**University of Michigan – Dearborn**

**CIS 200 – Computer Science 2**

**Lab# 6**

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# Question 1

## Source Code

The source code for this question has been uploaded to Canvas as Lab\_6.cpp.

## Description

This program stores data points in a linked list and applies linear regression techniques to determine the best-fit line.

## Structures

* Define a DataPoint class with x (double), y (double) and DataPoint \*next
* Define a DataSet class with DataPoint head
* Define a LinearCurveFitter class with double slope and double intercept

## Screenshots

Testing case 1

A black screen with white text

Description automatically generated

Testing case 2

A black screen with white text

Description automatically generated

# UML Diagram

A screenshot of a computer program

Description automatically generated

# Testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test # | Input value | Expected output | Actual output | Test Pass/Fail |
| 1 | Insert first node :  4, 7.8  3, 5.8  2, 3.9  1, 2  ->Output data points  Calculate the fit line  Output the equation  Output the prediction for all x  Calculate and output the RMS Error | Data Points:  (1, 2)  (2, 3.9)  (3, 5.8)  (4, 7.8)  Best Fit Line: y = 1.93 \* x + 0.05  Prediction for x = 1.00 : 1.98  Prediction for x = 2.00 : 3.91  Prediction for x = 3.00 : 5.84  Prediction for x = 4.00 : 7.77  RMS Error : 0.027386 | Data Points:  (1, 2)  (2, 3.9)  (3, 5.8)  (4, 7.8)  Best Fit Line: y = 1.93 \* x + 0.05  Prediction for x = 1.00 : 1.98  Prediction for x = 2.00 : 3.91  Prediction for x = 3.00 : 5.84  Prediction for x = 4.00 : 7.77  RMS Error : 0.027386 | Pass |
| 2 | Don’t input data points  ->Output data points  Calculate the fit line  Output the equation  Output the prediction for all x  Calculate and output the RMS Error | Data Points:  There is no input data point | Data Points:  There is no input data point | Pass |