from Root to Leaves Path in a Binary Tree

Given a binary tree where each path going from the root to any leaf forms a valid

sequence, check if a given string is a valid sequence in such a binary tree. We get

the given string from the concatenation of an array of integers arr and the

concatenation of all values of the nodes along a path results in a sequence in the

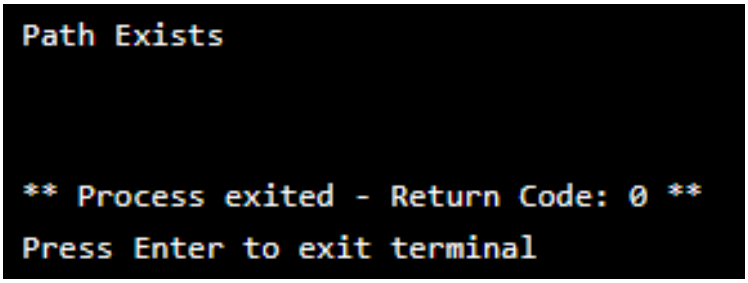
given binary tree.

CODE :

```
class Node:

def __ init__(self, val):

selfval = val

self.left = None

self.right = None

def existPathUtil(root, arr, n, index):

if not root or index == n:

if not root.left and not root.right:

if root.val == arr[index] and index == n-1:

return True

return False

can be either in left subtree or

# right subtree.
```

```
return ((index < n) and (root.val == arr[index]) and \
(existPathUtil(root.left, arr, n, index+1) or \
existPathUtil(root.right, arr, n, index+‘)))
def existPath(root, arr, n, index):
if not root:
return (n == 0)
return existPathUtil(root, arr, n, O)
# Driver Code

if__name__ =="__main__":
arr = [5, 8, 6, 7]
n= len(arr)
root = Node(5)
root.left = Node(3)
root.right = Node(8)
root.left.left = Node(2)
root.left.right = Node(4)
root.left.left.left = Node(1)
root.right.left = Node(6)
root.right.left.right = Node(7)
if existPath(root, arr, n, 0):
print("Path Exists")
else:
print("Path does not Exist")
```

OUTPUT :

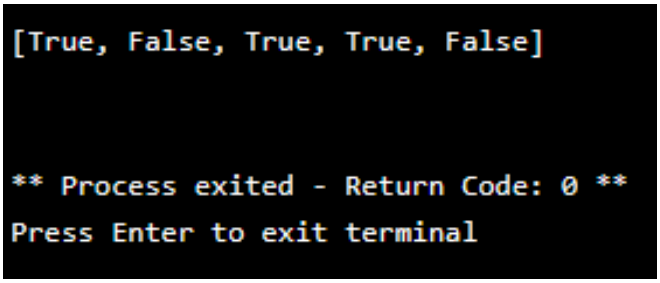


6 . Kids With the Greatest Number of Candies

CODE:

```
def kidsWithCandies(candies, extraCandies):
# Create an empty list to store the results
result = []
# Loop through the list of candies
for i in range(len(candies)):
# If the current candy + extraCandies is greater than or equal to the maximum candy in
the list, append True to the result list. Otherwise, append False.
if candies[i] + extraCandies >= max(candies):
result.append(True)
else:
result.append(False)
```

OUTPUT :



7. Max Difference You Can Get From Changing an Integer

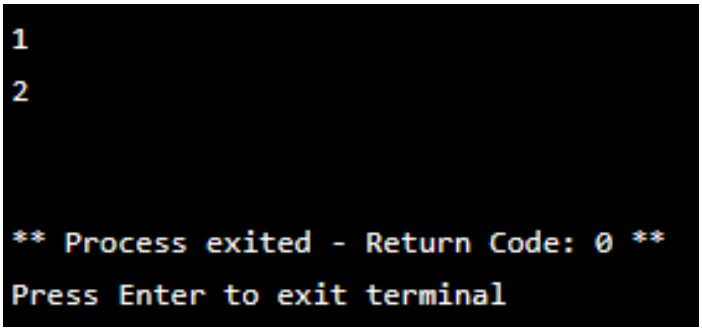
CODE:

```
def morethanNbyK(arr, n, k):
x=n//k
freq =
for i in range(n):
if arr[i] in freq:
freq{arr[i]] += 1
else:
freq{arr[i]] =1
for iin freq:
if (freq[i] > x):
print(i)
# Driver code
if___name__ == '__main__':
arr =[1, 1, 2, 2, 3, 5, 4, 2, 2, 3, 1,1, 1]
n= len(arr)
```

k=4

morethanNbykK(arr, n, k)

