AMA2222 lab10 (Week 11)

10) Consider a $m \times n$ matrix A multiply a $n \times 1$ column vector $\vec{v}$

For example, if $m = 2, n = 3$, we have:

$$A\vec{v} = \begin{pmatrix} a_{00} & a_{01} & a_{02} \\ a_{10} & a_{11} & a_{12} \end{pmatrix} \begin{pmatrix} v_0 \\ v_1 \\ v_2 \end{pmatrix} = \begin{pmatrix} a_{00}v_0 + a_{01}v_1 + a_{02}v_2 \\ a_{10}v_0 + a_{11}v_1 + a_{12}v_2 \end{pmatrix}$$

The transpose of A is:

$$A^T = \begin{pmatrix} a_{00} & a_{10} \\ a_{01} & a_{11} \\ a_{02} & a_{12} \end{pmatrix}$$

Write a program that prompt user to enter the row and column numbers m, n, then enter the entries of A and $\vec{v}$, then the program will show the result of $A\vec{v}$ and A^T

Sample:

```
Enter the row number: 2
Enter the column number: 3
Enter a 2x3 matrix A:
1 2 3
4 5 6
Enter a 3x1 vector v:
2
0
-1
The transpose of A is:
1 4
2 5
3 6
The result of Av is:
-1
2
```