

Baumann Software Calculator

Display



- Angle Mode** : RAD - DEG - GON.
- Operator** : Active Operation **[+]****[-]****[x]****[:]** Top Left
- Memory Value** : M 0.0 (0.0 = Memory is Zero)
- Invert [INV]** : Displayed Right beside the Angle-Mode and show if the Angle-Reverse Function is **On** or **Off**
- Shift-Status** : Shown Top Left as Status of the Mode of the Angle-Functions **Sine**, **Cosine**, **Tangent** or it's **SinH**, **CosH** and **TanH** Hyperbel-Functions
- Mantisse** : 25 Digits, 23 including Prefix and Decimalpoint

Function-Buttons



- Mode** : Switching the Angle-Mode **RAD DEG GON**
- Shift** : Switching the Hyperbel-Function for **Sine**, **Cosine** and **Tangent**.



- Angle-Invert** : Switching the Anglefunctions **Sine**, **Cosine** and **Tangent** to it's Reverse-Functions (⁻¹).



- Round** : Round the displayed Value to two Digits behind Decimalpoint. Scientific-Formats can be shown *Normal* (if Possible).



- Screen Change:** Convert Values/Units, the Display-Value will be shown in the Convert-Screen and can be used it to calculating on. 3 Screens are available.

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Memory Functions



- MC** : Clear Memory.
M+ : Adding the Display-Value to the Memory-Value
RM : Get the Memory-Value to the Display.

Constants

Button PI:



Get the Value of PI to the Display, to use PI for Calculations.

Button PI/4:



for Ex. Circle-Area Calculation Formula: $d^2 \times \text{PI} / 4$

Example Diameter = 100

Input: 100, Button $[x^2]$ Button $[\text{PI}/4]$ = 7853,98

Length of Diagonal in a Square:



Example Square-Sidelength = 100

Input: 100, Press Button, = 141,4

Note: Square-Diagonal = $\sqrt{2} \times \text{Sidelength}$,
Rectangle = $\sqrt{2} \times \text{smaller Sidelength}^2$

Fast Divides



The Divisor Buttons have all the same Function, they divide the Displayed-Value with the used Button.

Example:

Input 9 Button $[\frac{1}{2}]$ /2 = 4.5

Input 356,8765 Button $[\frac{3}{4}]$ /0.75 = 267.66

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Constants and Power

Euler Constant/Golden Number Phi:



With this both Buttons you can use the irrational Numbers of the Euler-Constant [2.71828...] and in [Shift-Mode] the golden Number Phi [1.61803...] to calculating on.

Power to Base (Base and Exponent editable):



Input 2, press Button: Take Value 2 as Base, the Display doesn't show a Value, the Calculator expecting an Input of another Value (Exponent).

Input 3, Take Value 3 as an Exponent

in Sense 2^3 (2x2x2) = 8

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Square Power 2 (Base editable):



Input 2, press Button, (2x2) = 4
Input 3, press Button, (3x3) = 9

Cubic Power 3 (Base editable):



Input 2, press Button, (2x2x2) = 8
Input 3, press Button, (3x3x3) = 27

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Root-Calculation

Square-Root Calculation:



Input 81, press Button = 9 (9x9 or $9^2 = 81$)

Root Y of Base X Calculation:



Input 81, press Button,

Take 81 as Base-Value, the Display doesn't show a Value now, the Calculator expecting the Input of another Value.

Input 2, (Square-Root)
2nd Root of 81 (Power 2)

Take 2 as Exponent
= 9 ($9^2 = 81$)

Input 81, press Button,

Take Value 81 as Base, the Display doesn't show a Value now, the Calculator expecting the Input of another Value.

