**CAP5415**

**Computer Vision**

**Fall 2022**

**Homework 1**

**Questions 1:** Inner product of two vectors will result in a 2-dimensional matrix with multiple rows and columns.

**True/False**

**Answer. False.** Inner product of two vectors will produce a single number.

**Question 2:** We discussed matrix multiplication in Lecture 2. In one of the interpretations, we saw that any matrix multiplication (AxB) can be represented asa linear combination of columns of A which gives you columns of the resultant matrix. This representation is also true for columns of B, and we can get columns of the resultant matrix by taking linear combinations of columns of B.

**True/False**

**Answer. False. The vice-versa is not true.**

**Question 3:** Given two vectors x and y, dot product of x with y will always provide projection of x on y.

**True/False**

**Answer. False. Dot product of two vectors is based on the projection of x vector over y vector.**

**Question 4:** We can use a 2x2 matrix to perform scaling, rotation and shifting on a vector.

**True/False**

**Answer. False. Since we have a vector to perform scaling, rotation and shifting 2 x 2 matrix will not work.**

**Question 5:** If we have three different matrices for scaling (S), rotation (R), and translation (T), which of the following order of matrix multiplication will provide us a matrix which can perform all these three operations with just one matrix multiplication operation (multiple options can be true),

A – TxRxS

B – RxSxT

C – TxSxR

D – None of the above

**Answer. A. The correct order of such operation is first translation then rotation followed by scaling.**