

HACETTEPE UNIVERSITY
DEPARTMENT OF COMPUTER ENGINEERING BBM104



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REPORT

1. Aim:

With 3 functions given to us (which could be more), we wrote a program that can be integral calculation within a specific range.

2. Software Usage:

I used the "Middle Riemann Sum" rule to do this calculation. He was talking about this rule. Divide the area by rectangles to find the area below the curve in the specified range. The more you divide the rectangle, the closer you get to the result. In that case, the starting point is defined, the ending point is defined, on the other hand, the rectangle number is already defined. Then I started writing the program.

Firstly, I introduced the functions that should be done. The first two functions were simple. But in the third function " $\text{arcsinh}(x)$ " it is necessary to use the "Maclaurin Series" written in PDF. I also wrote a function that calculates each multiplication and division separately, then my program combines them and it prints the result. The first phase was thus over.

In the second stage, the formula used in the third function actually did work for only one value. At this stage, I used the method I used before.

The last stage, the numbers known as "Armstrong Numbers". When I wrote this function, I applied the following formula. I took advantage of the split feature of string expressions, converting each number to a "String" expression and then splitting it into a list. I checked the "Armstrong Number" in a "for loop" and printed it on the screen. And so I finished the assignment.

In general, my program's work is as follows:

- Read the file and add words to the word list.
- Look for each element in the list in the "for" loop:
 - If the current element is "IntegrateReimann" and if the next element is "Func1" go to func1, if "Func2" go to func2, if "Func3" go to func3.
 - Go to Arcsinh function if the current element is "Arcsinh".
 - And if it is "Armstrong" go to the armstrong function.
- There is a value that all functions have. Finally, print on the screen in the "main" function.

3. Personal Comments:

3.1 Difficulties I Have Faced

It was hard to read the file at the beginning. I only looked at the screen for the first 5 days. Actually I know what to do but I don't know how to do it. As I sat idle, I began to think and I found a long way. My program looks at each word and it works according to that. It's long but it works.

3.2 What I Have Learned From This Assignment

In the simplest form, I simply learned how to write a function in Java, how to read the file, and how to catch it if an error occurs.

4 Sample Results:

4.1 Result #1

IntegrateReimann Func1 -5 12 40 Result: 608.9107812499999

IntegrateReimann Func1 -5 12 200 Result: 609.1564312500011

IntegrateReimann Func2 -12 17 10 Result: 565.5404384807164

IntegrateReimann Func2 -12 17 100 Result: 568.4083507135505

IntegrateReimann Func3 0.2 0.6 50 Result: 0.15517076915650288

Arcsinh 0.4 Result: 0.39003531977071526

Armstrong 3 Result: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 153, 370, 371, 407]

4.2 Result #2

IntegrateReimann Func1 -8 6 100 Result: 298.6438000000002

IntegrateReimann Func1 -8 6 150 Result: 298.6565037037038

IntegrateReimann Func2 -4 13 100 Result: 382.0504600486261

IntegrateReimann Func2 -4 13 150 Result: 382.0359648793622

IntegrateReimann Func3 -0.1 0.4 90 Result: 0.07398540630146694

Arcsinh 0.3 Result: 0.2956730475634224

Armstrong 5 Result: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 153, 370, 371, 407, 1634, 8208, 9474, 54748, 92727, 93084]