Input 3, (Cubic-Root)
Root of 81 (Power 3)

Take 3 as Exponent
= 4.3267 ($4.3267^3 = 81$)

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Invert Value



Input 5, press Button (1 divided by 5) = 0,2

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Logarithm Base 10

log

Input 1000, press Button = 3

Natural Logarithm (Euler-Base) [Shift-Mode]

ln

Input 25, press Button = 3.2188758

Angle-Functions

sin

cos

tan

Example Sine of 20° (Mode DEG)

Input 20, press Button [sin] = 0.3420201

Example Cosine of 20° (Mode DEG)

Input 20, press Button [cos] = 0.9396926

Example Tangent of 20° (Mode DEG)

Input 20, press Button [tan] = 0.3639702

Switching the Modes for Angle-Calculations can be set via the Buttons **Shift, Mode** and **INV**, see the Explanation for [Shift, Inv and Mode] at the Top of this Document and see also the additional Notes at the End of this Document.

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Percent



Example 23% of 3568:

Input 23, press Button [%]

Take 23 as a Percent-Value, the Display doesn't show a Value now, the Calculator expecting the Input of the Base-Value.

Input 3568, (Base-Value)
23% of 3568

Take 3568 as the Base-Value
= 820.64

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

Logarithm of a Number to a Base



Example Logarithm of 8 to Base 2:

Input 8, press Button

Take 8 as Input, the Display doesn't show a Value now, the Calculator expecting the Input of another Value, Input of Base.

Input 2, (Base)
Logarithm Base2 of 8

Take 2 as the Base.
= 3

Calculations that needs 2 Values will be disabled while calculating in Base-Operations [+ - x :], and get enabled by clicking the Clear-Button.

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Calculation

Hours	Price	42.90	Money/h
-------	-------	-------	---------

This Calculator have a simple Possibility to calculate Costs or Prices via a variable Value for Money/Hour. The predefined Value is 42,90 Money/Hour (for Ex. €/h). This Value can be changed by edit a new Value and clicking on the old Value 42.90.

Example 1:

You have a Sum of Money 3500,- and you need to calculate how much Time you can work for this 3500,-

Input 3500, press Button [Hours] = 86.42 Hours

Example 2:

You have a predefined Time of 80 Hours and you need to calculate the Costs for your Work.

Input 80, press Button [Price] = 3240

The Input Field

1	2	3	+	C
4	5	6	-	
7	8	9	×	=
±	.	0	:	

This Buttons for the Number-Input are trivial and don't need an Explanation. Additional to the Numbers, there is one Button for set the Prefix and one to set the Decimalpoint.

Button **C** deleting all Registers and set back the Calculator.

The Result-Button [=] gives the Results of Calculations with the Base-Calculations or Functions. Go on press on [=] calculating on.

Example: 2 [+] 2 [=] 4, [=] 6, [=] 8, [=] 10

This Function [Calculating On] is also available by clicking on the Buttons [+] [-] [×] [÷].

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Example Inputs

Addition and calculating on:

2 [+] 2 [=] 4 [+] [+] = 6 [+] = 8 (+2 stay as Operator [+] Button)
2 [+] 2 [=] 4 [=] = 6 [=] = 8 (+2 stay as Operator [=] Button)

Subtract and calculating on:

8 [-] 2 [=] 6 [-] [-] = 4 [-] = 2 (-2 stay as Operator [-] Button)
8 [-] 2 [=] 6 [=] = 4 [=] = 2 (-2 stay as Operator [=] Button)

Multiply and calculating on:

4 [x] 2 [=] 8 [x] [x] = 16 [x] = 32 (x 2 stay as Operator [x] Button)
4 [x] 2 [=] 8 [=] = 16 [=] = 32 (x 2 stay as Operator [=] Button)

Divide and calculating on:

8 [:] 2 [=] 4 [:] [:] = 2 [:] = 1 (:2 stay as Operator [:] Button)
8 [:] 2 [=] 4 [=] = 2 [=] = 1 (:2 stay as Operator [=] Button)

Input Examples:

The actual Version 2.0 Code 21 do NOT provide the Dot before Dash Rule!

