

Software Engineering Process: Problem 2

Topic: Functional Requirements of Gamma Function
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1 Introduction

Gamma Function: It is commonly referred as factorial function for complex numbers. It is derived by Daniel Bernoulli.

2 Overall Description

This is a project based on gamma function in which we are making calculator for gamma value. User can insert any real value and expect real value except on boundary conditions.

3 Stakeholders

Users 1: This function is mostly used in physics calculations. So, most important stakeholders are scientists for their calculations.

Users 2: This function is also used in basic maths calculations or any analytically field.

4 Formulas Related to Function

- $\Gamma(x) = \int_0^{\infty} s^{x-1} e^{-s} ds \quad \forall \operatorname{Re}(x) > 0$
- $\Gamma(1/2) = \sqrt{\pi}$
- $n! = n * (n - 1)!$
- $\Gamma(x) = x\Gamma(x - 1)$
- $\Gamma(0) = \text{undefined}$

5 Domain of Function

\forall Real numbers excluding all negative integers
 $(0, \infty)$

6 Co domain of Function

- It ranges from $(1, \infty)$
- For positive integers, we returns integer value as normal factorial
- For other real numbers, we use integral function.

7 Input/Output of Function

- For **negative input** $\forall x < 0$, **Function** will return **undefined** response
- For $x = 0$, **Function** will return **undefined**
- For $Re(x) > 0$, **Function** will return positive real value

8 Risk/Constraints of Gamma Function

We cannot **input** value of **non negative integers** as well as negative real number