python
import turtle
turtle.setup(650,350,200,200)
turtle.penup()
turtle.fd(-250)
turtle.pendown()
turtle.pensize(25)
turtle.pencolor("purple")
turtle.seth(-40)
for 1 in range(4):
turtle.circle(40, 80)
turtle.circle(-40, 80)
turtle.circle(40, 80/2)
turtle.fd(40)
turtle.circle(16, 180)
turtle.fd(40 * 2/3)

Python语言程序设计

第5章 课程导学

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前课复习

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数字类型及操作

- 整数类型的无限范围及4种进制表示
- 浮点数类型的近似无限范围、小尾数及科学计数法
- +、-、*、/、//、%、**、二元增强赋值操作符
- abs()、divmod()、pow()、round()、max()、min()
- int()、float()、complex()

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```
#DayDayUpQ3.py
dayup = 1.0
dayfactor = 0.01
for i in range(365):
    if i % 7 in [6,0]:
        dayup = dayup*(1-dayfactor)
    else:
        dayup = dayup*(1+dayfactor)
print("工作日的力量：{:.2f}".format(dayup))
```

for..in.. (计算思维)

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```
#DayDayUpQ4.py
def dayUP(df):
    dayup = 1
    for i in range(365):
        if i % 7 in [6,0]:
            dayup = dayup*(1 - 0.01)
        else:
            dayup = dayup*(1 + df)
    return dayup
dayfactor = 0.01
while dayUP(dayfactor) < 37.78:
    dayfactor += 0.001
print("工作日的努力参数是：{:.3f}".format(dayfactor))
```

def..while..

("笨办法"试错)

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字符串类型及操作

- **正向递增序号、反向递减序号、<字符串>[M:N:K]**
- **+、*、len()、str()、hex()、oct()、ord()、chr()**
- **.lower()、.upper()、.split()、.count()、.replace()**
- **.center()、.strip()、.join() 、.format()格式化**