Example 1 (Basic Calculations/Changing Operators):

3 [+] 2 [x] 2 = 10 (Calculating 5 x 2, +2 replaced by x 2)

Variant:

3 [+] 2 [=] [x] 2 = 10 (Calculating 5 x 2)

Example 2 (Basic Calculations/Changing Operators):

3 [x] 2 [+] 2 = 8 (Calculating 6 +2, x 2 replaced by +2)

Variant:

3 [x] 2 [=] [+] 2 = 8 (Calculating 6 +2)

Example 3 (Basic Calculations with Constants):

3 [x] [PI] [+] 2 = 11.42 (Calculating 9.42 +2, x PI replaced)

Variant:

3 [x] [PI] [=] [+] 2 = 11.42 (Calculating 9.42 +2)

Example 4 (Basic Calculations with Pow):

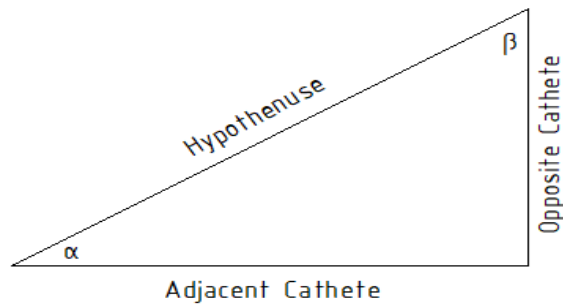
3 [x] 2 [x²] [+] 2 = 14 (Calculating 3 x [4] + 2)

Variant:

3 [x] 2 [x²] [=] [+] 2 = 14 (Calculating 12 + 2)

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Angle-Functions



Example Tangent

(1)

Given: Adjacent Cathete = 325 mm
 Opposite Cathete = 180 mm

Find Angle α :

Angle-Function Tangent **tan = Opposite Cathete/Adjacent Cathete**
tan = 180 mm / 325 mm
tan = 0.5538462

Press Button Angle Reverse-Function



Angle α = 28.979°

(2)

Given: Angle α = 25°
 Aligned Cathete = 550 mm

Find the Opposite Cathete:

Formula Change ~ Opposite Cathete = **tan α 25° x Adjacent Cathete**
Opposite Cathete = 0.4663076 x 550 mm
Opposite Cathete = 256.47 mm

(3)

Given: Angle α = 18°
 Opposite Cathete = 185 mm

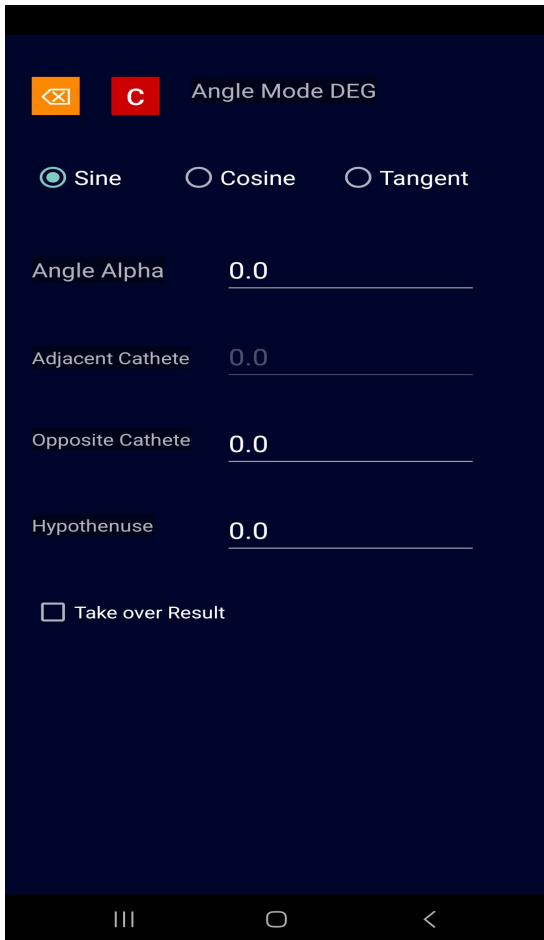
Find the adjacent Cathete:

Formula Change ~ **Adjacent Cathete = Opposite Cathete / tan α 25°**
Adjacent Cathete = 185 mm / 0.3249196
Adjacent Cathete = 569.37 mm

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Calculating Angles via Screen 2

Press Button



The Screen2 is made for easier calculating Angles and it's Functions.

