

# 实验二 Python变量、简单数据类型

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Github地址： [https://github.com/blmeue/Python\\_resources.git](https://github.com/blmeue/Python_resources.git)

CodeWars地址： <https://www.codewars.com/users/blmeue>

## 实验目的

1. 使用VSCode编写和运行Python程序
2. 学习Python变量和简单数据类型

## 实验环境

1. Git
2. Python 3.10
3. VSCode
4. VSCode插件

## 实验内容和步骤

### 第一部分

实验环境的安装

1. 安装Python，从Python官网下载Python 3.10安装包，下载后直接点击可以安装： [Python官网地址](#)
2. 为了在VSCode集成环境下编写和运行Python程序，安装下列VScode插件
  - Python
  - Python Environment Manager
  - Python Indent

- Python Extended
- Python Docstring Generator
- Jupyter
- indent-rainbow
- Jinja

## 第二部分

Python变量、简单数据类型和列表简介

完成教材《Python编程从入门到实践》下列章节的练习：

- 第2章 变量和简单数据类型

## 第三部分

在[Codewars网站](#)注册账号，完成下列Kata挑战：

### 第1题：求离整数n最近的平方数（Find Nearest square number）

难度：8kyu

你的任务是找到一个正整数n的最近的平方数

例如，如果n=111，那么nearest\_sq(n) (nearestSq(n)) 等于121，因为111比100（10的平方）更接近121（11的平方）。

如果n已经是完全平方（例如n=144，n=81，等等），你需要直接返回n。

代码提交地址

<https://www.codewars.com/kata/5a805d8cafa10f8b930005ba>

### 第2题：弹跳的球（Bouncing Balls）

难度：6kyu

一个孩子在—栋高楼的第N层玩球。这层楼离地面的高度h是已知的。他把球从窗口扔出去。球弹了起来,例如:弹到其高度的三分之二(弹力为0.66)。他的母亲从离地面w米的窗户向外看,母亲会看到球在她的窗前经过多少次(包括球下落和反弹的时候)?

一个有效的实验必须满足三个条件:

- 参数 "h" (米) 必须大于0
- 参数 "bounce "必须大于0且小于1
- 参数 "window "必须小于h。

如果以上三个条件都满足, 返回一个正整数, 否则返回-1。

**注意:只有当反弹球的高度严格大于窗口参数时, 才能看到球。**

代码提交地址

<https://www.codewars.com/kata/5544c7a5cb454edb3c000047/train/python>

### 第3题: 元音统计(Vowel Count)

难度: 7kyu

返回给定字符串中元音的数量(计数)。对于这个Kata, 我们将考虑a、e、i、o、u作为元音(但不包括y)。输入的字符串将只由小写字母和/或空格组成。

代码提交地址:

<https://www.codewars.com/kata/54ff3102c1bad923760001f3>

### 第4题: 偶数或者奇数 (Even or Odd)

难度: 8kyu

创建一个函数接收一个整数作为参数, 当整数为偶数时返回"Even"当整数为奇数时返回"Odd"。

代码提交地址:

<https://www.codewars.com/kata/53da3dbb4a5168369a0000fe>

## 第四部分

使用Mermaid绘制程序流程图

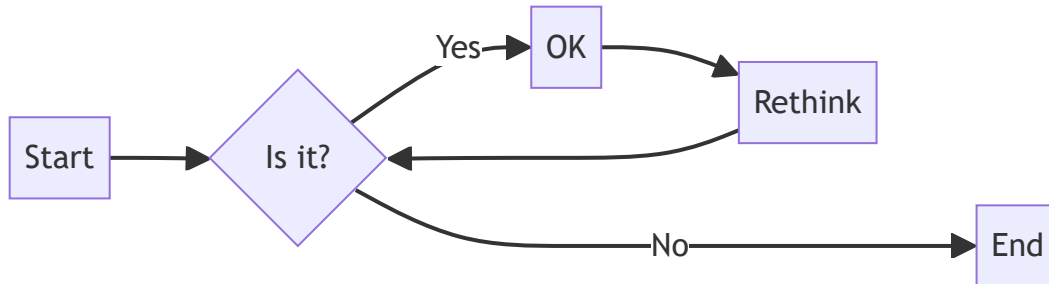
安装Mermaid的VSCode插件:

