CS001编程零基础 Python语言入门

第四讲

作业回顾

第一题：打字测速

#注意：如果完成26个字母超过26秒，说明打字速度还有很大提升空间，请联系老师做打字训练，不然后续课程很难跟上进度。如果完成时间比26秒快，可以试图改动程序，给自己更难的训练

第二题：中文和Python语言间的翻译

解法一：利用int()可以取整的效果

```
#week03solution02.py
#1）建立一个列表x，让它包含从20到0的所有偶数，从大到小排列
x=list(range(20,-1,-2))
#2）利用循环语句，依次打印列表x的每个元素
for num in x:
    print(num)
#3）在列表x最后加入一个元素，该元素为整数88
x.append(88)
#4）在列表x首位加入一个元素，该元素为整数666
x.insert(0,666)
```

有同学使用x[0]=666
这是错误的
因为第零位被覆盖了

```
#5）删除列表x中第一个出现的整数4
x.remove(4)
#6）在屏幕打印出列表x里共有几个元素
print(len(x))
#7）在不改变x原来顺序的前提下，打印整个列表从小到大排序完以后的样子
print(sorted(x))
#8）对列表x进行从小到大排序，改变列表元素的顺序，请不要打印
x.sort()
#9）打印整个列表x，看看是不是已经排好序了
print(x)
```

第三题： 随机列表

解法一： week03solution03-1.py

利用random.randrange()逐个加入列表

```
#引入随机工具模块random
import random
#初始化一个空的列表赋值给x
x=[]
#循环100次，每次加入一个随机数到列表x
for i in range(100):
    x.append(random.randrange(1,10))
#打印列表x
print(x)
```

