ASSIGNMENT-3

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Download all python codes from

https://github.com/Ravalika1630/Assignment−3/blob/main/assignment3.py

and latex-tikz codes from

https://github.com/Ravalika1630/Assignment−3/blob/main/Assignment%203.tex

1 QUESTION NO-2.30

Draw JUMP with JU=3.5, UM=4, MP=5,PJ=4.5 and PU=6.5 .

2 SOLUTION

Given,

$$JU = 3.5, UM = 4, MP = 5, PJ = 4.5, PU = 6.5. \tag{2.0.1}$$

Now,

$$JU = \|\mathbf{J} - \mathbf{U}\| = 3.5 \tag{2.0.2}$$
$$UM = \|\mathbf{U} - \mathbf{M}\| = 4 \tag{2.0.3}$$
$$MP = \|\mathbf{M} - \mathbf{p}\| = 5 \tag{2.0.4}$$
$$PJ = \|\mathbf{P} - \mathbf{J}\| = 4.5 \tag{2.0.5}$$
$$PU = \|\mathbf{P} - \mathbf{U}\| = 6.5 \tag{2.0.6}$$

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. $\triangle PMU$ and $\triangle PJU$ are two triangles of given quadrilateral. Let us consider $\triangle PMU$-

$$\|\mathbf{U} - \mathbf{M}\| + \|\mathbf{P} - \mathbf{U}\| = 10.5 > \|\mathbf{M} - \mathbf{P}\| \tag{2.0.7}$$
$$\|\mathbf{P} - \mathbf{U}\| + \|\mathbf{M} - \mathbf{P}\| = 11.5 > \|\mathbf{U} - \mathbf{M}\| \tag{2.0.8}$$
$$\|\mathbf{U} - \mathbf{M}\| + \|\mathbf{M} - \mathbf{P}\| = 10 > \|\mathbf{P} - \mathbf{U}\| \tag{2.0.9}$$

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

$$\|\mathbf{P} - \mathbf{J}\| + \|\mathbf{J} - \mathbf{U}\| = 8.0 > \|\mathbf{P} - \mathbf{U}\| \tag{2.0.10}$$
$$\|\mathbf{J} - \mathbf{U}\| + \|\mathbf{P} - \mathbf{U}\| = 10.0 > \|\mathbf{P} - \mathbf{J}\| \tag{2.0.11}$$
$$\|\mathbf{P} - \mathbf{U}\| + \|\mathbf{P} - \mathbf{J}\| = 11.0 > \|\mathbf{J} - \mathbf{U}\| \tag{2.0.12}$$

Triangle inequality is satisfied. $\therefore \triangle PJU$ can be constructed. $\therefore$ Given sides form a quadrilateral. Vertices of quadrilateral JUMP: Now from $\triangle PJU$,the sides of $\triangle PJU$ are known Which means vertices P,J and U can be obtained using example 1.3 Similarly,the vertices of $\triangle PJU$ can be obtained using example 1.3 $\therefore$ Vertices of given Quadrilateral JUMP can be written as,

$$\mathbf{P} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{J} = \begin{pmatrix} 4.5 \\ 0 \end{pmatrix}, \mathbf{U} = \begin{pmatrix} 5.58 \\ 3.33 \end{pmatrix}, \mathbf{M} = \begin{pmatrix} 3.94 \\ 3.07 \end{pmatrix} \tag{2.0.13}$$

Plot of the Quadrilateral JUMP :

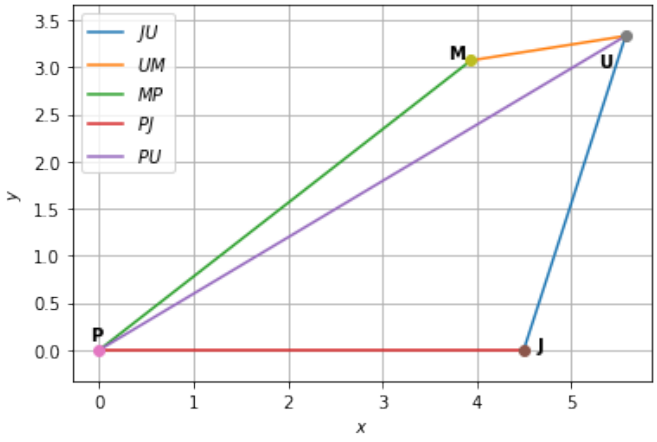

Fig. 2.1: Quadrilateral JUMP