

Experiment-4

Sequence Operations

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(Duration: 105 minutes)

Submission Deadline: 12.30

Purpose:

The purpose of this experiment is to create an array of n terms by using the sequence operations formula given below. In addition, it is to calculate the value of the mean, variance and find the closest element of the sequence to a given number.

Procedures:

Your program should receive four input data from the user in a float data type (e.g. n_0 , n , r and p) for the input parameters in the sequence operation **[5 pt.]**.

[15 pt.] You should create an array for the sequence whose summation formula is given below. You should print each generated element with its index on the screen.

$$\sum_{i=n_0}^n i^2 r^i$$

- [15 + 15 + 20 pt.]** Make an addition operation by using the numbers created. In addition, calculate the mean value and variance value. For mean and variance values, use the formulas given below:

$$\mu = mean = \frac{1}{n-n_0+1} \sum_{i=n_0}^n x_i$$

$$\sigma^2 = var = \frac{1}{n-n_0+1} \sum_{i=n_0}^n (x_i - \mu)^2$$

- [20 + 10 pt.]** Finally, you are asked to find **the closest number value to the “p” input data**. You are expected to create a function for this process.

Hint: Include **math.h** library in addition to standard input-output library (**#include < math.h >**), if/when necessary to use **pow ()** and **abs ()** functions. You can use “`float find_closest(float series[100], float array_length, float p);`” function to find the closest value.

Example Outputs

The outputs of your program should be as follows:

For $n_0=1$, $n=5$, $r=2$ and $p=18$	For $n_0=1$, $n=5$, $r= - 2$ and $p=750$
$a[1]=2.00$ $a[2]=16.00$ $a[3]=72.00$ $a[4]=256.00$ $a[5]=800.00$ Sum=1146.00 Mean=229.20 Variance=32112.51 Closest=16.00	$a[1]=-2.00$ $a[2]=16.00$ $a[3]=-72.00$ $a[4]=256.00$ $a[5]=-800.00$ Sum=-602.00 Mean=-120.40 Variance=14611.33 Closest=256.00
For $n_0=1$, $n=5$, $r=0.75$ and $p=4$	For $n_0=1$, $n=5$, $r= - 0.75$ and $p=2$
$a[1]=0.75$ $a[2]=2.25$ $a[3]=3.80$ $a[4]=5.06$ $a[5]=5.93$ Sum=17.79 Mean=3.56 Variance=8.56 Closest=3.80	$a[1]=-0.75$ $a[2]=2.25$ $a[3]=-3.80$ $a[4]=5.06$ $a[5]=-5.93$ Sum=-3.17 Mean=-0.63 Variance=0.35 Closest=2.25

Note: If you are unable to submit your code to CMS you can send an e-mail with your attached C file to eelab204@gmail.com (Code submissions via e-mail have the same deadline).