Choose the Mode for **Sine**, **Cosine** or **Tangent** and do the Inputs for this Calculations.

In this Example for **Sine** we give an Angle as an Input and the Length of the opposite Cathete, during the Input, the Calculator calculating the Length of the Hypothenuse.

Button [Arrow-Left] returning to the Main Calculator-Screen.

The Result can be use in the Main Calculator-Screen by check the [Take over Result] CheckBox before click the Button [Arrow-Left].

Button [C] set all Inputs back.

Convert Units




Button to change to the Convert-Screen (Values in Display get take over if it is available)

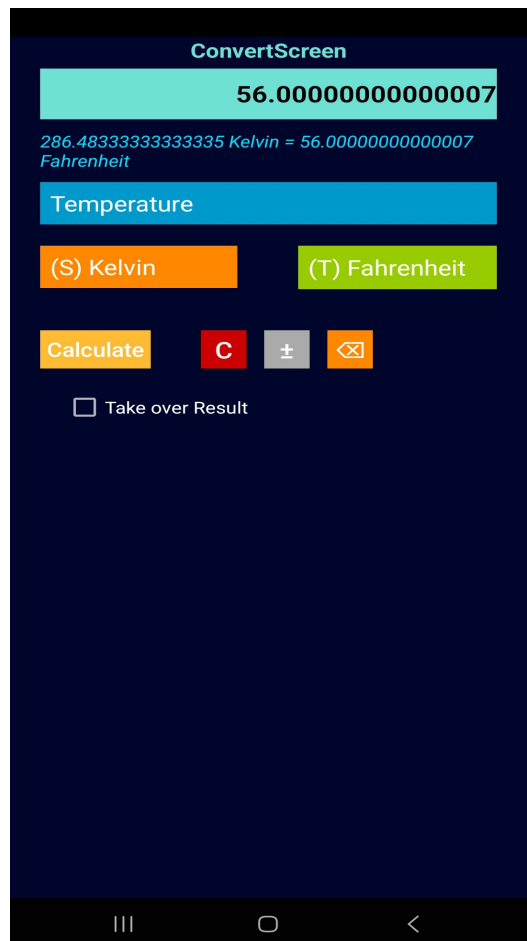
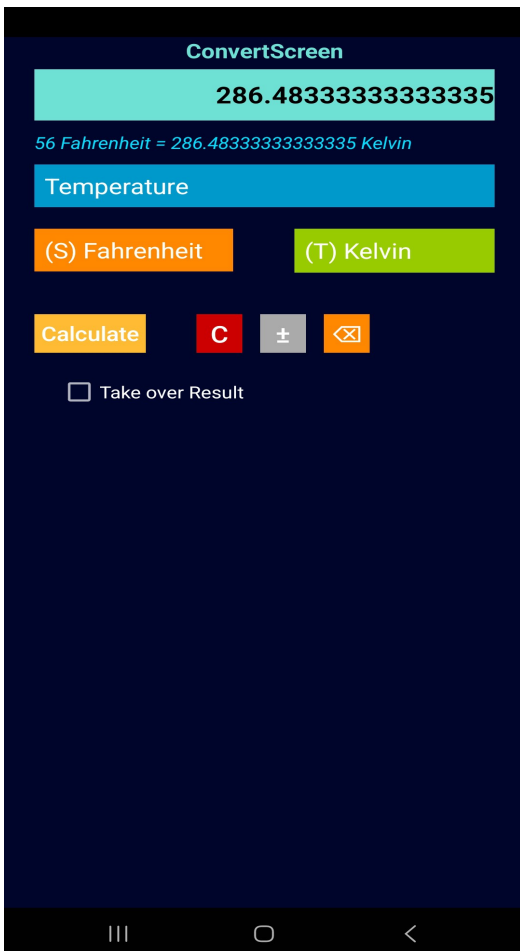
Example: Convert 56F Fahrenheit to Kelvin and back.

