भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Name:T.Manasa Reddy
Roll No.: FWC22048
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manasatanuboddi@gmail.com

MATRIX ASSIGNMENT

0.1 Problem:

Construct a triangle ABC in which BC=7cm, $\angle B = 75^0$ and AB + AC = 13 cm.

0.2 Solution

The input parameters for this construction are

Symbol	Value	Description
BC	a	where a is 7cm
AB	b	AB distance is b
AC	c	AC distance is c
$\angle BC$	75^0	ΔABC
C	$\begin{pmatrix} a \\ 0 \end{pmatrix}$	BC length is equal to a
A	$\begin{pmatrix} cos\theta \\ sin\theta \end{pmatrix}$	using the cosine formula in ΔABC

termux commands :

```
bash line.sh.....using shell command
```

Caluclating Other Coordinate:
Let the coordinates of A are X_2,Y_2 respectively.
Let $\mathbf{A} = \begin{pmatrix} \cos\theta \\ \sin\theta \end{pmatrix}$
Using the Cosine formula in ΔABC,

$$b^2 = a^2 + c^2 - 2accos\mathbf{B} \quad (1)$$

$$(b+c)(b-c) = a^2 - 2 \times a \times 0.25c \quad (2)$$

Upon Simplifaction we get:-

$$b - 1.26c = 3.76 \quad (3)$$

$$b + c = 13 \quad (4)$$

From the above, we obtain the matrix equation:-

$$\begin{pmatrix} 1 & -1.26 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} b \\ c \end{pmatrix} = \begin{pmatrix} 3.76 \\ 13 \end{pmatrix}$$

$$\begin{pmatrix} b \\ c \end{pmatrix} = \begin{pmatrix} 5.333 \\ 7.66 \end{pmatrix}$$

The vertices of Δ ABC are

$$\mathbf{A} = c\begin{pmatrix} cos75 \\ sin75 \end{pmatrix} = \begin{pmatrix} 1.33 \\ 5.15 \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$\mathbf{C} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$$

Below python code realizes the above construction :

```
https://github.com/manasareddy442002/
fwc-moudle1/blob/matrix-lines/matrix.py
```

0.3 Construction