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```
#TextProBarV3.py
import time
scale = 50
print("执行开始".center(scale//2, "-"))
start = time.perf_counter()
for i in range(scale+1):
    a = '*' * i
    b = '.' * (scale - i)
    c = (i/scale)*100
    dur = time.perf_counter() - start
    print("\r{:^3.0f}%[{}->{}]{:.2f}s".format(c,a,b,dur),end='')
    time.sleep(0.1)
print("\n"+"执行结束".center(scale//2,'-'))
```

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程序的分支结构

- 单分支 *if*　二分支 *if-else* 及紧凑形式
- 多分支 *if-elif-else* 及条件之间关系
- *not and or　> >= == <= < !=*
- 异常处理　*try-except-else-finally*

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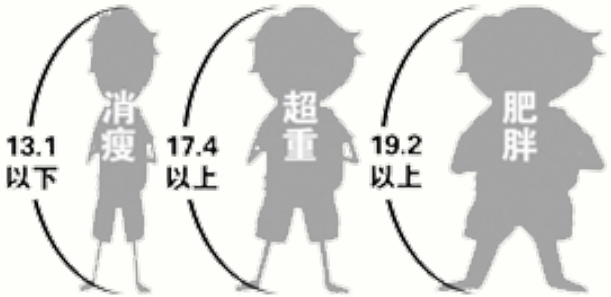
```
#CalBMI.py
height, weight = eval(input("请输入身高(米)和体重\(公斤)[逗号隔开]: "))
bmi = weight / pow(height, 2)
print("BMI 数值为: {:.2f}".format(bmi))
who, nat = "", ""
if bmi < 18.5:
    who, nat = "偏瘦", "偏瘦"
elif 18.5 <= bmi < 24:
    who, nat = "正常", "正常"
elif 24 <= bmi < 25:
    who, nat = "正常", "偏胖"
elif 25 <= bmi < 28:
    who, nat = "偏胖", "偏胖"
elif 28 <= bmi < 30:
    who, nat = "偏胖", "肥胖"
else:
    who, nat = "肥胖", "肥胖"
print("BMI 指标为:国际'{0}', 国内'{1}'".format(who, nat))
```



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程序的循环结构

- *for...in* 遍历循环: 计数、字符串、列表、文件...
- *while*无限循环
- *continue*和*break*保留字: 退出当前循环层次
- 循环*else*的高级用法: 与*break*有关

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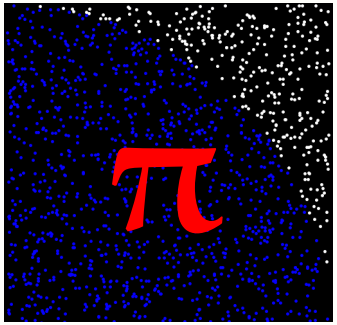
```python
#CalPiV2.py
from random import random
from time import perf_counter
DARTS = 1000*1000
hits = 0.0
start = perf_counter()
for i in range(1, DARTS+1):
    x, y = random(), random()
    dist = pow(x ** 2 + y ** 2, 0.5)
    if dist <= 1.0:
        hits = hits + 1
pi = 4 * (hits/DARTS)
print("圆周率值是: {}".format(pi))
print("运行时间是: {:.5f}s".format(perf_counter()-start))
```



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本课概要

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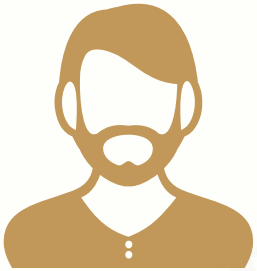
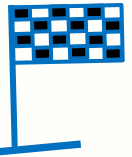
第5章 函数和代码复用



- 5.1 函数的定义与使用
- 5.2 实例7: 七段数码管绘制
- 5.3 代码复用与函数递归
- 5.4 模块4: PyInstaller库的使用
- 5.5 实例8: 科赫雪花小包裹



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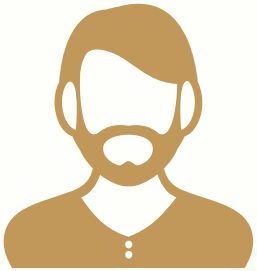
第5章 函数和代码复用

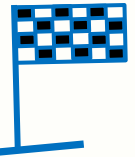


方法论

- Python基本代码抽象即函数的使用方法

实践能力

- 学会编写带有函数并复用代码的程序



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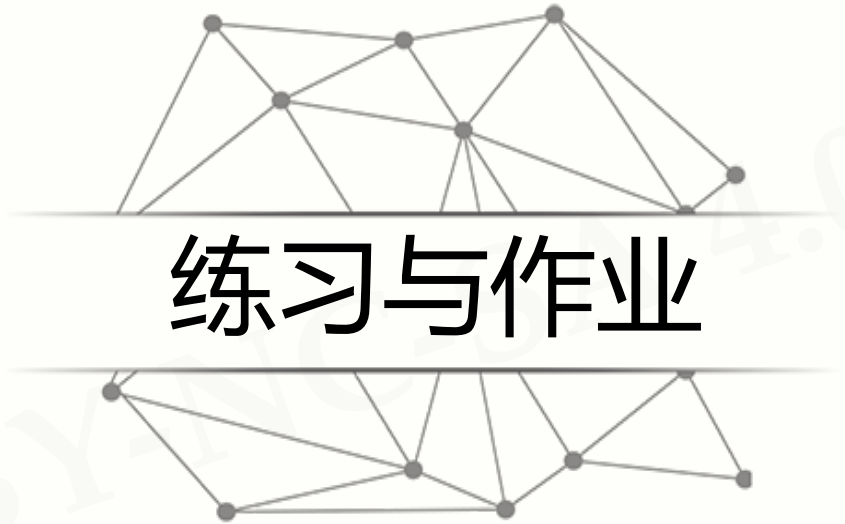

练习与作业

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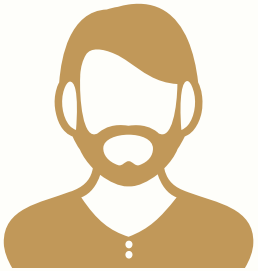
第5章 函数和代码复用

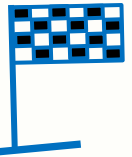


练习 (可选)

- 5道编程 @Python123

测验

- 10道单选+2道编程 @Python123



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