Python基础语法精讲

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实例1：自然常数的计算

嵩天

Python基础语法精讲

"自然常数的计算"需求分析

Python123

程序需求

计算自然常数e

- e的定义如下：

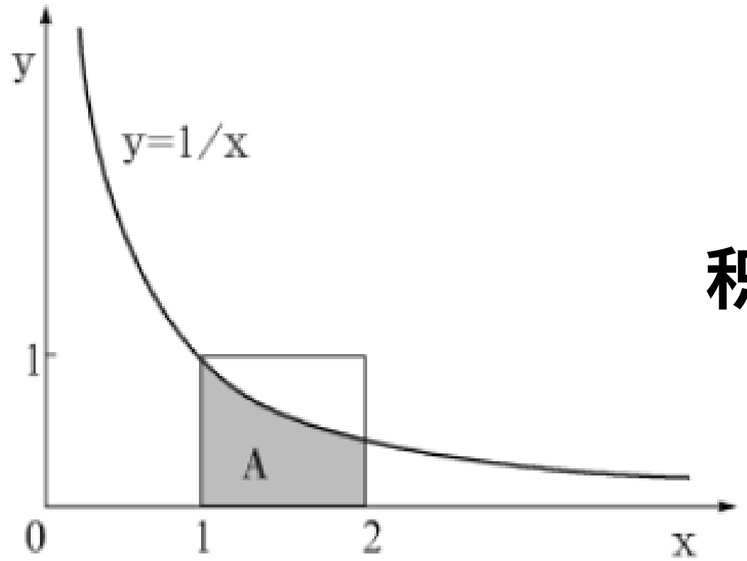
$$e = \lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$$

e的值：2.71828 18284 59045 23536

程序需求

两种方法：公式法 + 蒙特卡罗方法

$$e = \lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$$



积分$\int_1^2 \frac{1}{x} dx$值为ln2

Python基础语法精讲

"自然常数的计算"实例编写

Python123

代码演示

$$e = \lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$$

```
#CaleV1.py
x = 1024*1024
print(pow(1+1/x, x))
```

公式表达

2.718280532282396

代码初览

```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

2.7183846762354924

代码初览

```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

引入随机函数库

代码初览

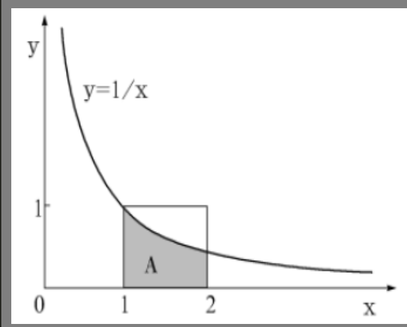
```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

设置撒点数

代码初览

```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

初始化面积
区域值为0



代码初览

```
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from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

→ 循环撒点

代码初览

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DARTS = 1024*1024
count = 0
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    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

随机生成点坐标

代码初览

```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

→

根据y=1/x公式判断点是否在阴影区域内

代码初览

```
#CaleV2.py
from random import *
DARTS = 1024*1024
count = 0
for i in range(DARTS):
    x = uniform(1,2)
    y = uniform(0,1)
    if x*y < 1:
        count += 1
e = pow(2, DARTS/count)
print("{}".format(e))
```

→

根据ln2反算e


Python 123
Thank you