

## Database & Analytics Programming

### Lab 4

#### 1. Exception Handling A

- a) Create a text file and manually add some data to the file
- b) Write Python code to
  - open the file for write only access
  - attempt to read the contents of the file
- c) Note the type of Error that has been raised.
- d) Modify your code to
  - use a try / except / finally construct that will catch the exception, print a user-friendly error message, and clean up the file resource
- e) Investigate how you would create your own Exception class. Then create your own Exception class and use it in your code from the previous exercise.

#### Exception Handling B

Sometimes we have to define explicit exceptions to indicate that something goes wrong. Use a combination of built in and user-defined exceptions to effectively support and provide feedback for the following statements

```
a = int(input("Enter value of a between [0 to 10]:"))
b = int(input("Enter value of b between [0 to 10]:"))

c = a / b
```

#### 2. Numpy Exercise A

- a) Create an array with the arrange function and reshape the array as follows:

```
b = arange(24).reshape(2,3,4)
```

This gives us a 3-dimensional data structure – you can think of it as being like 2 spreadsheet sheets where each sheet contains 3 rows of data and each row contains 4 columns.

Using indexing and slicing perform the following tasks:

- i) Choose the first set of 3 rows and 4 columns of data
- ii) Choose the second row of data from the second set of 3 rows of data

- iii) Choose all the data from the second column for both the first and second sets of rows and columns of data
- b) Use the ravel function to flatten the data. What's the difference between ravel and flatten?
- c) Reshape the data so that there are 6 rows of 4 columns per row.
- d) Get the transpose of the new data structure.
- e) Restack the rows of the transposed data structure in reverse order (hint: look at the row\_stack function).
- f) Split the resulting data structure horizontally (hint: look at the hsplit function).

### 3. NumPy Exercise B

The AAPL.csv contains some stock price data for Apple.

The MSFT.csv contains some stock price data for Microsoft.

- a) Use the loadtxt command to load data from AAPL.csv from columns 5 and 7 (i.e., the close price and the volume).
- b) Based on the data provided, calculate the volume weighted average price for the stock (i.e., calculate the average price using the volume as weight values).
- c) Calculate the median value of the closing prices (hint: use the median function).
- d) Calculate the variance value of the closing prices.
- e) Again, use the loadtxt command to load data from columns 3 and 4 (i.e., the high prices and the low prices).
- f) Use the max and min functions to get the highest high and the lowest low value.
- g) Load data from column 5 of AAPL.csv. Also, load data from column 5 of MSFT.csv.
- h) Calculate the covariance matrix of the closing prices of AAPL and MSFT (hint: use the cov function).
- i) View the values on the diagonal (hint: diagonal).
- j) Calculate the correlation coefficient of the closing prices of AAPL and MSFT (hint: corrcoef).

### 4. Regular Expressions

- a) Write Python program to search the numbers (0-9) of length between 1 to 3 in a given string.
- b) Write a Python program to remove leading zeros from an IP address.
- c) Write a Python program to find all three, four, five characters long words in a string
- d) Write a regex so that the full email addresses are extracted
- e) Find the words with exactly 8 letters using regex.
- f) Find the numbers starting with 212.
- g) Loop through the list and apply regex to each element so that only items ending with semicolon (;) are matched.
- h) Write a Python program to find all adverbs and their positions in a given sentence.
- i) Write a Python program to find all words starting with 'a' or 'e' in a given string.
- j) Write a Python program to abbreviate 'Road' as 'Rd.' in a given string
- k) Write a Python program that will identify URLs using regular expressions.