- Markdown Preview Mermaid Support
- Mermaid Markdown Syntax Highlighting

使用Markdown语法绘制你的程序绘制程序流程图（至少一个），Markdown代码如下：

程序流程图

显示效果如下：



查看Mermaid流程图语法-->[点击这里](#)

使用Markdown编辑器（例如VScode）编写本次实验的实验报告，包括[实验过程与结果](#)、[实验考查](#)和[实验总结](#)，并将其导出为 **PDF格式** 来提交。

## 实验过程与结果

请将实验过程与结果放在这里，包括：

- [第二部分 Python变量、简单数据类型和列表简介](#)

i. 练习2.1: 简单消息

(1) 实验代码：

```
message="hello world"
print(message)
```

(2) 实验结果：

hello world

ii. 练习2.2: 多条简单消息

(1) 实验代码：

```
message="hello world"
print(message)
message="how are you"
print(message)
```

(2) 实验结果:

hello world

how are you?

iii. 练习2.3: 个性化消息

(1) 实验代码:

```
name="Eric"
message=f"Hello {name},would you like to learn some Python today?"
print(message)
```

(2) 实验结果:

Hello Eric,would you like to learn some Python today?

iv. 练习2.4: 调整名字的大小写

(1) 实验代码:

```
name='eRic'
print(name.lower())
print(name.upper())
print(name.title())
```

(2) 实验结果:

eric

ERIC

Eric

v. 练习2.5: 名言1

(1) 实验代码:

```
name="Albert Einstein"
saying = "A person who never made a mistake never tried anything new."
print(f"{name}: \"{saying}\"")
```

(2) 实验结果:

Albert Einstein: "A person who never made a mistake never tried anything new."

vi. 练习2.6: 名言2

(1) 实验代码:

```
famous_person="Albert Einstein"
famous_saying = "A person who never made a mistake never tried anything new."
message=f"{famous_person}: \"{famous_saying}\""
print(message)
```

(2) 实验结果:

Albert Einstein: "A person who never made a mistake never tried anything new."

vii. 练习2.7: 删除人名中的空白

(1) 实验代码:

```
name="\t Eric \n "  
print(name.lstrip())  
print(name.rstrip())  
print(name.strip())
```

(2) 实验结果:

```
... Eric  
  
Eric  
  
Eric
```

viii. 练习2.8: 文件扩展名

(1) 实验代码:

```
filename='python_notes.txt'  
print(filename.removesuffix('.txt'))
```

(2) 实验结果:

python\_notes

ix. 练习2.9: 数字8

(1) 实验代码:

```
print(5+3)  
print(10-2)  
print(4*2)  
print(16/2)
```

(2) 实验结果:

```
8  
8  
8  
8.0
```

x. 练习2.10: 最喜欢的数

(1) 实验代码:

```
number=10  
print(f"My favorite number is {number}")
```

(2) 实验结果:

My favorite number is 10

xi. 练习3.1: 姓名

(1) 实验代码:

```
names=["Albert","Einstein","Marie","Curie","Tsung-Dao","Lee"]
for name in names:
    print(name)
```

(2) 实验结果:

Albert

Einstein

Marie

Curie

Tsung-Dao

Lee

xii. 练习3.2: 问候语

(1) 实验代码:

```
for name in names:
    print(f"{name},how are you?")
```

(2) 实验结果:

Albert,how are you?

Einstein,how are you?

Marie,how are you?

Curie,how are you?

Tsung-Dao,how are you?

Lee,how are you?

xiii. 练习3.3: 自己的列表

(1) 实验代码:

```
ways=["Honda motorcycle","car"]
for way in ways:
    print(f"I would like to own a {way}.")
```

(2) 实验结果:

I would like to own a Honda motorcycle.

