Class 2 - Find the Torsional Angle ☆

48/115 challenges solved

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Problem Submissions Leaderboard Editorial

You are given four points A, B, C and D in a 3-dimensional Cartesian coordinate system. You are required to print the angle between the plane made by the points A, B, C and B, C, D in degrees(**not radians**). Let the angle be PHI.

$Cos(PHI) = (X.Y)/|X||Y|$ where $X = AB$ x BC and $Y = BC$ x CD.

Here, $X.Y$ means the dot product of X and Y, and AB x BC means the cross product of vectors AB and BC. Also, $AB = B - A$.

Input Format

One line of input containing the space separated floating number values of the X, Y and Z coordinates of a point.

Output Format

Output the angle correct up to two decimal places.

Sample Input

```
0 4 5
1 7 6
0 5 9
1 7 2
```

Sample Output

```
8.19
```

Change Theme Python 3

```
9       def __sub__(self, no):
10          return Points((self.x - no.x),(self.y - no.y),(self.z - no.z))
11
12      def dot(self, no):
13          return (self.x * no.x)+(self.y * no.y)+(self.z * no.z)
14
15      def cross(self, no):
16          return Points((self.y * no.z)-(self.z * no.y),(self.z * no.x)-(self.x * no.z),
    (self.x * no.y)-(self.y * no.x))
17
18      def absolute(self):
19          return pow((self.x ** 2 + self.y ** 2 + self.z ** 2), 0.5)
20
```

```
if __name__ == '__main__':
    points = list()
    for i in range(4):
        a = list(map(float, input().split()))
        points.append(a)

    a, b, c, d = Points(*points[0]), Points(*points[1]), Points(*points[2]), Points
(*points[3])
    x = (b - a).cross(c - b)
    y = (c - b).cross(d - c)
    angle = math.acos(x.dot(y) / (x.absolute() * y.absolute()))

    print("%.2f" % math.degrees(angle))
```

Line: 21 Col: 27

Upload Code as File | Test against custom input | Run Code | Submit Code

You have earned 20.00 points!

48/115 challenges solved.

42%

Congratulations

You solved this challenge. Would you like to challenge your friends?

Next Challenge

Test case 0

Test case 1

Test case 2

Test case 3

Test case 4

Test case 5

Test case 6

Compiler Message

Success

Input (stdin) Download

```
0 4 5
1 7 6
0 5 9
1 7 2
```

Expected Output Download

```
8.19
```