Assignment 6: Applications of Python in the field of Soil Mechanics

DATE:

1. A Concentrated load of 2500 kN is applied at the ground surface Determine the vertical stress at a point up to 6 m depth and at a horizontal distance of 5 m from the axis of load. Plot graph by using Excel. Use Boussinesq's Theory.

Q1.

INPUT

# Stress When depth is constant

Q = float(input("Enter the value of Load in kN: "))

N = int(input("Number of data values of radial distance: ")) Z = float(input("Depth: "))

r = []

for i in range(1, N + 1):

print ("Enter radial distance in m".format (i)) Value\_r = float(input () )

r.append(Value\_r) # this line was not indented correctly, causing the error Stress = ((3\*Q)/(2\*math.pi\*Z\*Z) ) \* (((1/ (1+((Value\_r/Z) \*\*2))) ) \*\* 2.5) print ("Stress: ", Stress, " kN/m^2")

OUTPUT

Enter the value of Load in kN: 2500 Number of data values of radial distance: 5 Depth: 6

Enter radial distance in m 1

Stress: 30.9621304453601 kN/m^2 Enter radial distance in m

2

Stress: 25.479163627896558 kN/m^2

Enter radial distance in m 3

Stress: 18.980334491124726 kN/m^2

Enter radial distance in m 4

Stress: 13.222902239693882 kN/m^2

Enter radial distance in m 5

Stress: 8.871775810212817 kN/m^2

Q2.

INPUT

# Stress when Radius is Constant

Q = float (input("Enter the value of Load in kN: ")) M= int (input ("Number of data values of depth: ")) pi = 3.14159265359

r = float (input("Radial Distance: ")) Z = []

for j in range (1, M+1):

print ("Enter depth in z".format (j)) Value\_Z = float (input ())

Z.append (Value\_Z)

Stress = ((3\*Q)/(2\*pi\*Value\_Z\* Value\_Z)) \* ((1/ (1+ ( (r/Value\_Z) \*\*2))) )\*\*2.5 print ("Stress: ", Stress, " kN/m^2")

OUTPUT

Enter the value of Load in kN: 2500 Number of data values of depth: 6 Radial Distance: 5

Enter depth in z 1

Stress: 0.34629643854273023 kN/m^2

Enter depth in z 2

Stress: 2.1085135063018074 kN/m^2

Enter depth in z 3

Stress: 4.781320614736756 kN/m^2 Enter depth in z

4

Stress: 7.0974399578803125 kN/m^2

Enter depth in z 5

Stress: 8.440465463972316 kN/m^2 Enter depth in z

6

Stress: 8.871775810212231 kN/m^2

Q3.

INPUT

# Calculating the stress by Boussineq's Theory Q= int(input("Enter the value of given load : "))

z= int(input("Enter the distance of vertical stress : ")) r= int(input("Enter the distance of horizntal stress: ")) stress = (3\*Q\*(1/(1+(r/z)\*\*2)) \*\* 2.5)/(2\*3.14\*(z\*\*2)) print("The value of stress is", stress)

OUTPUT

Enter the value of given load : 2500

Enter the distance of vertical stress : 6

Enter the distance of horizontal stress: 5 The value of stress is 8.876275703713446