I would like to own a car.

#### xiv. 练习3.4：嘉宾名单

##### (1) 实验代码：

```
guests=["Albert","Einstein","Marie"]
for person in guests:
    print(f"{person},please come to my dinner")
```

##### (2) 实验结果：

Albert,please come to my dinner

Einstein,please come to my dinner

Marie,please come to my dinner

#### xv. 练习3.5：修改嘉宾名单

##### (1) 实验代码：

```
cannot_attend="Albert"
guests=["Albert","Einstein","Marie"]
print(f"Sorry to hear that {cannot_attend} can not attend")
new_guest="Mary"
guests[guests.index(cannot_attend)]=new_guest
for guest in guests:
    print(f"{guest},please come to my dinner")
```

##### (2) 实验结果：

Sorry to hear that Albert can not attend

Mary,please come to my dinner

Einstein,please come to my dinner

Marie,please come to my dinner

#### xvi. 练习3.6：添加嘉宾名单

##### (1) 实验代码：

```
print("I found a bigger table")
guests=["Albert","Einstein","Marie"]
guests.insert(0,"Jane")#在列表开头添加元素
guests.insert(2,"Mary")#在列表中间添加元素
guests.append("Jack")#在列表末尾添加元素
for guest in guests:
    print(f"{guest},please come to my dinner")
```

##### (2) 实验结果：

I found a bigger table

Jane,please come to my dinner



Albert,please come to my dinner  
Mary,please come to my dinner  
Einstein,please come to my dinner  
Marie,please come to my dinner  
Jack,please come to my dinner

xvii. 练习3.7：缩短名单

(1) 实验代码：

```
print("Sorry!I can only invite two guests")
guests=["Jane","Albert","Mary","Einstein","Marie","Jack"]
while len(guests)>2:
    print(f"Sorry {guests.pop()},I can not invite you")
for guest in guests:
    print(f"Dear {guest}, You are still invited to my dinner!")
del guests[: ]#删除列表里面所有的元素
print(guests)
```

(2) 实验结果：

Sorry!I can only invite two guests  
Sorry Jack,I can not invite you  
Sorry Marie,I can not invite you  
Sorry Einstein,I can not invite you  
Sorry Mary,I can not invite you  
Dear Jane, You are still invited to my dinner!  
Dear Albert, You are still invited to my dinner!  
[]

xviii. 练习3.8：放眼世界

(1) 实验代码：

```

cities=["Beijing","Shanghai","Guangzhou","Shenzhen","HongKong","Macao"]
print(cities)
print(sorted(cities))#使用sorted()按字母顺序打印这个列表
print(cities)
print(sorted(cities,reverse=True))#使用sorted()按字母顺序相反的顺序打印这个列表
print(cities)
cities.reverse()#修改列表元素的排列顺序,反转列表元素的排列顺序
print(cities)
cities.reverse()#再次修改列表元素的排列顺序。打印该列表,核实排列顺序又恢复到原来的排序列表
print(cities)
cities.sort()#修改该列表,使其元素按字母顺序排列
print(cities)
cities.sort(reverse=True)#修改该列表,使其元素按与字母顺序相反的顺序排列
print(cities)

```

(2) 实验结果:

```

['Beijing', 'Shanghai', 'Guangzhou', 'Shenzhen', 'HongKong', 'Macao']
['Beijing', 'Guangzhou', 'HongKong', 'Macao', 'Shanghai', 'Shenzhen']
['Beijing', 'Shanghai', 'Guangzhou', 'Shenzhen', 'HongKong', 'Macao']
['Shenzhen', 'Shanghai', 'Macao', 'HongKong', 'Guangzhou', 'Beijing']
['Beijing', 'Shanghai', 'Guangzhou', 'Shenzhen', 'HongKong', 'Macao']
['Macao', 'HongKong', 'Shenzhen', 'Guangzhou', 'Shanghai', 'Beijing']
['Beijing', 'Shanghai', 'Guangzhou', 'Shenzhen', 'HongKong', 'Macao']
['Beijing', 'Guangzhou', 'HongKong', 'Macao', 'Shanghai', 'Shenzhen']
['Shenzhen', 'Shanghai', 'Macao', 'HongKong', 'Guangzhou', 'Beijing']