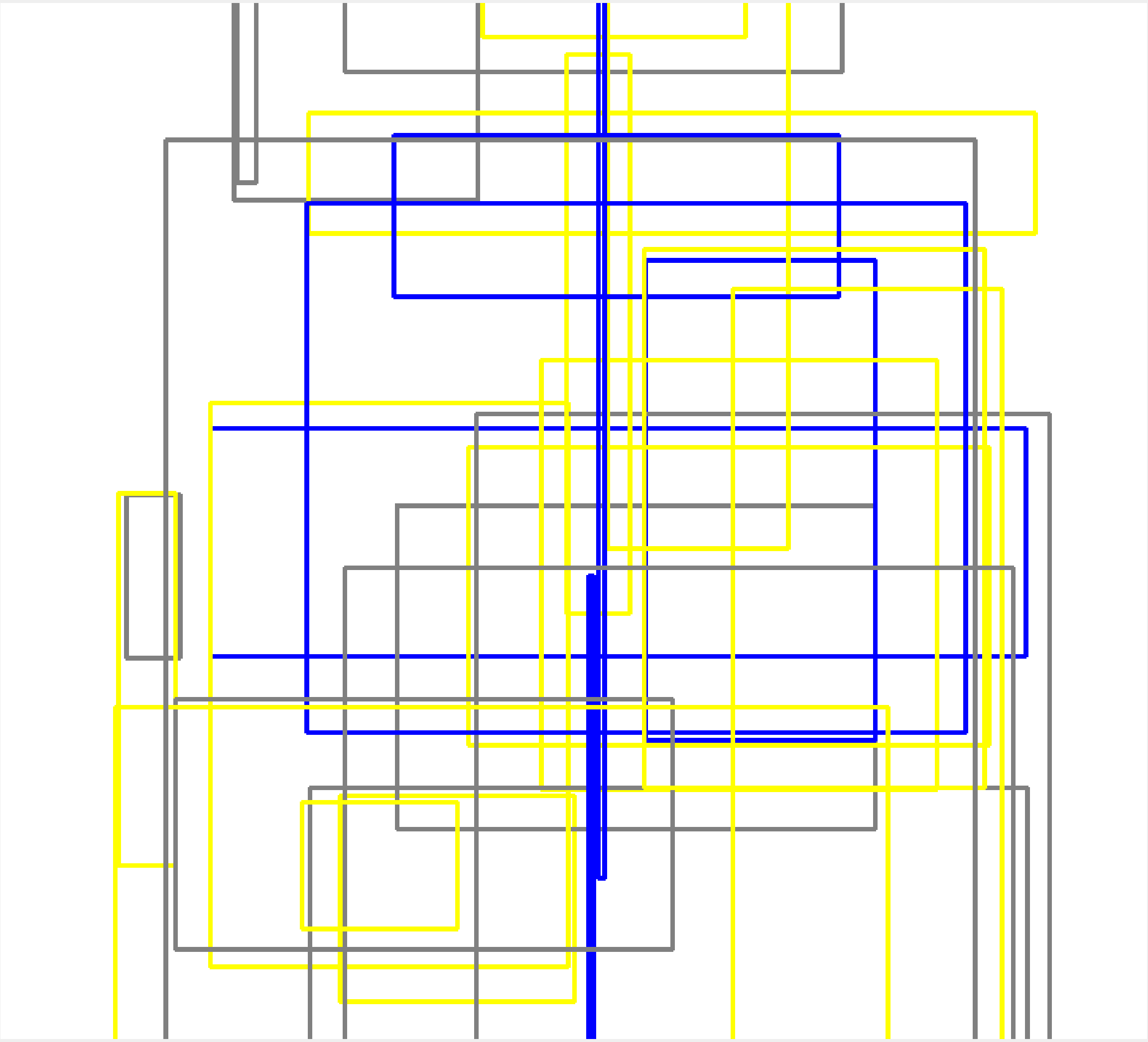
解法二： week03solution03-2.py

利用python的生成器(generator)高级语法，结合random.randint() 直接生产列表

```
#引入随机工具模块random
import random

#python生成器(generator)的高级语法：生成100个随机数，直接放在一个列表里，并赋值给x
x=[random.randint(1,9) for i in range(100)]

#打印列表x
print(x)
```

附加题：现代艺术画自动生成程序

```
#modernart-with-input.py
import turtle
import random
#只需要修改以下这一句为标准输入即可
NUM=int(input("How many rectangles? "))
for i in range(NUM):
