ASSIGNMENT-2

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Download all python codes from

```
https://github.com/CRAMYATULASI/
    ASSIGNMENT−2/tree/main/ASSIGNMENT
    %202/CODES
```

and latex-tikz codes from

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https://github.com/CRAMYATULASI/
    ASSIGNMENT−2/tree/main/ASSIGNMENT
    %202
```

1 QUESTION NO-2.34

Draw GOLD such that OL = 7.5, GL = 6, GD= 6, LD = 5 and OD = 10 .

2 SOLUTION

Given,

$$OL = 7.5, GL = 6, GD = 6, LD = 5, OD = 10. \tag{2.0.1}$$

Now,

$$OL = \|\mathbf{O} - \mathbf{L}\| = 7.5 \tag{2.0.2}$$
$$GL = \|\mathbf{G} - \mathbf{L}\| = 6 \tag{2.0.3}$$
$$GD = \|\mathbf{G} - \mathbf{D}\| = 6 \tag{2.0.4}$$
$$LD = \|\mathbf{L} - \mathbf{D}\| = 5 \tag{2.0.5}$$
$$OD = \|\mathbf{O} - \mathbf{D}\| = 10 \tag{2.0.6}$$

1) We know,a quadrilateral is a polygon with 4 sides if we have four points they will not form a quadrilateral if any three points are collinear.
2) Now,let us use the above fact and consider two triangles on same base if any three points are collinear it cannot be a triangle and then given sides cannot form a quadrilateral if any three sides are collinear. $\triangle LDO$ and $\triangle LDG$ are two triangles of given quadrilateral which are on same base LD Now, we check if any three sides are collinear in two triangles. Let us consider $\triangle LDO$-

$$\|\mathbf{O} - \mathbf{L}\| + \|\mathbf{O} - \mathbf{D}\| = 17.5 > \|\mathbf{L} - \mathbf{D}\| \tag{2.0.7}$$
$$\|\mathbf{O} - \mathbf{D}\| + \|\mathbf{L} - \mathbf{D}\| = 15 > \|\mathbf{O} - \mathbf{L}\| \tag{2.0.8}$$
$$\|\mathbf{O} - \mathbf{L}\| + \|\mathbf{L} - \mathbf{D}\| = 12.5 > \|\mathbf{O} - \mathbf{D}\| \tag{2.0.9}$$

Triangle inequality is satisfied.
$\therefore$ $\triangle LDO$ can be constructed.
Similarly, Now we consider $\triangle LDG$

$$\|\mathbf{L} - \mathbf{D}\| + \|\mathbf{G} - \mathbf{L}\| = 11 > \|\mathbf{G} - \mathbf{D}\| \tag{2.0.10}$$
$$\|\mathbf{G} - \mathbf{L}\| + \|\mathbf{G} - \mathbf{D}\| = 12 > \|\mathbf{L} - \mathbf{D}\| \tag{2.0.11}$$
$$\|\mathbf{L} - \mathbf{D}\| + \|\mathbf{G} - \mathbf{D}\| = 11 > \|\mathbf{G} - \mathbf{L}\| \tag{2.0.12}$$

Triangle inequality is satisfied.
$\therefore$ $\triangle LDG$ can be constructed.
$\therefore$ Given sides form a quadrilateral.
Vertices of quadrilateral GOLD:
Now from $\triangle LDO$,the sides of $\triangle LDO$ are known Which means vertices O,L and D can be obtained using example 1.2.3
Similarly,the vertices of $\triangle LDG$ can be obtained using example 1.2.3
$\therefore$ Vertices of given Quadrilateral GOLD can be written as,

$$\mathbf{L} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{D} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}, \mathbf{O} = \begin{pmatrix} -1.875 \\ 7.26 \end{pmatrix}, \mathbf{G} = \begin{pmatrix} 2.5 \\ 5.5 \end{pmatrix} \tag{2.0.13}$$

Plot of the Quadrilateral GOLD :

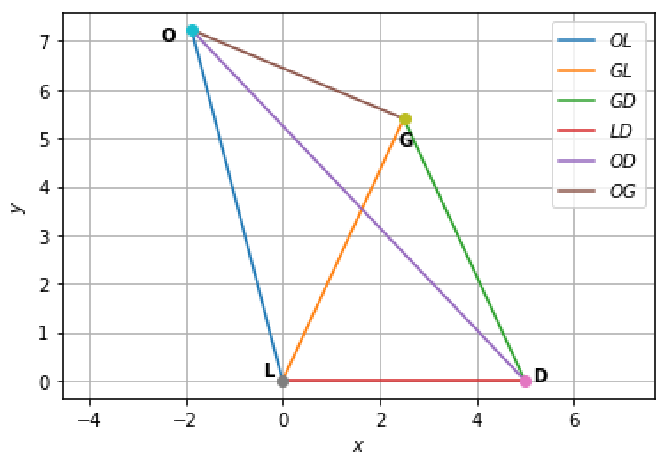

Fig. 2.1: Quadrilateral GOLD