Choose Category Temperature:

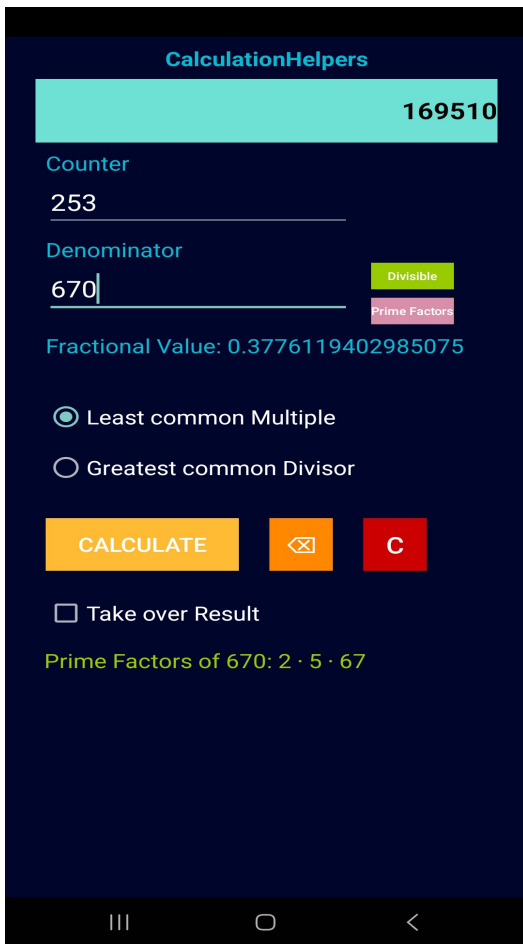
Source (S) Choose Unit [**Fahrenheit**]
Target (T) Choose Unit [**Kelvin**]
Button [**Calculate**] = 286.48K

Calculate back (Test):
Source (S) Choose Unit [**Kelvin**]
Target (T) Choose Unit [**Fahrenheit**]
Button [**Calculate**] = 56F

Results can be take over to the Main Calculator-Screen by check the [Take over Result] CheckBox and click [].



Calculation Helpers



This new Screen provides you with some Functions, that are commonly used in Mathematics.

The Display-Value of the Calculator is displayed as the Fractional Counter.

If a Counter and a Denominator is given, you can calculate the GCD or the LCM.

The GCD and LCM are mostly used by fraction calculation if you need to reduce or expanding Fractions.

```
gcd(counter,denominator);  
lcm(counter,denominator);  
Fract. Value = counter/denominator;
```

The fractional Value will also be calculated and displayed, by click on [Calculate]. Additional,

you can check the Divisibly and the Primefactors of the Denominator-Value.

In this Example we calculate the **lcm** of **253** and **670**, and we get the Primefactors of 670 by clicking on the [PrimeFactors] Button.

Primefactors of 670: $2 \times 5 \times 67$

lcm (the 1st or smallest Multiple for both Numbers 253 & 670)

Multiples of 253 = 253x1, 253x2 . . . 253x670 = 169510

Multiples of 670 = 670x1, 670x2 . . . 670x253 = 169510

The Button [Divisible] checking the divisibly of 670, and give back the Integer-Numbers that divide 670 without a Rest-Value (Modulo).

670 is divisible without Rest by the Numbers **1, 2, 5, 10, 67, 134, 335, 670**.

This Screen is available since **Code20**.

