

12. PYTHONDA MODULLAR



Har bir yangi dasturning kodini yozish ko'p vaqt talab qiladigan jarayon hisoblanadi. Shu sababli, tayyor qism dasturlardan foydalanish har bir dasturchi uchun qulaydir. Zamonaviy dasturlash tillarida bu jarayonni yengillashtirish uchun tayyor dastur kodlarini saqlovchi kutubxonalar mavjud.

Modullar – alohida faylda yozilgan bo'lib, turli dasturlarda qo'llanilishi mumkin bo'lgan kodlar majmui.

Boshqa dasturlash tillari kabi Python dasturlash tilining standart kutubxonasi ham ko'plab tayyor kod fragmentlari (modullar, standart funksiyalar va b.)dan tarkib topgan.

Python dasturlash tilini yanada takomillashtirish uchun foydalanuvchi tomonidan yozilgan modullarni kutubxonaning alohida qismiga yuklash ham mumkin.

Python dasturlash tilida juda ko'p modul mavjud bo'lib, ularning asosiylarini ko'rib chiqamiz.

Modul nomi	Modul tavsifi
math	Modul murakkab matematik ifodalarni hisoblash uchun qo'llaniladi
random	Modul tasodifiy sonlarni tanlab oladi yoki ro'yxat elementlarini tasodifiy tartibda joylashtiradi
tkinter	Modul foydalanuvchi va dastur o'rtasida o'zaro aloqa o'rnatish uchun oyna, tugmacha va boshqa grafik elementlardan foydalanish imkonini beradi
datetime	Modul joriy sana va vaqtni ko'rsatish hamda sanalarni hisoblash, sanalar ustida amallar bajarish imkonini beradi
socket	Modul kompyuterlarni internet orqali birbiriga ulash uchun qo'llaniladi
turtle	Modul ekranda chiziq va figuralarni chizish uchun qo'llaniladi
locale	Modul sonlarni formatlashda belgilangan tartibni aniqlash muammosini hal qilish uchun qo'llaniladi
decimal	Modul o'nli kasr sonlari bilan ishlash va ularni yaxlitlash uchun qo'llaniladi
os	Modul katalog va fayllar bilan ishlash uchun bir qancha imkoniyatlarni beradi

copy	Modul nusxalash bilan bog'liq masalalarni hal qilishga mo'ljallangan
sys	Python interpretatorida dasturni bajaruvchi muhit hisoblanadi
pygame	ovoz va maxsus o'yin grafikasi bilan ishlash imkonini beruvchi, videoo'yinlar yaratish uchun mo'ljallangan

Dasturda modullardan foydalanish uchun avval uni dasturga yuklash kerak bo'ladi. Bu esa uning tarkibida saqlanuvchi kod fragmentiga murojaat qilishni talab qiladi. Modullarni dasturga yuklashning uch xil usuli mavjud.

1-usul. Modul funksiyalarini yuklab olishning bu usulida murojaat etilayotgan kod fragmentidan oldin modulning nomi ko'rsatilishi lozim. Bunday dasturlarni o'qish juda oson, chunki kod qaysi modulga tegishli ekanligini tez aniqlash mumkin.

Sintaksisi:

```
import modul fayli nomi
```

```
import modulni yuklovchi kalit so'z
```

```
>>> import math
```

Har bir funksiyadan oldin modulning nomi ko'rsatiladi.

2-usul. Modul funksiyalarini yuklab olishning bu usuli uncha katta bo'lmagan dasturlar uchun qulay. Katta dasturlarda esa dasturni tushunish qiyin kechadi, ya'ni funksiya qaysi modulga taalluqli ekanligini aniqlash uchun biroz urinish kerak bo'ladi.

Sintaksisi:

```
from modul fayli nomi import *
```

from ... import * – modulni yuklovchi kalit so'z

3-usul. Moduldan faqat funksiyalarning o'zini yuklab olish ham mumkin. Agar dasturdan faqat bitta funksiya kerak bo'lsa, u holda funksiyalarning barchasini emas, kerakli funksiyaning o'zinigina yuklab olgan ma'qul.

Sintaksisi:

```
from modul fayli nomi import funksiya nomi
```

```
>>> from random import *
```

```
>>> randint(1,5)
```

Standart kutubxonadan random moduli funksiyalarini yuklab oldi.

Funksiya qaysi modulga taalluqli ekanligi ko'rsatilmaydi.

```
>>> from random import randint
```

```
>>> randint(1,5)
```

Standart kutubxonadan random modulining randint funksiyasi yuklab olindi.

Python dasturlash tili tayyor modullar bilan keladi, modullarning to'liq ro'yxatini quyidagi bo'glama orqali kirib ko'rishingiz mumkin:

[Python Module Index — Python 3.9.5 documentation](https://docs.python.org/3.9.5/module-index.html)

docs.python.org

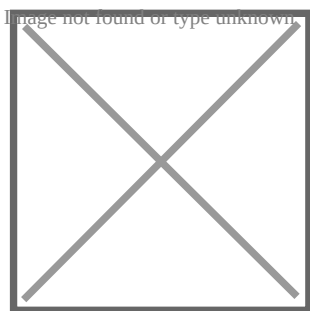
Python kutubxonasining **math moduli** o'z ichiga matematik, trigonometrik va logarifmik amallarni bajaruvchi funksiyalarni qamrab olgan.

