ADS Assignment 1

1. Create two numpy arrays and find the cosine similarity between the arrays. Do not use any packages  
2. Numpy basic data structures and operations

* Create two numpy arrays 'numbers1' and 'numbers2'
* Find the sum of the two arrays
* Find the dot product the two arrays
* Find the mean of the array
* Create another 2D array 'new\_numbers' from numbers1 and numbers2 using np.stack. What is the shape of the new array? How does np.stack work?
* Transpose the new 2D. What is the result?

3. Pandas dataframes and basic operations using a open dataset  
  
3.1 Operations on user created custom data frame  
  
Create a dataframe using the below command:  
data = pd.DataFrame({'Qu1': [1, None, 4, 3, 4],  
 'Qu2': [2, None, 1, 2, 3],  
 'Qu3': [1, 5, np.NaN, 4, 4]})

* Check for missing values
* Delete the rows with missing value in any one column/attribute
* Delete the row only if all columns have missing values
* Fill the missing values with zeros
* Fill missing values with constant one for each column
* Fill missing values withe mean value of the column

3.2 Analysis of an open dataset using pandas

* Load the built in dataset "Titanic" using the code below
* import pandas as pd
* import seaborn as sns

df = sns.load\_dataset("titanic")  
  
Then do the below operations in the dataset

* "Display the head of the dataset"?
* "Print the shape of the DataFrame"?
* "Display columns and their data types"?
* "Check for missing values in each column"?
* "Show only the first 10 rows"?
* "What is the average age of passengers?"
* "What is the total fare paid?"
* "What is the age range (min and max)?"
* "Show passengers who survived and were female"?
* "How many passengers were children (age < 12)?"
* "How many missing values are there?"

Structure of the Titanic Dataset  
The dataset consists of 892 rows and 12 columns. Each row represents a passenger, and each column represents a feature of the passenger. The columns are as follows:

* PassengerId: A unique identifier for each passenger.
* Survived: Indicates whether the passenger survived (1) or not (0).
* Pclass: The passenger's class (1 = 1st, 2 = 2nd, 3 = 3rd).
* Name: The name of the passenger.
* Sex: The gender of the passenger.
* Age: The age of the passenger.
* SibSp: The number of siblings or spouses the passenger had aboard the Titanic.
* Parch: The number of parents or children the passenger had aboard the Titanic.
* Ticket: The ticket number of the passenger.
* Fare: The fare paid by the passenger.
* Cabin: The cabin number of the passenger.
* Embarked: The port of embarkation (C = Cherbourg, Q = Queenstown, S = Southampton).