



**SOEN 6011 : SOFTWARE ENGINEERING PROCESSES
SUMMER 2021**

SUPER CALCULATOR

PROBLEM - 2
Requirements
ISO/IEC/IEEE 29148 Standard

Authors

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<https://www.overleaf.com/project/610304de4e6b8d24f7c781b6>

PROBLEM 2 - F2: $\tan(x)$

SOEN 6011 - Summer 2021

Software Engineering Processes

Repository address : <https://github.com/Dakatsu/SOEN6011Calculator>

Rokeya Begum Keya

40183615

Assumption:

The user will give integer(Degree) value of x in $\tan(x)$ function. The value of $\tan(x)$ function will be calculated in radian.

Requirements:

[1][2]

The current section describes the requirements to implement the function $\tan(x)$.

Requirement Id : F2-R1

Overview	$x = 0^\circ$ in to the $\tan(x)$ function
Version	1.0
Description	If the user gives an input $x = 0^\circ$ for $\tan(x)$ the function may return 0 as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanZeroCheck_1

Requirement Id : F2-R2

Overview	$x = (\text{Positive Degree})$ in to the $\tan(x)$ function.
Version	1.0
Description	If the user gives $x = \text{any positive degree}$ for $\tan(x)$ the function may return the approximate value of $\tan(\text{positive degree})$ as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanFortyCheck_2

Requirement Id : F2-R3

Overview	$x = 90^\circ$ in to the $\tan(x)$ function
Version	1.0
Description	If the user gives an input $x = 90^\circ$ for $\tan(x)$ the function may return "undefined" as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanNinetyCheck_3

Requirement Id : F2-R4

Overview	$x = (\text{Negative or Positive Degree})$ in to the $\tan(x)$ function
Description	If the user gives $x = \text{any Negative or Positive degree}$ for which $\tan(x)$ value is Negative the function may return the approximate negative value of $\tan(\text{Negative or Positive Degree})$ as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanNegativeValueCheck_4

Requirement Id : F2-R5

Overview	$x = (\text{Negative Degree})$ in to the $\tan(x)$ function
Version	1.0
Description	If the user gives $x = \text{any Negative degree}$ for $\tan(x)$ the function may return the approximate value of $\tan(\text{Negative degree})$ as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanNegativeNumberCheck_5

Requirement Id : F2-R6

Overview	$x = 180^\circ$ in to the $\tan(x)$ function
Version	1.0
Description	If the user gives an input $x = 180^\circ$ for $\tan(x)$ the function may return 0 as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_tanOneHundredAndEightyCheck_6

Requirement Id : F2-R7

Overview	$x = 90^\circ$ in to the $\text{Rad}(x)$
Version	1.0
Description	If the user gives an input $x = 90^\circ$ for $\text{Rad}(x)$ the function may return the approximate value in radian as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getRadCheck_7

Requirement Id : F2-R8

Overview	$x = 180^\circ$ in to the $Rad(x)$
Version	1.0
Description	If the user gives an input $x = 180^\circ$ for $Rad(x)$ the function may return the approximate value (3.14159..) in radian as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getRadOneHundredAndEightyCheck_8

Requirement Id : F2-R9

Overview	$x = 0^\circ$ in to the $\sin(x)$ function
Version	1.0
Description	If the user gives an input $x = 0^\circ$ for $\sin(x)$ the function may return 0 as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getSinZeroCheck_9

Requirement Id : F2-R10

Overview	$x = (Positive\ Degree)$ in to the $\sin(x)$ function.
Version	1.0
Description	If the user gives $x = any\ positive\ degree$ for $\sin(x)$ the function may return the approximate value of $\sin(positive\ degree)$ as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getSinFortyCheck_10

Requirement Id : F2-R11

Overview	$x = 0^\circ$ in to the $\cos(x)$ function
Version	1.0
Description	If the user gives an input $x = 0^\circ$ for $\cos(x)$ the function may return 1 as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getCosZeroCheck_11

Requirement Id : F2-R12

Overview	$x = (Positive\ Degree)$ in to the $\cos(x)$ function.
Version	1.0
Description	If the user gives $x = any\ positive\ degree$ for $\cos(x)$ the function may return the approximate value of $\cos(positive\ degree)$ as output.
Owner	Rokeya Begum Keya
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F2_getCosFortyCheck_12

Requirement Id : F2-R13

Overview	Availability
Version	1.0
Description	The system may provide the calculation to the user within four seconds.
Owner	Rokeya Begum Keya
Priority	High
Type	Non-Functional
Difficulty	Medium

PROBLEM 2 - F3: Hyperbolic Sine, $\sinh(x)$

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Software Engineering Processes

Repository address : <https://github.com/Dakatsu/SOEN6011Calculator>

Kyle Taylor Lange

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0.1 Function Requirements

Requirements and Assumptions

The current section describes the requirements and assumptions to implement the function $\sinh(x)$.