Funksiyalar	Tavsifi
<code>ceil(x)</code>	Eng yaqin katta butun songacha yaxlitlaydi. <code>Ceil(1.5)==2</code> , <code>ceil(-1.5)= -1</code>
<code>round(x, n)</code>	x sonini nuqtadan keyin n ta belgi qolgunga qayta yaxlitlaydi
<code>floor(x)</code>	Eng yaqin kichik butun songacha yaxlitlaydi. <code>floor(1.5)==1</code> , <code>floor(-1.5)= -2</code>
<code>round(x)</code>	x sonini yaxlitlaydi.
<code>log(a, b)</code>	b asosga ko'ra a logarifmini hisoblaydi
<code>log10(x)</code>	x sonining o'nli logarifmini hisoblaydi
<code>sqrt(x)</code>	x ning kvadrat ildizini hisoblaydi
<code>pow(x, n)</code>	x ning n-darajasini hisoblaydi
<code>factorial(x)</code>	x faktorialni hisoblaydi
<code>abs(x)</code>	x ning modulini hisoblaydi
<code>cos(x)</code>	x ning kosinusini hisoblaydi
<code>sin(x)</code>	x ning sinusini hisoblaydi
<code>tan(x)</code>	x ning tangensini hisoblaydi

<code>acos(x)</code>	x ning arkkosinusini hisoblaydi
<code>asin(x)</code>	x ning arksinusini hisoblaydi
<code>atan(x)</code>	x ning arktangensini hisoblaydi
<code>degrees(x)</code>	Radiandan gradusga o'tkazadi
<code>radians(x)</code>	Gradusdan radianga o'tkazadi
<code>exp(x)</code>	e^x ni qaytaruvchi funksiya
<code>fabs(x)</code>	x ning absolyut qiymatini qaytaradi

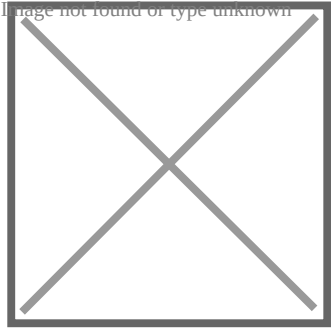
Bu modulda matematik hisob kitoblarni bajaruvchi funksiyalar va o'zgaruvchilar joylashgan. Keling ularga ba'zi misollarni ko'ramiz.

`sqrt()` - qavs ichida berilgan qiymatning kvadrat ildizini qaytaradi



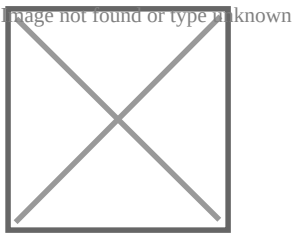
5.0

`pow(x,y)` - x ning y-darajasini qaytaradi



125.0

pi ning qiymatini aniqlaymiz.

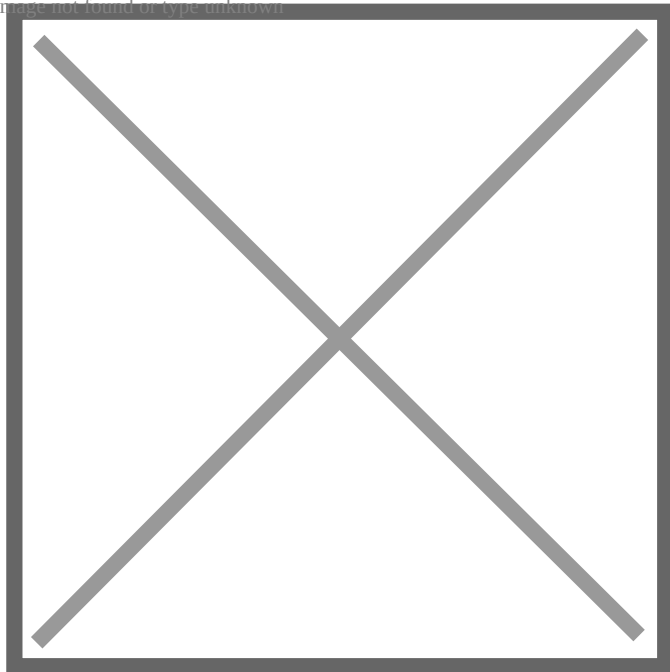


3.141592653589793

1 topshiriq. $y=x*\cos x$ funksiyaning qiymatini hisoblang

Pythonda dastur tuzilishi:

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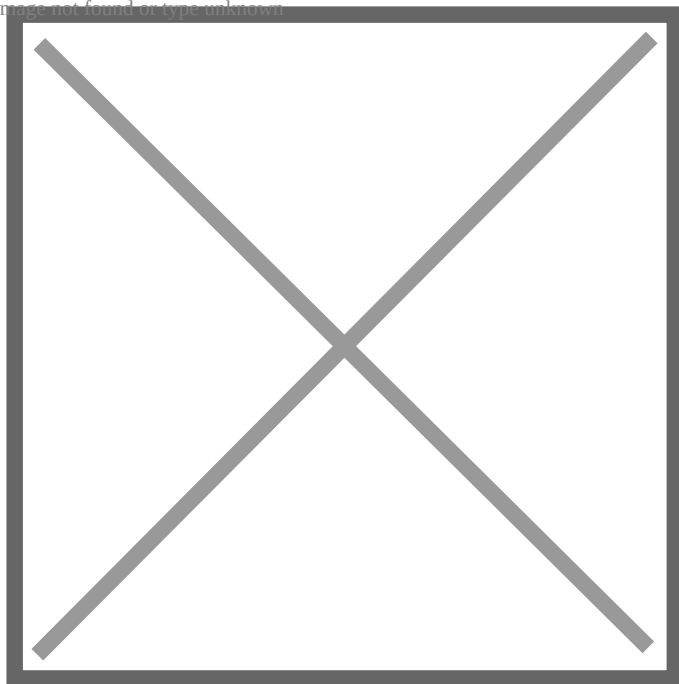
x ning qiymatini kiriting =1

y ning qiymati =
0.5403023058681398

2 topshiriq. $y=|\sin x|+|\cos x|$ funksiyaning qiymatini hisoblang

Pythonda dastur tuzilishi:

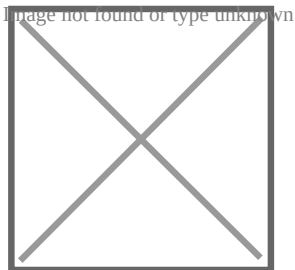
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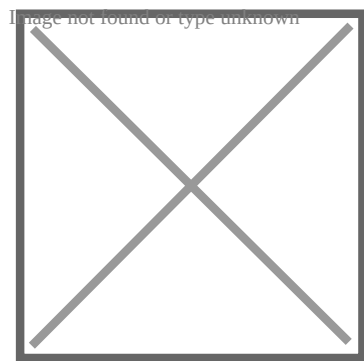
x ning qiymatini kiriting =-3

y ning qiymati = 1.3817732

3 topshiriq. funksiyaning qiymatini hisoblang

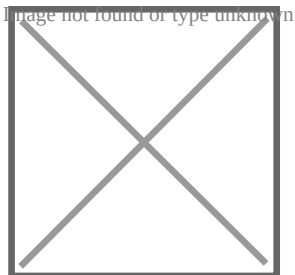


Pythonda dastur tuzilishi:

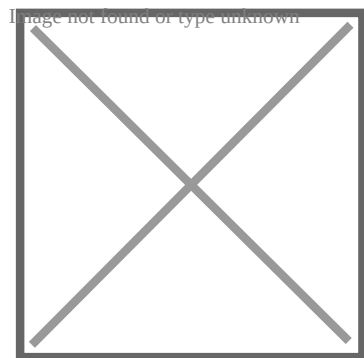


$x=3$
Natija $a= -1.5735972951640635$

4 topshiriq. Funksiyaning qiymatini hisoblang

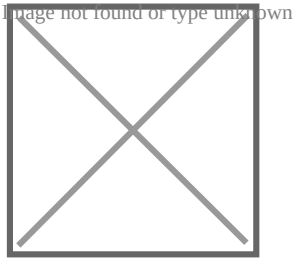


Pythonda dastur tuzilishi:

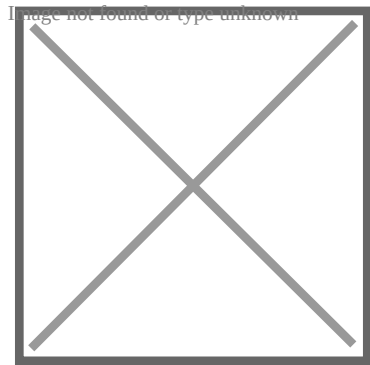


$x=3$
Natija $a= -1.5735972951640635$

5 topshiriq. Funksiyaning qiymatini hisoblang



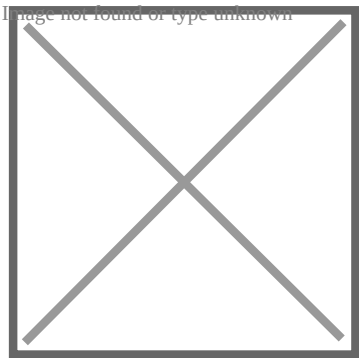
Pythonda dastur tuzilishi:



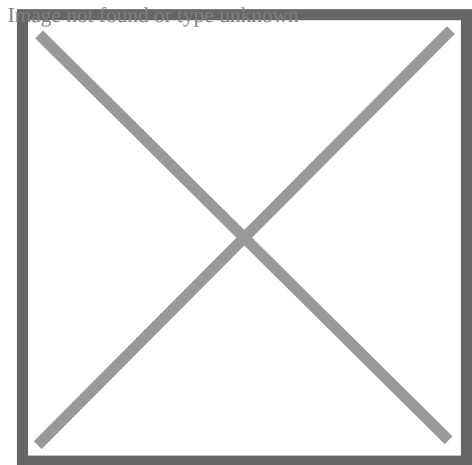
$$y=3$$

$$\text{Natija } b= 0.519914856674817$$

6 topshiriq. Funksiyaning qiymatini hisoblang



Pythonda dastur tuzilishi:

