def initialize(n):

for key in ['queen','row','col','nwtose','swtone']:

board[key] = {}

for i in range(n):

board['queen'][i] = -1

board['row'][i] = 0

board['col'][i] = 0

for i in range(-(n-1),n):

board['nwtose'][i] = 0

for i in range(2\*n-1):

board['swtone'][i] = 0

def printboard():

for row in sorted(board['queen'].keys()):

print((row,board['queen'][row]),end=" ")

print("")

def free(i,j):

return(board['row'][i] == 0 and board['col'][j] == 0 and

board['nwtose'][j-i] == 0 and board['swtone'][j+i] == 0)

def addqueen(i,j):

board['queen'][i] = j

board['row'][i] = 1

board['col'][j] = 1

board['nwtose'][j-i] = 1

board['swtone'][j+i] = 1

def undoqueen(i,j):

board['queen'][i] = -1

board['row'][i] = 0

board['col'][j] = 0

board['nwtose'][j-i] = 0

board['swtone'][j+i] = 0

def placequeen(i):

n = len(board['queen'].keys())

for j in range(n):

if free(i,j):

addqueen(i,j)

if i == n-1:

printboard()

else:

extendsoln = placequeen(i+1)

undoqueen(i,j)

board = {}

n = int(input("How many queens? "))

initialize(n)

if placequeen(0):

printboard()