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Programming

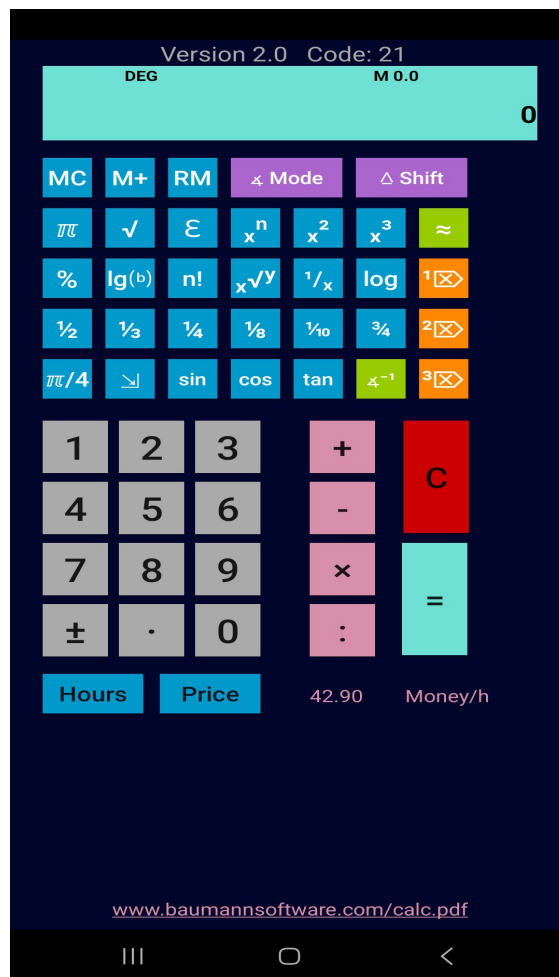
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Developed with Android Studio

Get it free on Google Play

<https://play.google.com/store/apps/details?id=com.test.taschenrechner&hl=de>



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Last Release

Code 21, Version 2.0, Release 30.04.2024

Android Studio Koala 2024.1.1

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Short History

Code 6:

The variable Value for Calculation of **Price** or **Hours** is stored since **Code 6**.

to change this Value:

- Type in a new Value (Money/hour)
- Fingerclick on the Value Text Bottom Right near **Price**
- New Value is set

The Calculator can be closed or terminate now, at the next Start of the Calculator, it get this (new) stored Value.

Code 8:

Button $[10^x]$ are removed and replaced by $[\epsilon]$, with this new Button, the Euler-Constant can be used for calculations.

Code 13:

The Button $[\%_{\infty}]$ (Per 10000) removed and replaced by the Factorial-Funktion Button $[n!]$. Natural Numbers f.Ex. 4 will be calculated: $1 \times 2 \times 3 \times 4 = 24$ ($4! == 24$). Decimal Numbers will be calculated by the Euler Gamma-Function.

For Example: $4.2! == 32.58$

Code 15:

Check of all Functions- and Inputs as a Quality-Control done.

Code 16:

Adaption for bigger Screens [Tablets], Shift-Modus extended - Natural Logarithm $[\ln]$, Euler-Base Logarithm added.

Code 17:

Gamma-Function Decimal-Number Factorial $[n!]$ Code-Revision for a better Accuracy.

Extensions:

Shift-Modus, Button $\frac{3}{4}$ erhält den Modus **DigitSum** [DS]
Shift-Modus, Button $\frac{1}{10}$ erhält den Modus **DigitProduct** [DP]

DS = Digit Sum for Ex. 1234 (1+2+3+4) = 10
DP = Digit Product 1234 (1x2x3x4) = 24, 120 (1x2x0) = 0

Code 18

Code-Changes at the Input-Validation of the Basic-Calculations (+ - x :),

The Convert-Screen is extended, all Items the can be used on both Sides (Source/Target) now. Overall **208** possible Pairings of the Categories Length, Weight, Volume, Speed and Temperature as Calculation-Methods are available.