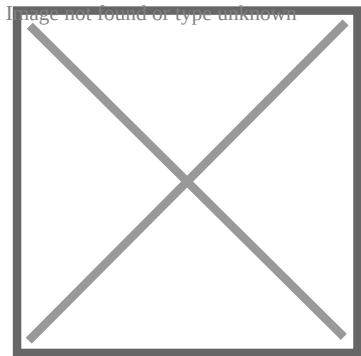


$$x=3$$

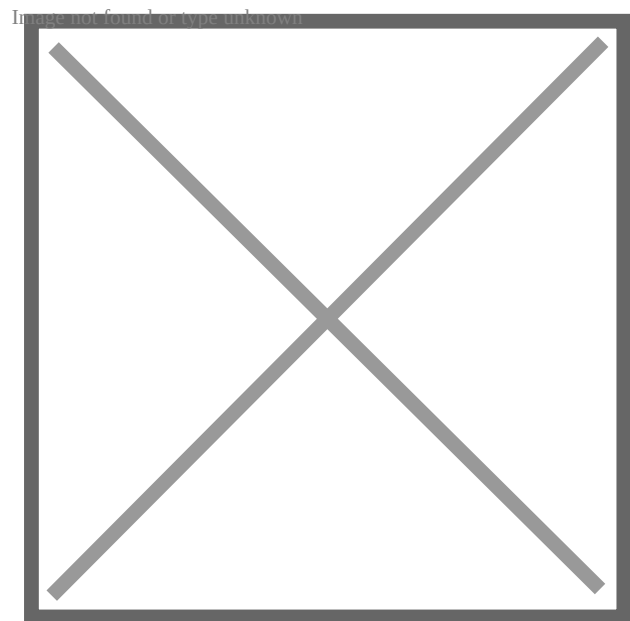
$$y=5$$

$$\text{Natija } c= 2.3513346877207573$$

7 topshiriq. Funksiyaning qiymatini hisoblang



Pythonda dastur tuzilishi:



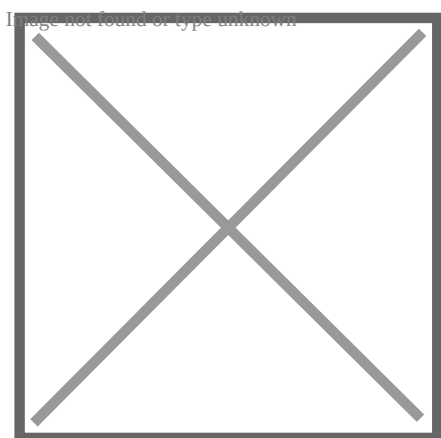
$$x=9$$

$$y=6$$

$$z=7$$

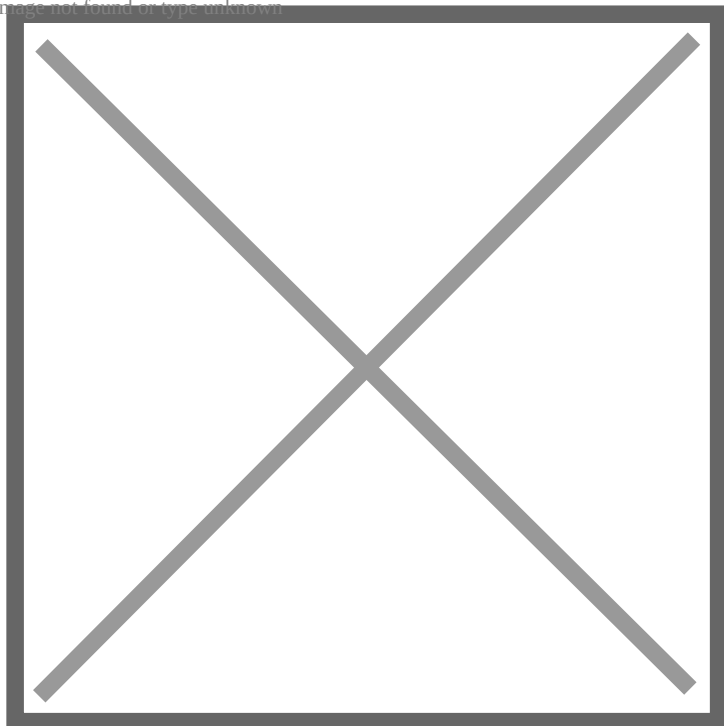
$$\text{Natija } u= 3244.984976821376$$

8 topshiriq. Funksiyaning qiymatini hisoblang



Pythonda dastur tuzilishi:

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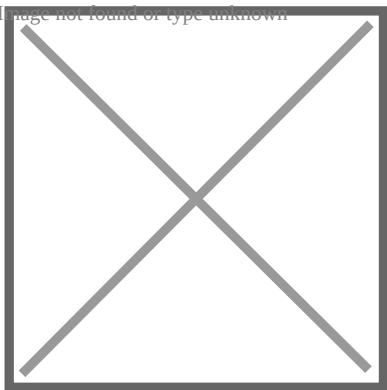
$$x=8$$