Explicit Assumptions: For a value to be *accurate*, it shall be correct up to a specific number of decimal places. This value will be based on balancing accuracy with computation speed. Above a certain absolute input value, the function may return $\pm\infty$ due to the exponential nature of the function going beyond the range of a double floating point.

Requirement ID: F3-R1

Overview	Input x into $\sinh(x)$ function.
Version	1
Description	If the $\sinh(x)$ function as given in Problem 1 receives an integer or decimal input x , the system shall return an accurate value.
Owner	Kyle Taylor Lange
Priority	High
Type	Functional
Difficulty	High
Verification Method	

Requirement ID: F3-R2

Overview	Availability
Version	1
Description	The system may provide the calculation in F3-R1 to the user within three seconds.
Owner	Kyle Taylor Lange
Priority	High
Type	Performance
Difficulty	Medium
Verification Method	

PROBLEM 2 - F5

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Repository address : <https://github.com/Dakatsu/SOEN6011Calculator>

Sijie Min

40152234

Requirements and Assumptions

The user will give value of a,b and x .a,b can be both integer and decimal, x is integer

Requirement Id : F5-R1

Overview	Sets a,b, then input x into $y = ab^x$
Version	1.0
Description	If a is set to 0, the output result is 0. If the x input is 0, the return result is equal to a.
Owner	Sijie Min
Priority	High
Type	Functional
Difficulty	Medium

Requirement Id : F5-R2

Overview	Sets a,b, then input x into $y = ab^x$
Version	1.0
Description	x can be entered as a positive number or a negative number.
Owner	Sijie Min
Priority	High
Type	Functional
Difficulty	Medium

Requirement Id : F5-R3

Overview	Availability
Version	1.0
Description	Avoid calculating x times of multiplications, but reduce the number of multiplications to approximately \sqrt{x} times to increase the running speed.
Owner	Sijie Min
Priority	High
Type	Functional
Difficulty	High

PROBLEM 2 - F7 : x^y

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Software Engineering Processes

Repository address : <https://github.com/Dakatsu/SOEN6011Calculator>

Manimaran Palani

40167543

Requirements and Assumptions

[1][2]

The current section describes the requirements and assumptions to implement the function x^y .

Explicit Assumption : The transcendental function x^y will be accurate and accepts input which comprises of rational and irrational numbers.

Requirement Id : F7-R1

Overview	X(0) to the power of Y(0)
Version	1.0
Description	If the user gives an input for X as Zero and input for Y as Zero. The function may return the 1 as output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_1

Requirement Id : F7-R2

Overview	X(0) to the power of Y(Real Number)
Version	1.0
Description	If the user gives an input for X as zero and input for Y as any Real Number. The function may return zero as output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_2

Requirement Id : F7-R3

Overview	X(Positive Number) to the power of Y(0)
Version	1.0
Description	If the user gives an input for X of any positive number and input for Y as Zero.The function may return 1 as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_3

Requirement Id : F7-R4

Overview	X(Negative Number) to the power of Y (0)
Version	1.0
Description	If the user gives an input for X of any negative number and input for Y as Zero.The function may return 1 as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_4

Requirement Id : F7-R5

Overview	X(Positive Number) to the power of Y(1)
Version	1.0
Description	If the user gives an input for X as any positive number and input for Y as 1. The function may return X as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_5

Requirement Id : F7-R6

Overview	X(Positive Number) to the power of Y(Positive Number)
Version	1.0
Description	If the user gives an input for X as any positive number and input for Y as positive number. The function may return positive number as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_6

Requirement Id : F7-R7

Overview	X(Negative Number) to the power of Y(Positive Even Number)
Version	1.0
Description	If the user gives an input for X as any Negative number and input for Y as positive Even number. The function may return positive number as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_6

Requirement Id : F7-R8

Overview	X(Negative Number) to the power of Y(Positive Odd Number)
Version	1.0
Description	If the user gives an input for X as any negative number and input for Y as positive odd number. The function may return negative number as the output.
Owner	Manimaran Palani
Priority	High
Type	Functional
Difficulty	Medium
Verification Method	F7_TestCase_6

Requirement Id : F7-R9

Overview	Availability
Version	1.0
Description	The system may provide the response with output to the user within finite time.
Owner	Manimaran Palani
Priority	High
Type	Non-Functional
Difficulty	Medium

Bibliography

- [1] ReqView : Nykamp DQ: Requirements Specification Templates
<https://www.reqview.com/doc/iso-iec-ieee-29148-templates>
- [2] 29148-2018-ISO/IEC/IEEE International Standard-Systems and software engineering-Life cycle processes-Requirements engineering,
<https://standards.ieee.org/standard/29148-2018.html>