import turtle

# FORMATION OF THE GRID

n=int(input("Enter size of matrix:"))

j=0

for k in range (n):

for j in range (n):

for i in range (4):

turtle.forward(100)

turtle.left(90)

turtle.forward(100)

turtle.backward(100+100\*j)

turtle.left(90)

turtle.forward(100)

turtle.right(90)

# LOCATION OF THE SOURCE

x=int(input("Enter x component of source:"))

y=int(input("Enter y component of source:"))

if x==0 and y==3 :

turtle.forward(0)

elif x==1 and y==3:

turtle.forward(100)

elif x==2 and y==3:

turtle.forward(200)

elif x==3 and y==3:

turtle.forward(300)

elif x==0 and y==2:

turtle.right(90)

turtle.forward(100)

elif x==1 and y==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(100)

elif x==2 and y==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(200)

elif x==3 and y==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(300)

elif x==0 and y==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

elif x==1 and y==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(100)

elif x==2 and y==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(200)

elif x==3 and y==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(300)

elif x==0 and y==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

elif x==1 and y==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(100)

elif x==2 and y==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(200)

elif x==3 and y==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(300)

else :

print("Invalid grid input")

# LOCATION OF THE DESTINATION

x1=int(input("Enter x component of destination:"))

y1=int(input("Enter y component of destination:"))

if x==0 and y==3 :

turtle.forward(0)

elif x==1 and y==3:

turtle.backward(100)

elif x==2 and y==3:

turtle.backward(200)

elif x==3 and y==3:

turtle.backward(300)

elif x==0 and y==2:

turtle.left(90)

turtle.forward(100)

turtle.right(90)

elif x==1 and y==2:

turtle.backward(100)

turtle.left(90)

turtle.forward(100)

turtle.right(90)

elif x==2 and y==2:

turtle.backward(200)

turtle.left(90)

turtle.forward(100)

turtle.right(90)

elif x==3 and y==2:

turtle.backward(300)

turtle.left(90)

turtle.forward(100)

turtle.right(90)

elif x==0 and y==1:

turtle.left(90)

turtle.forward(200)

turtle.right(90)

elif x==1 and y==1:

turtle.backward(100)

turtle.left(90)

turtle.forward(200)

turtle.right(90)

elif x==2 and y==1:

turtle.backward(200)

turtle.left(90)

turtle.forward(200)

turtle.right(90)

elif x==3 and y==1:

turtle.backward(100)

turtle.left(90)

turtle.forward(200)

turtle.right(90)

elif x==0 and y==0:

turtle.backward(0)

turtle.left(90)

turtle.forward(300)

turtle.right(90)

elif x==1 and y==0:

turtle.backward(100)

turtle.left(90)

turtle.forward(300)

turtle.right(90)

elif x==2 and y==0:

turtle.backward(200)

turtle.left(90)

turtle.forward(300)

turtle.right(90)

elif x==3 and y==0:

turtle.backward(300)

turtle.left(90)

turtle.forward(300)

turtle.right(90)

else :

print("Invalid grid input")

if x1==0 and y1==3 :

turtle.forward(0)

elif x1==1 and y1==3:

turtle.forward(100)

elif x1==2 and y1==3:

turtle.forward(200)

elif x1==3 and y1==3:

turtle.forward(300)

elif x1==0 and y1==2:

turtle.right(90)

turtle.forward(100)

elif x1==1 and y1==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(100)

elif x1==2 and y1==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(200)

elif x1==3 and y1==2:

turtle.right(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(300)

elif x1==0 and y1==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

elif x1==1 and y1==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(100)

elif x1==2 and y1==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(200)

elif x1==3 and y1==1:

turtle.right(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(300)

elif x1==0 and y1==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

elif x1==1 and y1==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(100)

elif x1==2 and y1==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(200)

elif x1==3 and y1==0:

turtle.right(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(300)

else :

print("Invalid grid input")

# FIND SHORTEST PATH FROM SOURCE TO DESTINATION:

turtle.color('red')