$$y=2$$

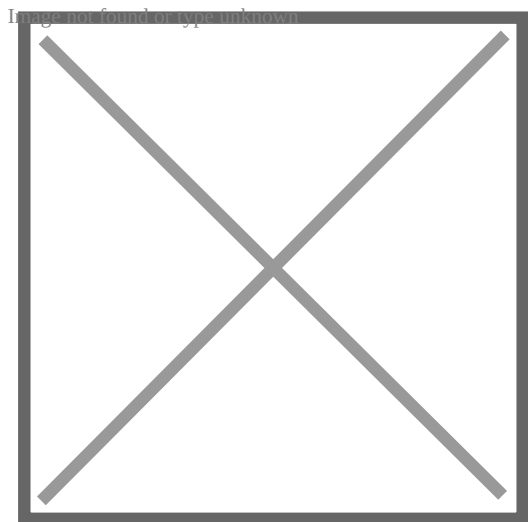
$$\text{Natija } v= 0.0311745059$$

9 topshiriq. Funksiyaning qiymatini hisoblang

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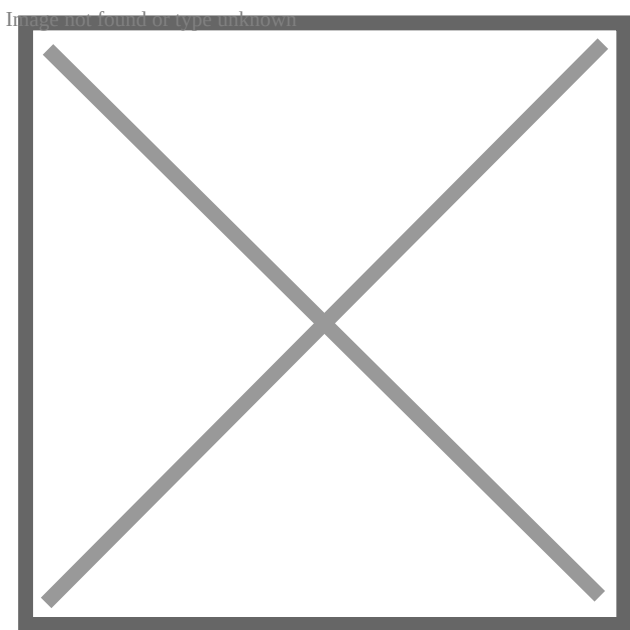
Pythonda dastur tuzilishi:



$z=9$

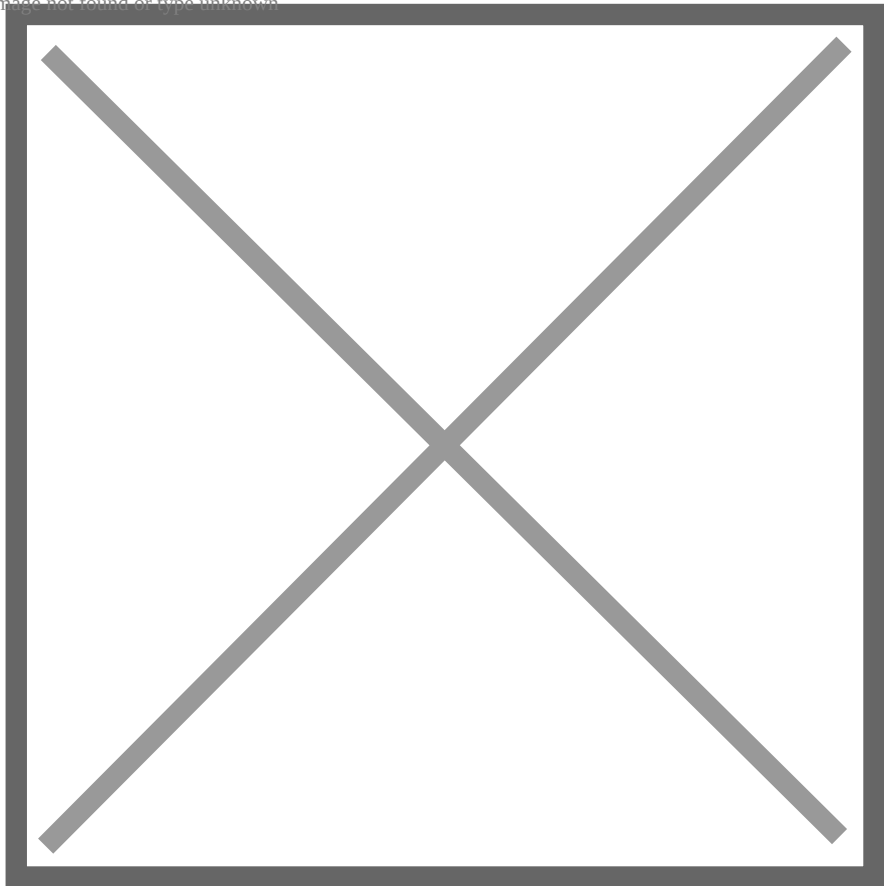
Natija $w= 1933.75$

10 topshiriq. Funksiyaning qiymatini hisoblang



Pythonda dastur tuzilishi:

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$x=3$

$y=4$

$z=5$

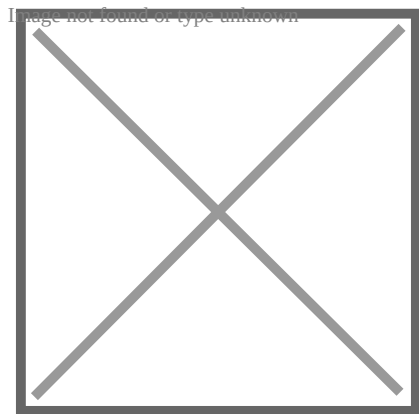
Natija $f= -1.$

DATETIME — SANA VA VAQT

Ushbu modul yordamida Pythonda sanalar bilan ishlashimiz mumkin. Moduldan foydalanishdan avval uni import qilamiz. Har gal moduldan foydalanishda datetime deb qayta yozmaslik uchun, import qilishda modulga dt nomini beramiz.

