

MMDS Lab Assessment

Lab-Assesment -1

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<https://github.com/sujaykumarmag/CSE3045>

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1 Google Colab Link

<https://colab.research.google.com/drive/1A6KnYoxDNpOXUX6mOVRN9nDxlqjS1Dz-?usp=sharing>

2 Consider the linear equations and solve them to find the values for co-efficient using matrix method. The equations are $3s+5t=7$ and $2s+4t=6$. Your code must satisfy the following

```
1 import numpy as np
2
3 def parser(eq1):
4     a1 = []
5     c1 = 0
6     i=0
7     while(i<=len(eq1)):
8         if eq1[i]=='-':
9             a1.append(-float(eq1[i+1]))
10            i = i+2
11        if eq1[i]=='+' :
12            a1.append(float(eq1[i+1]))
13            i = i+2
14        elif eq1[i] == '=':
15            if eq1[i+1]=='-':
16                c1 = -float(eq1[i+2])
17                i = i+2
18            else:
19                c1 = float(eq1[i+1])
20                i = i+2
21            break
22        elif eq1[i]== "s" or eq1[i]=='t' or eq1[i]=='x' or eq1[i]=='y':
23            i = i+1
24        else:
25            a1.append(float(eq1[i]))
26            i = i+1
27    return a1,c1
28
29
30
31 eq1 = input("Enter the First Equation : ")
32 x1, c1 = parser(eq1)
33 eq2 = input("Enter the Second Equation : ")
34 x2,c2 = parser(eq2)
35
36 a1 = x1[0]
37 b1 = x1[1]
38 a2 = x2[0]
39 b2 = x2[1]
40
```

```

41 a = np.array([[a1,b1],[a2,b2]])
42 b = np.array([c1,c2])
43
44 def det():
45     return a1*b2 - b1*a2
46
47 def adjoint():
48     return np.array([[b2,-b1],[-a2,a1]])
49
50
51
52 a_inv = adjoint()/det()
53
54
55 res = np.matmul(a_inv,b)
56
57
58 print("s : ",res[0],"t : ",res[1])

```

2.1 Results

```

(base) sujaykumar@Sujays-MacBook-Air Desktop % python3 20BDS0294_1.py
Enter the First Equation : 2s+5t=2
Enter the Second Equation : -2s+4t=-6
s : 2.111111111111111 t : -0.4444444444444444
(base) sujaykumar@Sujays-MacBook-Air Desktop % python3 20BDS0294_1.py
Enter the First Equation : 3s-5t=7
Enter the Second Equation : -2s+4t=-6
s : -1.0 t : -2.0
(base) sujaykumar@Sujays-MacBook-Air Desktop % █

```

3 You are given a set of vectors represented as 3- dimensional points in space. Your task is to determine whether these vectors are coplanar or not. Write a function or a program that takes as input a list of vectors, where each vector is represented as a triplet (x, y, z), and returns a Boolean value indicating whether the vectors are coplanar or not. Test your code with following triplets:

```

1
2 import numpy as np
3
4
5
6 def parser(eq1):
7     list1 = []
8     x = []
9     for i in range(0,len(eq1)):
10         if eq1[i].isdigit():
11             if eq1[i-1]=='-':
12                 list1.append(-1 * int(eq1[i]))
13             else:
14                 list1.append(int(eq1[i]))
15         elif eq1[i].isalpha():
16             x.append(eq1[i])
17     return list1
18
19 x = list(input("Enter the First Vector (comma separated) "))
20 x = parser(x)
21
22 y = list(input("Enter the Second Vector (comma separated) "))
23 y = parser(y)

```

```

24
25 z = list(input("Enter the Second Vector (comma separated) "))
26 z = parser(z)
27
28 print(x,y,z)
29
30 a = np.array([x,y,z],dtype=float)
31
32
33 def det():
34     return x[0]*(y[1]*z[2]- z[1]*y[2]) - x[1]*(y[0]*z[2]-z[0]*y[2]) + x[2]*(y[0]*z[1]-z
        [0]*y[1])
35
36 def coplanar():
37     if(det()==0):
38         return True
39     else:
40         return False
41
42 coplanar()

```

3.1 Results

```

(base) sujaykumar@Sujays-MacBook-Air Desktop % python3 20BDS0294_2.py
\Enter the First Vector (comma separated) [2,3,4]
Enter the Second Vector (comma separated) [5,6,7]
Enter the Second Vector (comma separated) [-1,-1,-1]
[2, 3, 4] [5, 6, 7] [-1, -1, -1]
True
(base) sujaykumar@Sujays-MacBook-Air Desktop % python3 20BDS0294_2.py
Enter the First Vector (comma separated) [1,2,3]
Enter the Second Vector (comma separated) [1,1,1]
Enter the Second Vector (comma separated) [-1,-1,2]
[1, 2, 3] [1, 1, 1] [-1, -1, 2]
False

```