    p=turtle.Turtle()
    p.hideturtle()
    p.speed("fastest")
    rcolor=random.choice(["grey","blue","yellow"])
    p.pen(pencolor=rcolor,pensize=3)
    x1=random.randrange(-XMAX,XMAX)
    y1=random.randrange(-YMAX,YMAX)
    x2=random.randrange(-XMAX,XMAX)
    y2=random.randrange(-YMAX,YMAX)
```



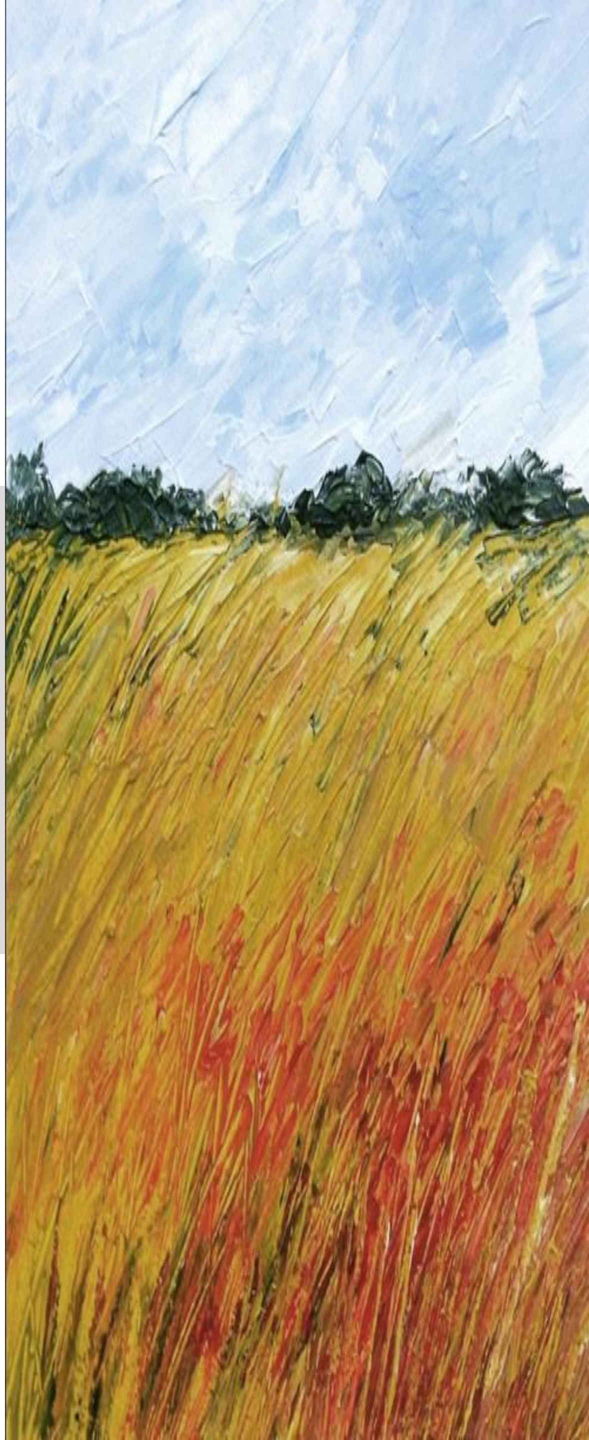
注意事项：冒号，缩进

```
for i in range(5):
        print(i)
        print(-i)
0
0
1
-1
2
-2
3
-3
4
-4
```