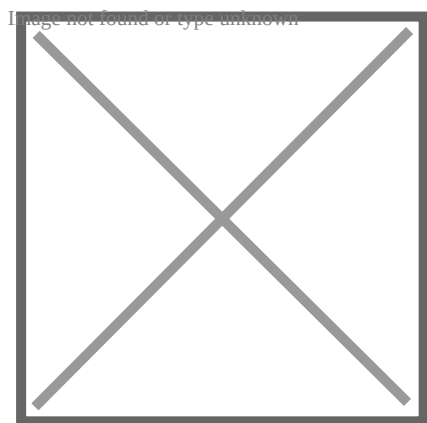
```
import datetime as dt
```

Hozirgi vaqt va sanani ko'rish uchun `datetime.now()` moduliga murojat qilamiz:



2021-09-16 21:39:19.306789

Kurib turganingizdek, natija yil, oy, kun soat, minut, sekund va millisekund ko'inishida chiqdi. Biz bu qiymatlardan istaganimzni maxsus metodlar yordamida ajratib olishimiz mumkin:



2021-09-16 21:43:03.210374

2021-09-16

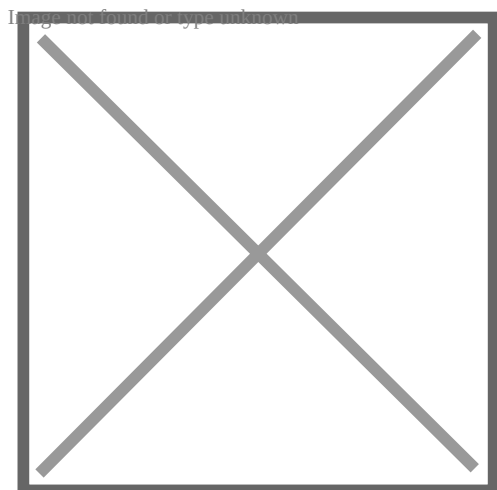
21:43:03.210374

21

43

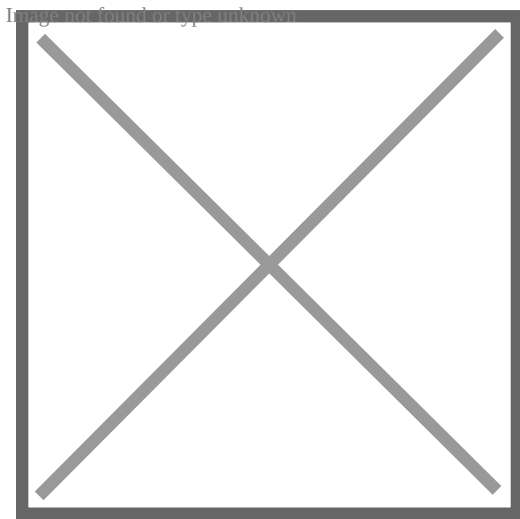
3

Agar bugungi kunning sanasi talab qilinsa datetime moduli ichidagi `date.today()` moduliga murojat qilamiz.



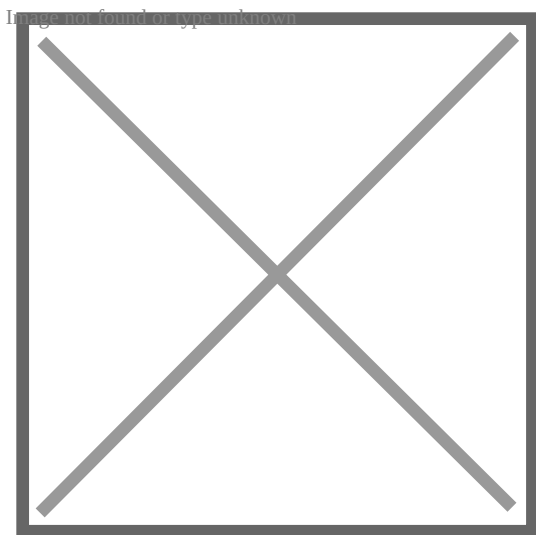
Bugungi sana: 2021-09-16

Agar biror sanani qo'lda kiritish talab qilinsa `.date()` metodiga kerakli sanani (yil, oy, kun) ko'rinishida kiritamiz.



Ertangi sana: 2021-09-17

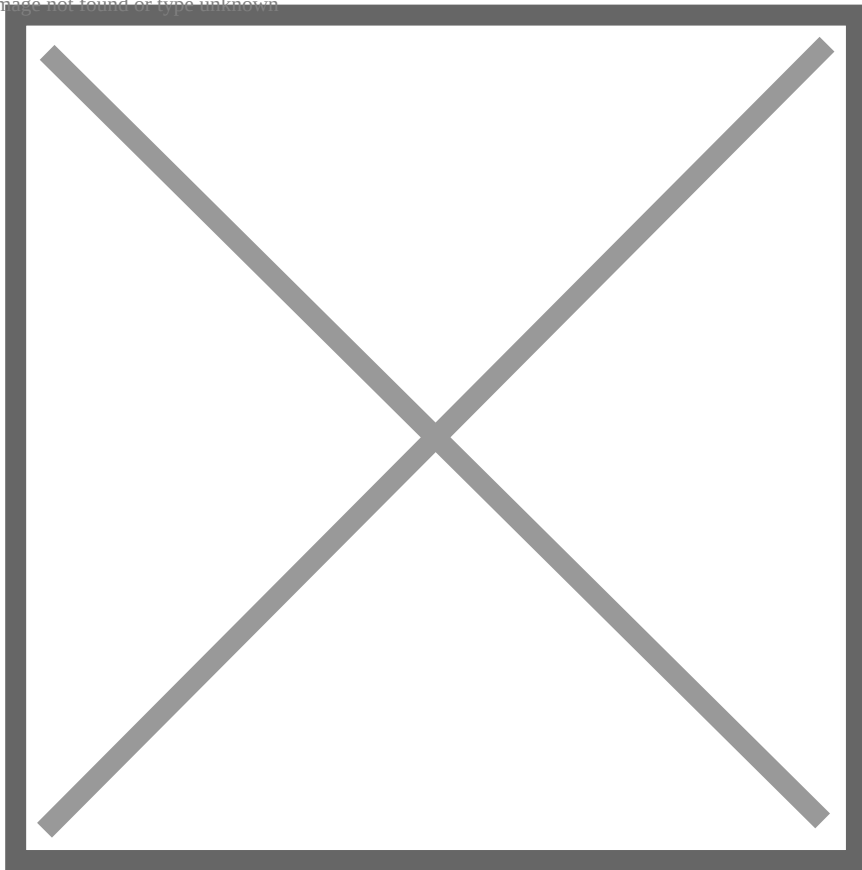
Faqatgina vaqt bilan ishlash uchun `.datetime.now().time()` metodiga murojat qilishimiz mumkin:



