COMP4220: Machine Learning, Spring 2021, Assignment 1

Due: Wednesday, Feb 10, 11pm

Please submit one pdf file for all questions.

You can type your answers for the first two questions in the cell below of each question using "Markdown" option!

**When turning in assignments after the due date, please clearly specify the number of late hours used.

P1. What can go wrong if you tune hyperparameters using the test set?

Tuning hyperparameters using the test set can result in the overfitting data and the model will not work optimally

P2. Please explain machine learning algorithms that rely on similarity measures to make predictions.

In [ ]:
```
Instance based learning algorithms rely on similarity to make predictio
ns because they compare instances seen
in their training with instances encountered in problems
```

P3. Programming Assignment

P3.1 Create two different ndarray using NumPy's arange function and step parameter. Please note that these arrays must have the same shape!

Here are simple example, please create your own arrays!

In [5]:
```
import numpy as np
a = np.arange(1, 5,1)
b = np.arange(1, 9,2)
print("a=",a)
print("b=",b)
```

```
a= [1 2 3 4]
b= [1 3 5 7]
```

The element-wise product of two arrays

P3.2 Multiply these two arrays and show the result using print function.

In [13]:
```
print (np.multiply(a, b))
```

```
[ 1  6 15 28]
```

The dot multiplication of two arrays

P3.3 Compute the dot multiplication of two arrays and show the result using print function.

In [12]:
```
print (np.dot(1, b))
```

```
[1 3 5 7]
```

Arithmetic operations

P3.4 Now, play with the arrays you created in previous step.

To see how operaters like (+, -, *, /, //,**) apply elementwise, show the result of applying each of these operators with your arrays.

In [11]:
```
print (a+b)
print (a-b)
print (a/b)
print (a//b)
print (a*b)
```

```
[ 2  5  8 11]
[ 0 -1 -2 -3]
[1.         0.66666667 0.6        0.57142857]
[1 0 0 0]
[ 1  6 15 28]
```

In [ ]:
```

```