注意冒号，表示这个冒号之后是一个分段落

注意缩进，相同缩进的代码是在同一个分段落

判断语句：if



程序员的日常

老婆给当程序员的老公打电话：下班顺路买两斤皮皮虾，如果看到卖西瓜的，就买一个。

当晚老公手捧一个皮皮虾进了家门。老婆怒道：你怎么只买了一个皮皮虾？！

老公喃喃道：因为我真看到卖西瓜的了。

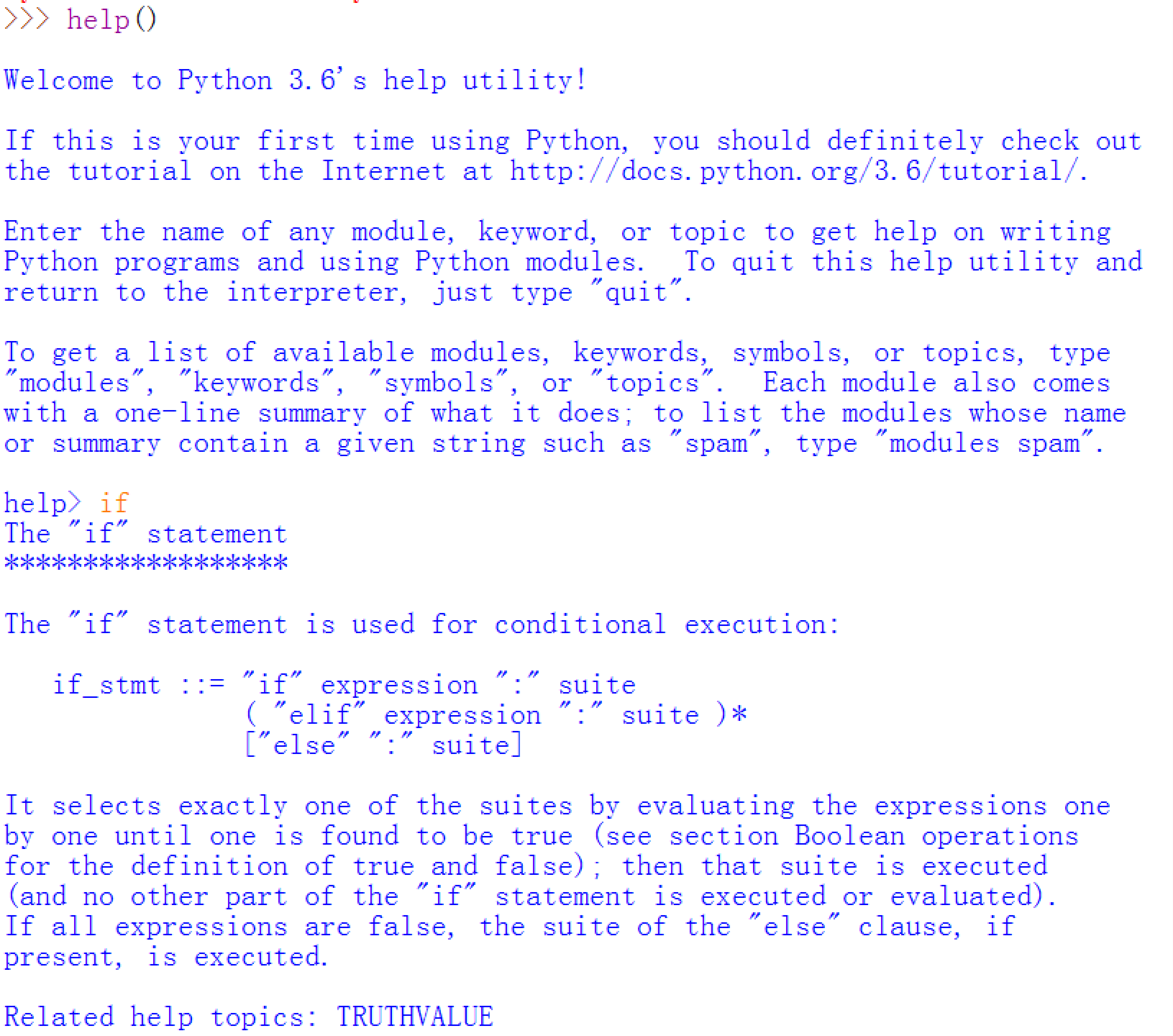
if 语法说明

查看if 语法的方法

1. IDLE中输入help()进入帮助界面

2. help>提示符后输入if查看if语句说明文档

3. help>提示符后输入quit退出帮助界面



```
>>> help()

Welcome to Python 3.6's help utility!

If this is your first time using Python, you should definitely check out
the tutorial on the Internet at http://docs.python.org/3.6/tutorial/.

Enter the name of any module, keyword, or topic to get help on writing
Python programs and using Python modules.  To quit this help utility and
return to the interpreter, just type "quit".

To get a list of available modules, keywords, symbols, or topics, type
"modules", "keywords", "symbols", or "topics".  Each module also comes
with a one-line summary of what it does; to list the modules whose name
or summary contain a given string such as "spam", type "modules spam".

help> if
The "if" statement
******************

The "if" statement is used for conditional execution:

   if_stmt ::= "if" expression ":" suite
               ( "elif" expression ":" suite )*
               ["else" ":" suite]

It selects exactly one of the suites by evaluating the expressions one
by one until one is found to be true (see section Boolean operations
for the definition of true and false); then that suite is executed
(and no other part of the "if" statement is executed or evaluated).
If all expressions are false, the suite of the "else" clause, if
present, is executed.

Related help topics: TRUTHVALUE
```

简单if 语法练习

```
>>> x=99
>>> if x>100:
        print("x is greater than 100")
>>> if x<100:
        print("x is less than 100")
x is less than 100


>>> if 1+1==2 :
       print("Your math test is True")
Your math test is True
```

