

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY
THIRUVANANTHAPURAM 695 547

First Year B. Tech. - Assignment Sheet
MA122-Computer Programming and Applications

03.02.2017

Maximum Marks: 10

Assignment Sheet 5

- a. Consider an experiment in which a ball is dropped, and its velocity is recorded as a function of time:

<i>time</i>	<i>velocity</i>
0.0	-0.10290
0.1	0.37364
0.2	2.43748
0.3	3.93836
0.4	3.31230
0.5	5.49472
0.6	5.43325
0.7	6.39321
0.8	9.06048
0.9	9.36416
1.0	9.52066

Write a program to find the “best fit” to the above given data using least squares method. Store the time data in the variable x (array of size 11), velocity data in the variable y (array of size 11) and the number of data points in the variable n . x and y data should be initialized in the program during the declaration of variable. Method: These n data points can be modelled using the equation $y = ax + b$. Your program should find the coefficients a and b using the equations given below

$$a = \frac{n \sum_{i=1}^n x_i y_i - (\sum_{i=1}^n x_i) (\sum_{j=1}^n y_j)}{n \sum_{i=1}^n x_i^2 - (\sum_{i=1}^n x_i)^2}$$
$$b = \frac{1}{n} \left(\sum_{i=1}^n y_i - a \sum_{i=1}^n x_i \right).$$

- b. Write a program to find the roots of the quadratic equation $ax^2 + bx + c = 0$. Ask the user to enter the values of a , b , and c and store it in the variables a , b , and c respectively.

Program submission:

Name the programs as XXXA5Y.cpp, where XXX is the last three digits of your student id and Y is program number. For example, if the student id is 'sc17b150' and your program number is 'a' then the file name should be 150A5a.cpp. Submit the program using ftp to the server: 172.20.2.200