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**Theory**

**2.1 Indices**

**def** indices(N, d):  
 list = [0 **for** x **in** range(d)]  
 **if** d != 0:  
 indices\_recurse(N, d, list, 1)  
  
**def** indices\_recurse(N, d, list, index):  
 **if** index == len(list):  
 **for** i **in** range(N + 1):  
 print(list) *# print a unit of output* list[index-1] += 1  
 list[index-1] = 0  
 **else**:  
 **for** i **in** range(N + 1):  
 indices\_recurse(N, d, list, index+1)  
 list[index-1] += 1  
 list[index-1] = 0

Q: “If we say an output of (0, 0, … , 0) is one unit of output, how many units of output in terms of N and d are there?”

A: (N+1)d

Q: “Now dropping the assumption that n1, n2, … , nd = N, how many units of output in terms of n1, n2, … , nd and d are there?”

A: (n1+1)(n2+1) … (nd+1)

**2.1 Loops**

Prove that