Hozir soat: 22:07:06.183691

Istalgan vaqtni qo'lda kiritish uchun esa `.time()` metodiga kerakli vaqtni (soat, minut, sekund), ikki vaqt oralig'ini sekundlarda yoki soatlarda ko'rinishida beramiz:

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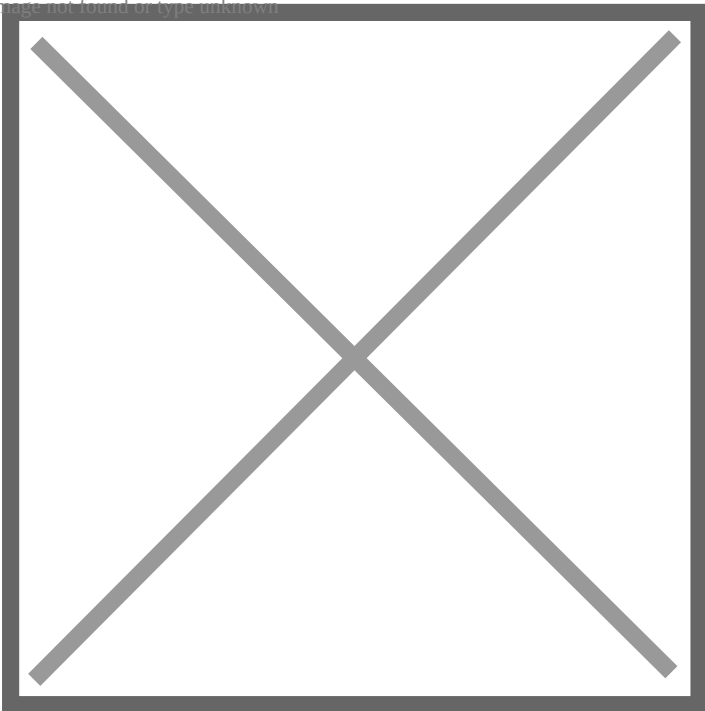
Futbol boshlanishiga 56

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Yuqorida sanalar AQSh standartiga ko'ra, yil-oy-kun ko'rinishida chiqayapti. Sanani o'zimizga moslab chiqarish uchun `.strftime()` metodini chaqiramiz, va sanani o'zimizga qulay formatda chiqaramiz.

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Hozir soat: 22:13:13

Bugun sana: 16-09-2021

16/09/2021, 22:13

Mustaqil yechish uchun topshiriqlar

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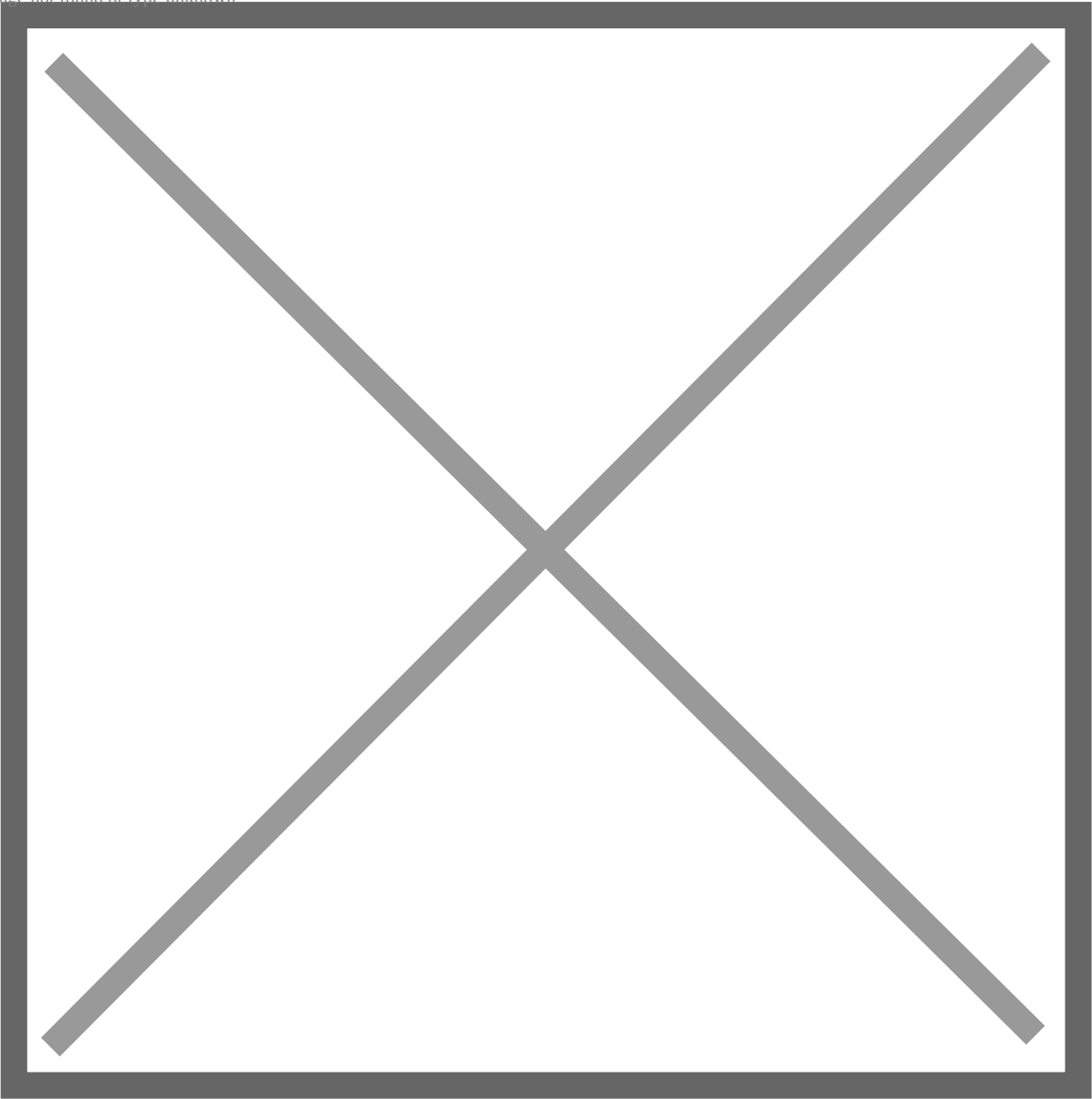


