

**SCHOOL OF COMPUTER TECHNOLOGY**

AASD 4001 Mathematical Concepts for Machine Learning

**Labs week 2**

**Exercise 1:**

Open jupyter notebook LabExercise\_4.ipynb and go through the following steps:

1. Using numpy arrays and slicing operations (:), define and print the following A, B, and C matrix:

, ,

2. Define D matrix using numpy:

D

3. Use numpy *matmul* to calculate AD and also DA. Are they equal?

4. Manually calculate the determinant and inverse of B. Use numpy to calculate the same entities and confirm that your manual calculation agrees with your results from the jupyter notebook.

5. Use numpy to calculate the inverse of D. Confirm that and both are 3-by-3 identity matrices. Do you have any observations?

**Exercise 2:**

1. Calculate the bag of words (without TF-IDF, just word counts) matrix for the following 5 phrases.

* + - college student
    - airport taxi driver
    - Toronto art museum
    - life art
    - machine learning student

*Hints: How many rows should be there? How many columns should be there?*

2. Calculate the IDF for the words “college” and “art”.