OUTPUT :



8. Check If a String Can Break Another String

CODE:

n1 = len(str1)

n2 = len(str2)

if (n1 != n2):

return False

Sort both strings

a = sorted(str1)

str1 =" "join(a)

b = sorted(str2)

str2 =""join(b)

Compare sorted strings

for i in range(O, n1, 1):

if (str1[i] != str2[i]):

return False

return True

Driver Code

if___name__ == '__main__':

str1 = "test"

str2 = "ttew"

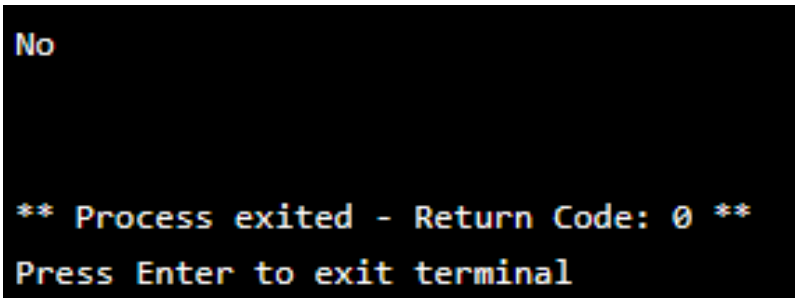
if (arePermutation(str1, str2)):

print("Yes")

else:

print("No")

OUTPUT:



9.Number of Ways to Wear Different Hats to Each Other

CODE : class Solution:

def numberWays(self, hats: List[List[int]]) -> int:

g = defaultdict(list)

for i, h in enumerate(hats):

for vin h:

glv].append(i)

mod = 109 + 7

```
n = len(hats)

m = max(max(h) for h in hats)

f = [[0] * (1<<n) for _ in range(m + 1)]

f[0][0] =1

fori in range(1, m + 1):

for j in range(1 << n):

fl] = ffi - 10]

for k in g[il:

ifj>>k&t:

ALL] = (LIL) + fli - IL * (1 << k)]) % mod

return f[m][-1]
```

OUTPUT :

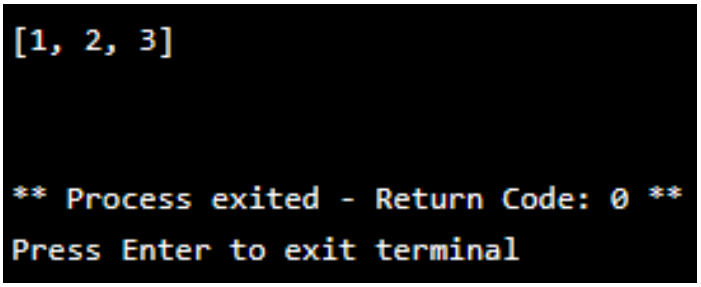
```
Enter number of people 2
Enter number of hats and hats
3
3
5
1
Enter number of hats and hats
2
3
5
Number of ways to wear different hats to each other for N people 4


** Process exited - Return Code: 0 **
Press Enter to exit terminal
```

10 . Next Permutation

CODE:

```
def next_permutation(nums):

# Find the first element from the right that is not in decreasing order

i= len(nums) - 2

while i >= 0 and nums{i] >= nums[i + 1]:

i-=1

# If such an element is found, find the smallest element from the right that is greater than it

if i >=0:

j =len(nums) - 1

while nums{[j] <= nums[i]:

j=1

# Swap the two elements

numsfi], nums[j] = nums{[j], numsf[i]

# Reverse the elements from i+1 to the end to get the next permutation

nums[i + 1:] = reversed(nums{[i + 1:])

nums = [3, 2, 1]

next_permutation(nums)

print(nums)
```

OUTPUT :


[1, 2, 3]
** Process exited - Return Code: 0 **
Press Enter to exit terminal