Convert Hints:

Unit *Pint* = **UK** Pint (Imperial Pint)

Unit *Barrel* = **US** Barrel for Oil

Unit *Zentner* = **DE** 50 Kg

Code 19

Input-Errors removed, (Methods like f.Ex. [%] that needs a 2nd Input-Value, crashing the App in Case the the Display have NO Value AND the Prefix-Button [+ -] was clicked

Extensions:

Result-Checkings for:

Prime Numbers (Result is only divisible by itself OR 1)

Armstrong Number (Count of the Digits is Exponent - every Digit is added by the Power of the Exponent)

Palindrome Number (A Number that have the same Value if it is mirrored f.Ex. 131, 4224)

Every ONE Digit Number > 0 is a *Palindrome* and also *Armstrong Number* (1,2,3,4,5,6,7,8,9)

Examples: 151 (*Prime Number, Palindrome*)

153 (*Armstrong Number*) - Count of Digits = 3
(3 = Exponent) $1^3 + 2^3 + 3^3 = 153$

A Text Output shows the Result everytimes if the Result-Button [=] is clicked.

Example:

Search a Prime-Number near 100

Input:

```
[100]+[1][=] 101 (Prime Number) (Palindrome)
[=]           102
[=]           103 (Prime Number)
[=]           104
[=]           105
[=]           106
[=]           107 (Prime Number)
```

Fixes:

- Input-Validation recoded.
- Factorial-Calculation recoded to Datatypes BigInteger/BigDecimal (Java).

Example 50! = 3.041409320171337804E064

50! Factorial have 65 Digits. Count of Nulls at the End is 12

50!=30414093201713378043612608166064768844377641568960512000000000000

- New Inputvalidation permit the 90° Input for the Tangent-Function in DEG Mode.
- Big Numbers (Factorials) can be displayed if the Shift-Mode is active:

Example:

Input:

```
[Shift] 102 [n!] = 9.614466715035126609E161
```

```
96144667150351266092686555869725954845535590505965946436944471404853171513025459
06033149618823644513849855959803620591575037100428655329280000000000000000000000000
00
```

Code 20:

Screen4 Calculation Helpers implemented, Calculation of the greatest common Divisor (**gcd**) and the least common Multiple (**lcm**) of two Values.

Code 21:

Screen4: Extension for Functions [Divisible] and [Primefactors].

Screen2: All Convertings checked.

Button [%o] replaced by a Logarithm-Function to a given Base.

The Calculator-App is translated to the English Language. The Language of the Android-System is (if NOT English is setted) set the Application to German Language.

Shift Modus Extensions:

Minimum and Maximum:



Example Minimum:

Input 23.75, Button [↓↓] Result = 23

This Function cutting all Digits after Decimalpoint and return the Value before Decimalpoint (Next lower Integer).

Example Maximum:

Input 23.34, Button [↑↑] Result = 24

This Function cutting all Digits after Decimalpoint and increase the Value before Decimalpoint with 1 (Next higher Integer).

Integer:



Example:

Input 23.75, Button [int] Result = 24 (Round up)
Input 23.5, Button [int] Result = 24 (Round up)
Input 23.25, Button [int] Result = 23 (Round down)

This Function rounding a Decimal-Number up- or down into the resulting Integer-Number.

Next lower Integer if the Digit after Decimalpoint is < 0.5
Next higher Integer if the Digit after Decimalpoint is >= 0.5

Logarithm to a given Base:



Example: $\log_2 8$

Input 8, press Button [$\lg(b)$],
Input 2, press Button [=], (Base is now 2) **Result = 3**

This Function is helpful if you need to calculate an unknown Power of a Number.

For this Example:

$2^x = 8$ | \log_2
 $\log_2 (2^x) = \log_2 (8)$
 $x = \log_2 (8)$
 $x = \log_2 / \log_8$ (Internal Calculation)
 $x = 3$

Code 22

English Language implemented if the Android System set to an English Language.

Code 23

Fontsize-Adaption, if the Android System is set to bigger/smaller Fontsizes.

Code 24

Error removed in gcd (greatest common Divisor) Calculation on Screen 3, the Recursive-Function did crashing the App in some Cases.