

TALLINN UNIVERSITY OF TECHNOLOGY  
Department of Computer and Systems Engineering

Gürcan Güleç  
165515IASM

IAG0581 Programming I

Function  $y = f(x)$   
Homework I

Supervisor  
Vladimir Viies

Tallinn 2016

**Declaration**

I hereby certify that I am the sole author of this report and that no part of this report has been published or submitted for publication. All works and major viewpoints of the other authors, data from other sources of literature and elsewhere used for writing this paper have been referenced.

Gürcan Güleç

## Table of Contents

Declaration - 2

Task, Function Graphic - 3

Program Explanation - 4

Screenshots - 4,5

Algorithm - 6

## Task, Function Graphic

In this task we tried to give input to a function and see the output. The function I had to deal with can be seen below in the Figure 1.

$$y = \frac{1}{\sqrt{x^2 - \frac{1}{x}}} - \frac{2}{3\sqrt{5 - x^2}}$$

Figure 1: Function

In my function x cannot be "0" because a number cannot be divided into "0". Also inside a square root shouldn't be minus since it will give a result as a complex number. And when it gives a complex number I should display "**Complex**" or when it gives infinite, I should display "**Infinite**".

The function graphic can be seen below in the Figure 2.

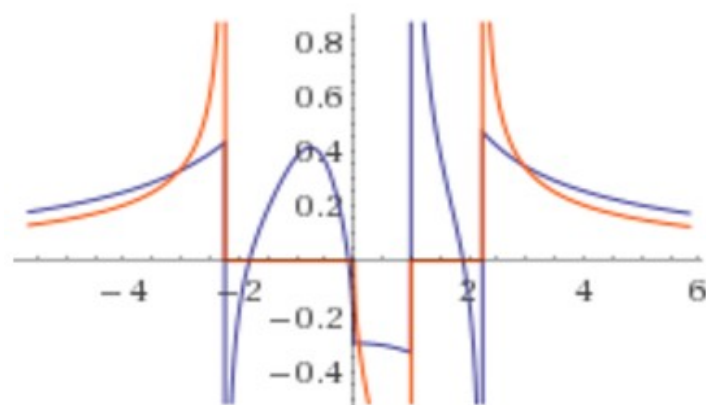


Figure 2: Function's graphic

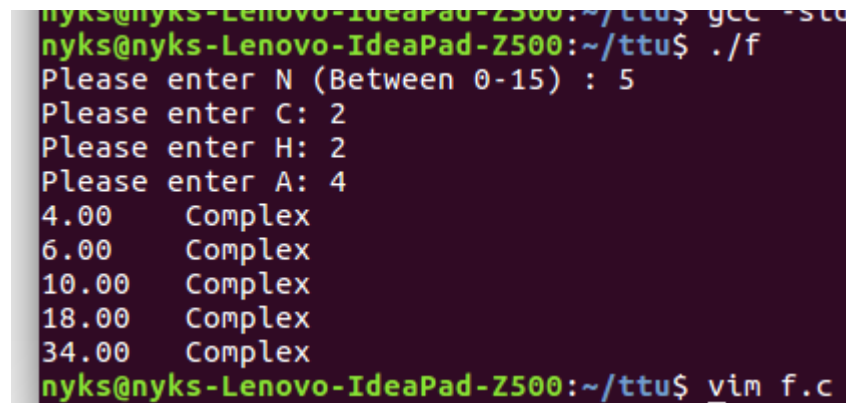
According to the graphics and the calculation  $x$  should be between 1 and 2. When it is bigger than 2 it will always give a complex number. Since  $H$  and  $C$  have to be bigger than 0, it almost every time gives a complex number. So there is nothing to see if I chose  $x$  between 1.2 after the second step.

### Program Explanation

When I was writing my code I used Ubuntu OS and I did my coding using VIM. Also compiled it using gcc compiler. And I also declared some restrictions for the input numbers.  $N$  is not allowed to be bigger than 15 and it cannot be 0 or minus 0. Also  $C$  has to be bigger than or equal to 1 and  $H$  has to be bigger than 0.

I had to use while and for loops to print out the outputs and also restrict the user to not to input the values we don't want to. I had to include math.h library to use pow and also sqrt functions.

### Screenshots

A screenshot of a terminal window with a dark background and light-colored text. The prompt is 'nyks@nyks-Lenovo-IdeaPad-Z500:~/ttu\$'. The user enters 'gcc -std=c99 -fmath f.c -o f' and then './f'. The program prompts for 'N (Between 0-15)' and the user enters '5'. It then prompts for 'C', 'H', and 'A', with the user entering '2', '2', and '4' respectively. The program then outputs five lines: '4.00 Complex', '6.00 Complex', '10.00 Complex', '18.00 Complex', and '34.00 Complex'. Finally, the user enters 'vim f.c' at the prompt.

```
nyks@nyks-Lenovo-IdeaPad-Z500:~/ttu$ gcc -std=c99 -fmath f.c -o f
nyks@nyks-Lenovo-IdeaPad-Z500:~/ttu$ ./f
Please enter N (Between 0-15) : 5
Please enter C: 2
Please enter H: 2
Please enter A: 4
4.00      Complex
6.00      Complex
10.00     Complex
18.00     Complex
34.00     Complex
nyks@nyks-Lenovo-IdeaPad-Z500:~/ttu$ vim f.c
```

Figure 3: Program input and outputs

When  $A$  is 4 there is no way it could show us a not a real number. Giving  $A$  the value of 4 will give us the output as a complex number all the time. This can be seen in Figure 3.

```
nyks@nyks-Lenovo-IdeaPad-2500:~/tt0$ ./t
Please enter N (Between 0-15) : 6
Please enter C: 3
Please enter H: 5
Please enter A: 1.2
1.20    0.508220
6.20    Complex
21.20   Complex
66.20   Complex
201.20  Complex
606.20  Complex
```

*Figure 4: Program input and outputs*

When we give 1.2 to A, only on the first step we can see a value, because it won't be bigger than 2. On the other steps it is always bigger than 2, so it will again give us a complex number.

Algorithm

