Scientific calculator

Software Documentation

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Introduction

This software documentation includes: description of the application's operation, what is needed for use, algorithms used, interface description and source code description. This application is used for basic and advanced arithmetic calculations.

Describing of the application’s operation

After running the script, the application displays all available calculations - not only the basic ones, but those provided by the math module. All the functions used are available at https://en.python.org/docs/lib/module-math.html . These are useful functions for normal calculations for elementary school as well as advanced calculations for high school and college. Examples are logarithms, roots, powers, and trigonometric functions. The user can also select an option that allows the exact value of the constants pi and e to be displayed.

After selecting an option from 1 to 29, enter the value of one or two variables depending on how many parameters the function needs. If he enters the value 30 or 31, the program displays the value of the constant pi and e in turn. If he enters a wrong number, the program will inform him about the wrong option.

What is needed for use?

The application does not require installation. It only needs the Windows operating system.

Source code description

The project was made in the Python programming language, in the PyScripter programming environment. All work was done on the Windows 10 operating system. The application's source code looks like this.

```
import math

#https://pl.python.org/docs/lib/module-math.html

option = int(input("1. x+y\r\n2. x-y\r\n3. x*y\r\n4. x/y\r\n5.
acos(x)\r\n6. asin(x)\r\n"+
"7. atan(x)\r\n8. atan2(y,x)\r\n9. ceil(x)\r\n10. cos(x)\r\n11.
cosh(x)\r\n12. degrees(x)"+
"\r\n13. exp(x)\r\n14. fabs(x)\r\n15. floor(x)\r\n16.
fmod(x,y)\r\n17. frexp(x)\r\n"+
"18. hypot(x,y)\r\n19. ldexp(x,y)\r\n20. log(x,y)\r\n21.
log10(x)\r\n22. modf(x)\r\n"+
"23. pow(x,y)\r\n24. radians(x)\r\n25. sin(x)\r\n26. sinh(x)\r\n27.
sqrt(x)\r\n"+
```

```
"28. tan(x)\r\n29. tanh(x)\r\n30. pi\r\n31. e\r\nEnter the number:
"))
if option>0 and option<30:
    a=float(input("Enter a: "))
    if not(option>=5 and option<=7) and option!=16 and
not(option>=18 and option<=20) and option!=23:
        b=float(input("Enter b: "))

    if option == 1:
        print(str(a)+'+'+str(b)+'='+str(a+b))
    elif option == 2:
        print(str(a)+'-'+str(b)+'='+str(a-b))
    elif option == 3:
        print(str(a)+'*'+str(b)+'='+str(a*b))
    elif option == 4:
        if b!=0:
            print(str(a)+'/'+str(b)+'='+str(a/b))
        elif b==0:
            print('Do not divide by zero!')
    elif option == 5:
        print("acos("+str(a)+")="+str(math.acos(a)))
    elif option == 6:
        print("asin("+str(a)+")="+str(math.asin(a)))
    elif option == 7:
        print("atan("+str(a)+")="+str(math.atan(a)))
    elif option == 8:
        print("atan2("+str(b)+"/"+str(a)+")="+str(math.atan2(b,a)))
    elif option == 9:
        print("ceil("+str(a)+")="+str(math.atan(a)))
    elif option == 10:
        print("cos("+str(a)+")="+str(math.cos(a)))
    elif option == 11:
        print("cosh("+str(a)+")="+str(math.cosh(a)))
    elif option == 12:
        print("degrees("+str(a)+")="+str(math.degrees(a)))
    elif option == 13:
        print("exp("+str(a)+")="+str(math.exp(a)))
    elif option == 14:
        print("fabs("+str(a)+")="+str(math.fabs(a)))
    elif option == 15:
        print("floor("+str(a)+")="+str(math.floor(a)))
    elif option == 16:
        print("fmod("+str(a)+","+str(b)+")="+str(math.fmod(a,b)))
    elif option == 17:
        print("frexp("+str(a)+")="+str(math.frexp(a)))
    elif option == 18:
        print("hypot("+str(a)+")="+str(math.hypot(a)))
    elif option == 19:
        print("ldexp("+str(a)+","+str(b)+")="+str(math.ldexp(a,b)))
```

```
    elif option == 20:
        print("log("+str(a)+","+str(b)+")="+str(math.log(a,b)))
    elif option == 21:
        print("log10("+str(a)+")="+str(math.log10(a)))
    elif option == 22:
        print("modf("+str(a)+")="+str(math.modf(a)))
    elif option == 23:
        print("pow("+str(a)+","+str(b)+")="+str(pow(a,b)))
    elif option == 24:
        print("radians("+str(a)+")="+str(math.radians(a)))
    elif option == 25:
        print("sin("+str(a)+")="+str(math.sin(a)))
    elif option == 26:
        print("sinh("+str(a)+")="+str(math.sinh(a)))
    elif option == 27:
        print("sqrt("+str(a)+")="+str(math.sqrt(a)))
    elif option == 28:
        print("tan("+str(a)+")="+str(math.tan(a)))
    elif option == 29:
        print("tanh("+str(a)+")="+str(math.tanh(a)))
elif option == 30:
    print("pi="+str(math.pi))
elif option == 31:
    print("e="+str(math.e))
else:
    print('Bad option')
```

Listing 1: Source code [own study]

The option variable holds a value that determines what action is to be performed. The user decides which option to choose. Variables a and b hold floating point values that are needed for math operations. There is a link in the comment to the page with the functions used.

List of listings