SD=input("Map shortest distance:")

print(" The red coloured path is the shortest route from source to destination")

if x<=x1 and y<=y1:

if x1-x==0 and y1-y==0:

print("Source and destination are the same")

elif x1-x==1 and y1-y==0:

turtle.backward(100)

elif x1-x==2 and y1-y==0:

turtle.backward(200)

elif x1-x==3 and y1-y==0:

turtle.backward(100)

elif x1-x==0 and y1-y==1:

turtle.right(90)

turtle.forward(100)

elif x1-x==1 and y1-y==1:

turtle.backward(100)

turtle.right(90)

turtle.forward(100)

elif x1-x==2 and y1-y==1:

turtle.backward(200)

turtle.right(90)

turtle.forward(100)

elif x1-x==3 and y1-y==1:

turtle.backward(300)

turtle.right(90)

turtle.forward(100)

elif x1-x==0 and y1-y==2:

turtle.right(90)

turtle.forward(200)

elif x1-x==1 and y1-y==2:

turtle.backward(100)

turtle.right(90)

turtle.forward(200)

elif x1-x==2 and y1-y==2:

turtle.backward(200)

turtle.right(90)

turtle.forward(200)

elif x1-x==3 and y1-y==2:

turtle.backward(300)

turtle.right(90)

turtle.forward(200)

elif x1-x==0 and y1-y==3:

turtle.right(90)

turtle.forward(300)

elif x1-x==1 and y1-y==3:

turtle.backward(100)

turtle.right(90)

turtle.forward(300)

elif x1-x==2 and y1-y==3:

turtle.backward(200)

turtle.right(90)

turtle.forward(300)

elif x1-x==3 and y1-y==3:

turtle.backward(300)

turtle.right(90)

turtle.forward(300)

else:

print("Invalid")

#When X>X1 and Y>Y1

elif x>x1 and y>y1:

if x-x1==1 and y-y1==1:

turtle.forward(100)

turtle.left(90)

turtle.forward(100)

elif x-x1==2 and y-y1==1:

turtle.forward(200)

turtle.left(90)

turtle.forward(100)

elif x-x1==3 and y-y1==1:

turtle.forward(300)

turtle.left(90)

turtle.forward(100)

elif x-x1==1 and y-y1==2:

turtle.forward(100)

turtle.left(90)

turtle.forward(200)

elif x-x1==2 and y-y1==2:

turtle.forward(200)

turtle.left(90)

turtle.forward(200)

elif x-x1==2 and y-y1==2:

turtle.forward(300)

turtle.left(90)

turtle.forward(200)

elif x-x1==1 and y-y1==3:

turtle.forward(100)

turtle.left(90)

turtle.forward(300)

elif x-x1==2 and y-y1==3:

turtle.forward(200)

turtle.left(90)

turtle.forward(300)

elif x-x1==3 and y-y1==3:

turtle.forward(300)

turtle.left(90)

turtle.forward(300)

else:

print("Invalid")

elif x<x1 and y>y1 :

if x1-x==1 and y-y1==1:

turtle.left(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(100)

elif x1-x==1 and y-y1==2:

turtle.left(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(100)

elif x1-x==1 and y-y1==3:

turtle.left(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(100)

elif x1-x==2 and y-y1==1:

turtle.left(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(200)

elif x1-x==2 and y-y1==2:

turtle.left(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(200)

elif x1-x==2 and y-y1==3:

turtle.left(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(200)

elif x1-x==3 and y-y1==1:

turtle.left(90)

turtle.forward(100)

turtle.left(90)

turtle.forward(300)

elif x1-x==3 and y-y1==2:

turtle.left(90)

turtle.forward(200)

turtle.left(90)

turtle.forward(300)

elif x1-x==3 and y-y1==3:

turtle.left(90)

turtle.forward(300)

turtle.left(90)

turtle.forward(300)

else:

print("Invalid")

elif x>x1 and y<y1:

if x-x1==1 and y1-y==1:

turtle.forward(100)

turtle.right(90)

turtle.forward(100)

elif x-x1==1 and y1-y==2:

turtle.forward(100)

turtle.right(90)

turtle.forward(200)

elif x-x1==1 and y1-y==3:

turtle.forward(100)

turtle.right(90)

turtle.forward(300)

elif x-x1==2 and y1-y==1:

turtle.forward(200)

turtle.right(90)

turtle.forward(100)

elif x-x1==2 and y1-y==2:

turtle.forward(200)

turtle.right(90)

turtle.forward(200)

elif x-x1==2 and y1-y==3:

turtle.forward(200)

turtle.right(90)

turtle.forward(300)

elif x-x1==3 and y1-y==1:

turtle.forward(300)

turtle.right(90)

turtle.forward(100)

elif x-x1==3 and y1-y==2:

turtle.forward(300)

turtle.right(90)

turtle.forward(200)

elif x-x1==3 and y1-y==3:

turtle.forward(300)

turtle.right(90)

turtle.forward(300)

else:

print("Invalid")

else:

print("Invalid")

print("end")