**Student Name:** **Weight:** 20%

**Student ID:** **Marks:** /40

# Assignment: Price Predictions using Deep Learning (RNN-LSTM)

## Introduction

In this assignment, you'll explore deep learning techniques to make stock market predictions. You’ll develop a solid understanding of the mathematics behind long short-term memory (LSTM) and recurrent neural networks (RNN), and you’ll examine key statistical measures and identify whether data is stationary or non-stationary.

## Objective

The objective of this assignment is to familiarize yourself with common deep learning techniques by building models. Completing this assignment will help you to:

* Understand the mathematics behind LSTM and RNN
* Learn some of the important statistical measures
* Identify the type of data (stationary and non-stationary)

## Dataset

In this assignment, you’ll use the Yahoo Finance library to select a stock market dataset for a company and time period of your choice.

## Equipment and Materials

To build machine learning models using deep learning you will need:

* A computer with a minimum of 16 GB RAM and 250 GB of free disk space.
* Access to the Anaconda environment with [Jupyter Notebook](https://jupyter.org/install) (https://jupyter.org/install).

## Instructions

Using what you learned in the lectures on neural networks and deep learning algorithms, complete the following tasks. See the *Marking Criteria* section below for details on how you will be assessed.

**Note:** This is an individual assessment.

1. Import the required Python libraries.
2. Download a stock market dataset for a company and time period of your choice from the [Yahoo Finance Library](https://mysait-my.sharepoint.com/personal/michael_magee_sait_ca/Documents/Documents/SAIT/SADT/ARTI/DATA%20480%20Predictive%20Analytics%20and%20Modeling/Assessments/Yahoo%20Finance%20Library) (https://pypi.org/project/yfinance/). To load this data, follow the steps below:
   1. Install **yfinance** using pip.
   2. Import the library using the code snippet – import yfinance as **yf**.
   3. Yf.download(“company stock symbol”,start=“”,end=“”)

For example: df = yf.download(“AAPL”, start=“2023-01-01”, end = “2024-04-24”)

1. Check the trends by visualizing the dataset.
2. Apply feature scaling (a min-max scaler is recommended).
3. Build a model using RNN (recurrent neural networks) and LSTM (long short-term memory).
4. Code documentation in the form of comments in your .ipynb file

## Deliverables

Submit the following items to Brightspace by the due date shown in the course calendar:

* Zip folder containing the dataset and your completed Jupyter Notebook file

Assignments submitted after the due date will receive a mark of zero (0).

## Marking Criteria

|  |  |
| --- | --- |
| **Criteria** | **Marks** |
| Required libraries are installed. | /5 |
| Data is collected using the yfinance Python library. | /10 |
| Apply feature scaling | /10 |
| Model is built using RNN and LSTM. | /15 |
| **Total** | /40 |