

# **SOFTWARE REQUIREMENTS SPECIFICATION**

## **SCIENTIFIC CALCULATOR**

### **STAGE –II**

GROUP – 14

SLOT – 6

#### **TEAM MEMBERS:-**

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#### **INTRODUCTION :-**

Scientific calculators are used widely in any situation where quick access to certain mathematical functions is needed such as trigonometric functions, inverse functions, etc. which were once traditionally looked into tables assigned to them. Scientific calculator helps greatly in solving complex numericals which if done manually take up a whole lot of time.

#### **BASIC FUNCTIONS OF A SCIENTIFIC CALCULATOR :-**

The functions which can be done using this scientific calculator are:-

1. Basic operations like Addition, Subtraction, Multiplication and Division
2. Trigonometric functions like Sine, Cosine and Tangent

3. Inverse trigonometric functions like  $\arcsin$ ,  $\arccos$  and  $\arctan$
4. Hyperbolic functions like  $\sinh$ ,  $\cosh$ ,  $\tanh$
5. Inverse hyperbolic functions like  $\operatorname{arsinh}$ ,  $\operatorname{artanh}$ ,  $\operatorname{arcosh}$
6. Exponential functions
7. Logarithmic function
8.  $\ln$  function
9. Power function
  
10. Basic operations on complex numbers
11. Modulus functions
12. Inverse functions
13. Conversion of degrees into radians
14. Factorial of whole numbers
15. Permutations ( $nPr$ ) and combinations ( $nCr$ )
16. Solutions to quadratic equations
17. Nature of roots of cubic equations
18. Properties of triangle
19. Differentiation
20. Integration
21. Number of prime numbers below a given integer
22. Solving simultaneous equations using Gauss Jordan equations
23. Operations on vectors
24. Operations on matrices

## SYSTEM REQUIREMENT:-

- ☐ Windows
- ☐ Ubuntu

## SOFTWARE REQUIREMENT:-

- ☐ simplecpp
- ☐ Code Blocks

## CODING :

(a) Header files:

- i) iostream :this is used for the standard I/O functions.
- ii) simplecpp: this is used in the coding part for the graphics.
- iii) conio.h: for console input/output

```
#include<iostream>
#include<simplecpp>
#include<conio.h>
```

(b) Functions used:

double add()

double sub()

double multi()

double div()

double exponentialfn(double n)

long int factorial(int n)

double Infunction(double x)

double logarithmicfn(double x)

double radianfn(double x)

double powerfunction(double x,double n)  
double sinefunction(double x)  
double cosinefunction(double x)  
double tangentfunction(double x)  
int npr(int n,int r)  
int ncr(int n,int r)  
double sineinverse(double x)  
double cosineinverse(double x)  
double taninverse(double x)  
double inversefn(double x)  
double modulusfn(double x,double y)  
double sinhfunction(double x)  
double coshfunction(double x)  
double tanhfunction(double x)  
double sinhinversefn(double x)  
double coshinversefn(double x)  
double tanhinversefunction(double x)  
double quadratic\_eq\_soln(double a,double b,double c)  
double trianglefn(double x1,double y1,double x2,double y2,double x3,double y3)  
void cubicrootsequation(float a,float b,float c,float d)  
void differentialfn()  
void lineareqn()  
void primeno()  
void complexno()

void integralfn()

void vectorfn()

void matrixfn()

### **BOOK REFERENCES:-**

- An introduction to programming and object-oriented design by James P. Cohoon, Davidson
- e-book :-An Introduction to Programming through C++, McGraw Hill Education, 2014, by Prof. Abhiram Ranade

### **Web references:-**

<http://www.cse.iitb.ac.in/~cs101/lecture-slides.html>

[http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)

Wikipedia has been used for most of the formulae and identities which have been used in the coding part.

For example, the formulae for the inverse hyperbolic functions are obtained from the below site.

[http://en.wikipedia.org/wiki/Inverse\\_hyperbolic\\_function](http://en.wikipedia.org/wiki/Inverse_hyperbolic_function)

For the graphics part apart from the lecture vedios given by Abhiram G Ranade, the below site was quite helpful.

<http://www.cplusplus.com/doc/tutorial/>