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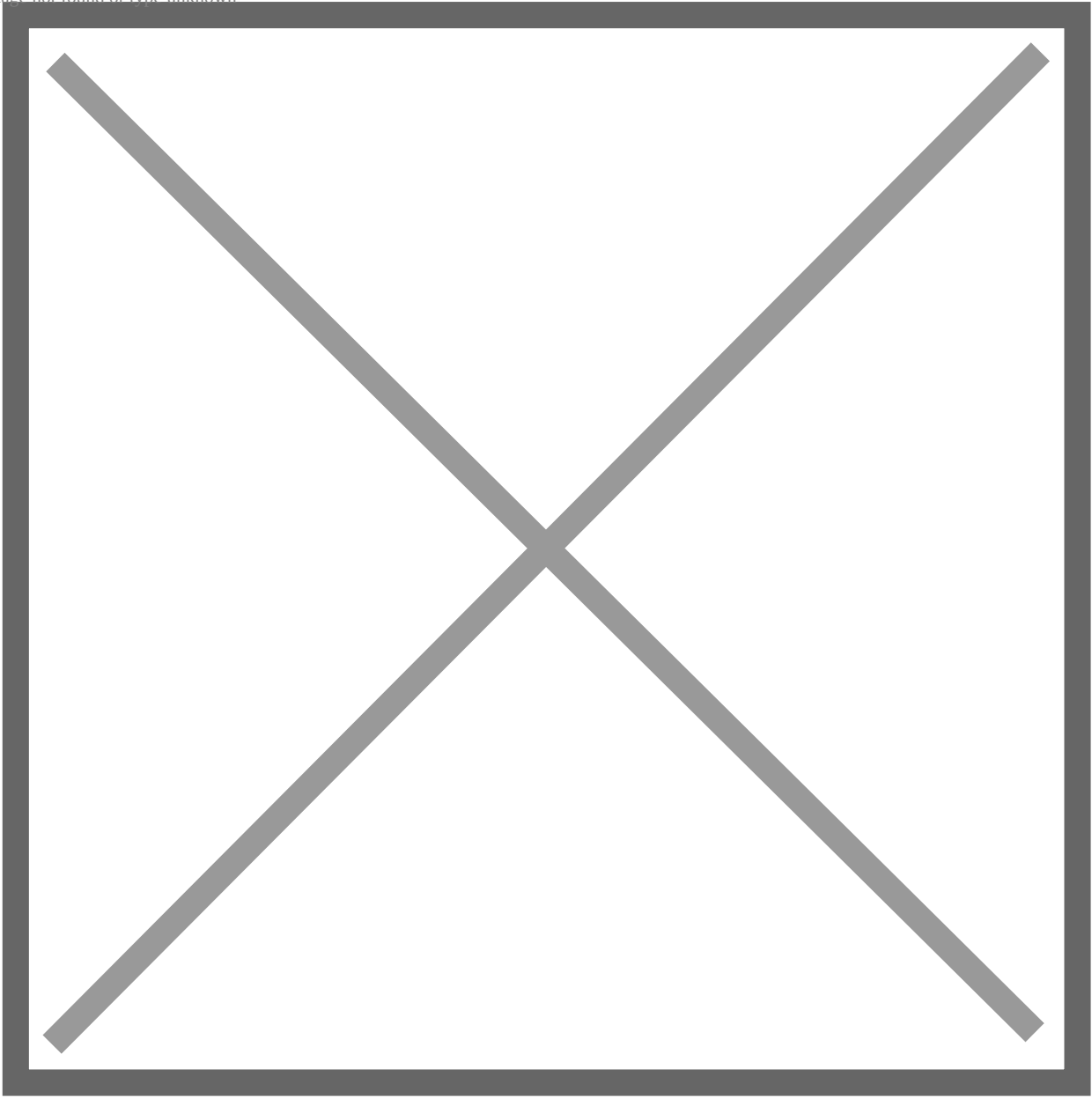


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