Assignment -1

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The python code and Latex file can be found here:

https://github.com/Sairam13001/AI5006/tree/master/Assignment_1

Problem 1:

Find the distance between the two planes (2 3 4)x = 4 & (4 6 8)x = 12.

Solution:

- The given two planes are parallel as the perpendicular vectors of the planes (2 3 4) and (4 6 8) are proportional.

  i.e 2/4 = 3/6 = 4/8.

- Given two parallel planes P1: a1 * x + b1 * y + c1 * z + d1 = 0 and P 2: a2 * x + b2 * y + c2 * z + d2 = 0, We can find the distance between these parallel planes using the formula

  |ax1 + by1 + cz1 + d| / sqrt(a^2 + b^2 + c^2).

  Which can be written in python as

```
n = np.array([a2,b2,c2])
distance = abs(a2*x1 + d2)/np.linalg.norm(n)
```

where (x1,y1,z1) is a point on one plane.

- Let y1, z1 = 0. Then we are left with 2x1 = 4 => x1 = 2.

- So, the distance between the planes is

|4*2 + 6*0 + 8*0 - 12| / sqrt(16+36+64) = 4/sqrt(116) = 2/sqrt(29).