SOEN6011- Software Engineering Processes

F3: sinh(x)

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1 Problem 1:

1.1 Introduction:

sinh(x) is a hyperbolic sine. This function is related to a hyperbola in the same way as the trigonometric function sin(x) is related to a circle.
Consider a hyperbola: $x^2 - y^2 = 1$

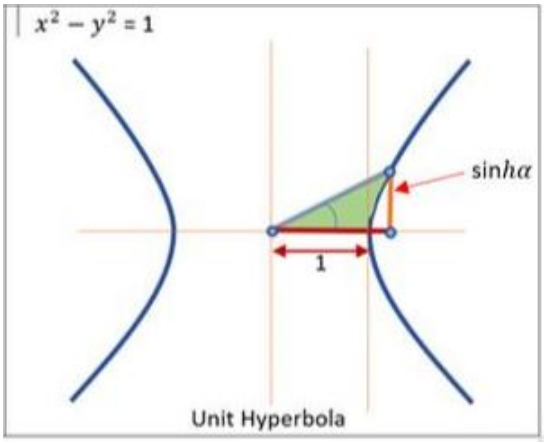

Figure:1.1-1 Hyperbola

sinh(x) would be the length of perpendicular drawn from a vertex on hyperbola to the x-axis. The vertex is 1 unit far from the origin.

$$sinh(x) = \frac{e^x - e^{-x}}{2}$$

Domain: $(-\infty, \infty)$
Co-domain: $(-\infty, \infty)$

1.2 Characteristics:

1.2.1 As x increases, e^x increases quickly and e^x decreases quickly.
$sinh(x) \approx \frac{e^x}{2}$

1.2.2 If x decreases, e^x decreases quickly and $-e^x$ becomes large.
$sinh(x) \approx \frac{-e^{-x}}{2}$

1.2.3 sinh(x) is an odd function.
$sinh(x) = sinh(x)$

1.2.4 sinh(x) is zero for x=0.
sinh(x) tends to infinity when x tends to infinity.
sinh(x) tends to minus infinity when x tends to minus infinity.

2 Problem 2:

2.1 Requirements:

2.1.1 Functional Requirements:

2.1.1.1 The program shall throw an error[2.2.5] when the value of x is input out of the specified range[2.2.1].

2.1.1.2 The error shall be displayed on the screen to the user.

2.1.1.3 The user shall be able to view the output after program is executed.

2.1.1.4 The program shall exit after displaying the output.

2.1.1.5 The program shall exit after throwing an error.

2.1.2 Non Functional Requirements:

2.1.2.1 The user shall be able to run the program on Windows 7, Windows 8, Windows 10, Mac OS X, Linux operating systems.

2.1.2.2 The user shall install Java Standard Edition Development Kit of the specified versions J2SE 5.0, Java SE 6, Java SE 7, Java SE 8.

2.1.2.3 The user shall be able to run the program through the specified Java Integrated Development Environments IntelliJ IDEA , NetBeans, Eclipse, JDeveloper.

2.1.2.4 The user doesnot need an internet connection to run the program.

2.2 Assumptions:

2.2.1 The user shall input the value of x between -300 to 700.

2.2.2 The value of x shall be integer, floating point.

2.2.3 The value of x shall not contain alphabets, keywords, space, special characters.

2.2.4 The user shall press enter key after keying in value of x to display the output.

2.2.5 The program shall display OutOfMemory error to the user.