```

xix. 练习3.9: 晚餐嘉宾

(1) 实验代码:

```

guests=["Jane","Albert","Mary","Einstein","Marie","Jack"]#练习3.6邀请的嘉宾
print(f"You have invited {len(guests)} guests to have dinner")

```

(2) 实验结果:

You have invited 6 guests to have dinner

xx. 练习3.10: 尝试使用各个函数

(1) 实验代码:

```

lists=["Mountains","Rivers","Country","City","Language","Love"]
print(f"The number of lists is {len(lists)}!")#队列长度
print(sorted(lists))#按照字母顺进行打印
print(sorted(lists,reverse=True))#使用sorted函数对列表按照字母顺序相反的顺序进行打印
lists.reverse()#利用reverse()函数反省打印列表
print(lists)
lists.sort()#sort()方法按字母升序排序
print(lists)
lists.sort(reverse=True)#sort(reverse=True)方法按字母降序排序
print(lists)
lists.remove("Love")#删除Love
print(lists)
lists.pop(2)#pop(i)删除位置i的元素
print(lists)
lists.pop()#删除列表末尾元素
print(lists)
del lists[1]#删除第二个元素
print(lists)
lists.append('Mountain')#在列表末尾添加元素
print(lists)
lists.insert(1,'Stars')#在列表任意位置插入元素
print(lists)
lists[1]='Animal'#修改列表元素
print(lists)

```

## (2) 实验结果:

The number of lists is 6!

['City', 'Country', 'Language', 'Love', 'Mountains', 'Rivers']

['Rivers', 'Mountains', 'Love', 'Language', 'Country', 'City']

['Love', 'Language', 'City', 'Country', 'Rivers', 'Mountains']

['City', 'Country', 'Language', 'Love', 'Mountains', 'Rivers']

['Rivers', 'Mountains', 'Love', 'Language', 'Country', 'City']

['Rivers', 'Mountains', 'Language', 'Country', 'City']

['Rivers', 'Mountains', 'Country', 'City']

['Rivers', 'Mountains', 'Country']

['Rivers', 'Country']

['Rivers', 'Country', 'Mountain']

['Rivers', 'Stars', 'Country', 'Mountain']

['Rivers', 'Animal', 'Country', 'Mountain']

## xxi. 练习3.11: 有意引发错误

### (1) 实验代码:

```
my_list=[1,2,3,4,5]
#试图访问列表中第七个元素, 这个将引发索引错误
#print(my_list[6])
#修改后
print(my_list[4])
```

### (2) 实验结果:

5

## • 第三部分 Codewars Kata挑战

### i. 第1题: 求离整数n最近的平方数 (Find Nearest square number)

#### (1) 实验代码:

```
def nearest_sq(n):
    return round(n**0.5,0)**2
```

#### (2) 实验结果:

## 8 kyu Find Nearest square number ✓

☆ 275 82 90% of 2,195 6,999 of 19,000 riyakayal

Instructions

Output

Past Solutions

Time: 546ms Passed: 1105 Failed: 0

### Test Results:

#### ✓ Fixed Tests

##### ➤ Basic Test Cases (5 of 5 Assertions)

Completed in 0.21ms

#### ✓ Random Tests

##### ➤ Small Random Tests (100 of 100 Assertions)

##### ➤ Big Random Tests (1000 of 1000 Assertions)

Completed in 23.84ms


You have passed all of the tests! :)

## ii. 第2题：弹跳的球 (Bouncing Balls)

### (1) 实验代码:

```
def bouncing_ball(h, bounce, window):
    # your code
    sum=1
    see_h=bounce*h
    if h>0 and (bounce>0 and bounce<1) and window <h:
        while window<see_h:
            sum +=2
            see_h=see_h*bounce
        return sum
    return -1
```

(2) 实验结果:

 **Bouncing Balls** ✓

☆ 2227   373   83% of 7,464   24,676 of 78,056   g964   1 Issue Reported

Instructions   **Output**   Past Solutions

Time: 517ms   Passed: 61   Failed: 0

**Test Results:**

▼ Tests

> Fixed Tests (11 of 11 Assertions)

> Random tests (50 of 50 Assertions)

Completed in 2.91ms

You have passed all of the tests! :)

iii. 第3题: 元音统计(Vowel Count)

(1)实验代码:

```
def get_count(sentence):  
    return sentence.count('a')+sentence.count('e')+sentence.count('i')+sentence.count('o')+sentence.count('u')  
pass
```

(2)实验结果:

## 7 kyu Vowel Count ✓

☆ 2607 🏆 654 📈 89% of 29,622 🎯 113,712 of 353,133 👤 jayeshcp

⚠️ 1 Issue Reported

Instructions

Output

Past Solutions

Time: 520ms Passed: 5 Failed: 0

### Test Results:

#### ▼ Sample tests

- Should count all vowels
- Should not count "y"
- Should return 0 when no vowels
- Should return 0 for empty string
- Should return 5 for "abracadabra"

Completed in 0.18ms

You have passed all of the tests! :)

iv. 第4题：偶数或者奇数（Even or Odd）

(1) 实验代码：

```
def even_or_odd(number):  
    if number%2 ==0:  
        return "Even"  
    return "Odd"
```

(2) 实验结果：

## 8 kyu Even or Odd ✓

☆ 2030   426   91% of 30,533   © 115,385 of 411,376   suuuzi  
⚠ 1 Issue Reported

Instructions

Output

Past Solutions

Time: 519ms   Passed: 111   Failed: 0

### Test Results:

#### ✓ Fixed Tests

##### > Basic Test Cases (11 of 11 Assertions)

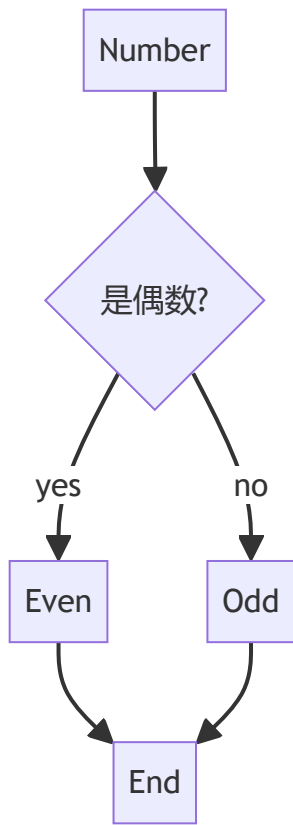
Completed in 0.21ms

#### > Random Tests

You have passed all of the tests! :)

- 第四部分 使用Mermaid绘制程序流程图





## 实验考查

请使用自己的语言并使用尽量简短代码示例回答下面的问题，这些问题将在实验检查时用于提问和答辩以及实际的操作。

1. Python中的简单数据类型有那些？我们可以对这些数据类型做哪些操作？

答：(1) 简单数据类型：整型、浮点型、布尔型、字符串、空值。

(2) 操作：算术运算、比较运算、逻辑运算、成员运算、身份运算、位运算、赋值运算、运算符

2. 为什么说Python中的变量都是标签？

答：在Python中，变量被视为标签，这是因为变量实际上是指向存储在内存中的对象的引用。换句话说，变量本身并不存储值，而是存储了对值的引用。

3. 有哪些方法可以提高Python代码的可读性？

答 (1) 合理使用空格。

(2) 合理使用注释。

(3) 合理使用缩进。

(4) 合理使用换行。

(5) 合理使用有意义的函数名、变量名、类名。

# 实验总结

在本次的实验过程中，我更加熟练的掌握了Python语言的语法，理解到更多的python函数，对python变量的操作更加熟练，也对Python语言的特性有了更深的理解。同时也更加熟悉Visual Studio Code的使用，能够熟练的进行代码的编写和调试。