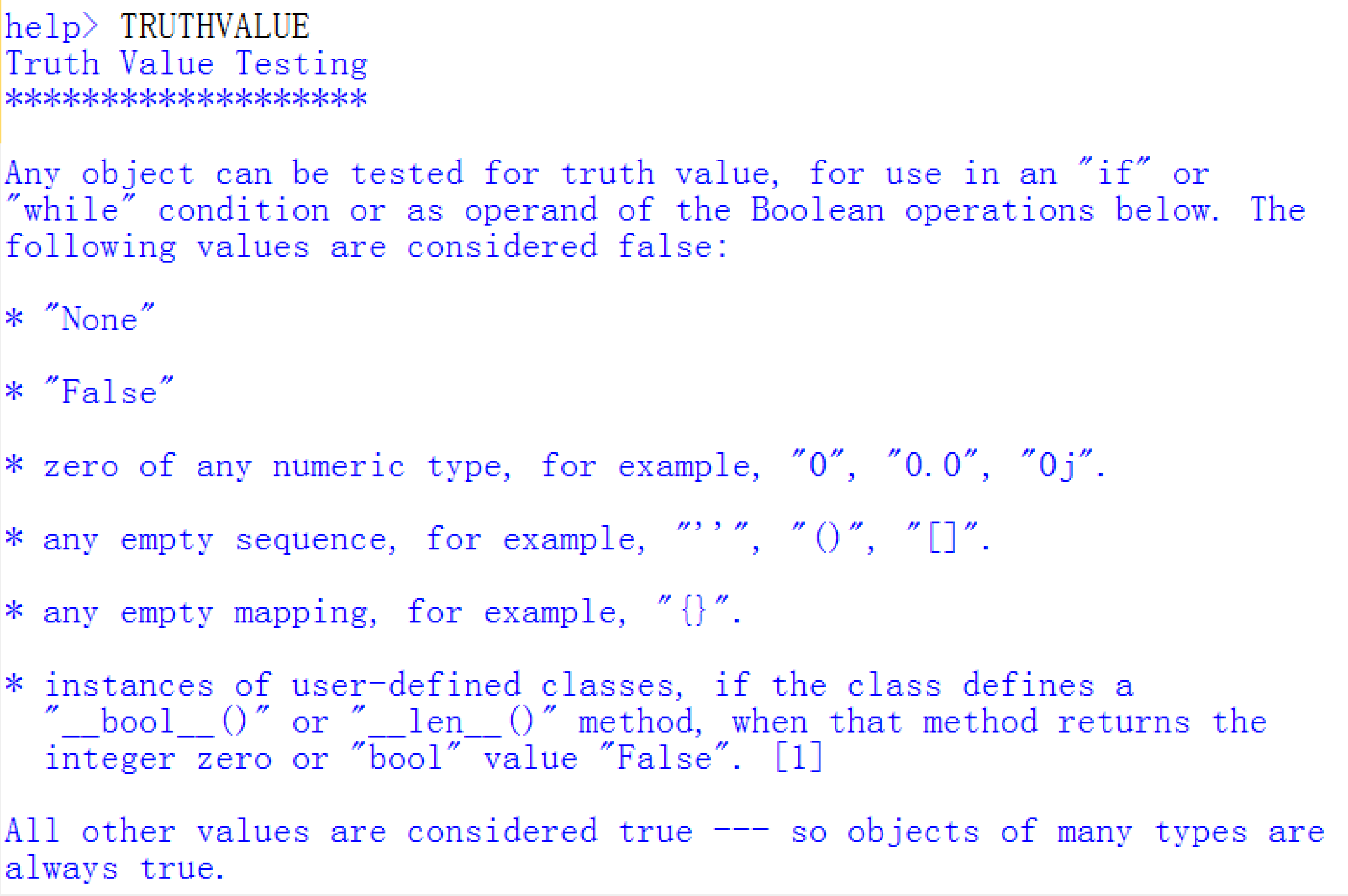
```
>>> age=19
>>> if age<18:
        print("You are too young to drive a car")

>>> s=["a pen","an apple","a pineapple"]
>>> if "an apple" in s:
        print("I have an apple")
I have an apple

>>> if "a pen" in s and "an apple" in s and "a pineapple" in s:
        print("Ahh! PPAP - Pen Pinapple Apple Pen")
Ahh! PPAP - Pen Pinapple Apple Pen
```

if 语法练习： True/False以外的否定或肯定

False, 0, “”, []等情况时，判断会是否定结果
其他情况都为肯定结果

```
>>> if 3:
        print(3)
3
>>> if 0:
        print(3)
>>> if 1+1:
        print(3)
3
```

```
>>> if "a":
        print("a")
a
>>> if []:
        print("hi")
>>> if "":
        print(1)
```



```
help> TRUTHVALUE
Truth Value Testing
*******************

Any object can be tested for truth value, for use in an ″if″ or
″while″ condition or as operand of the Boolean operations below. The
following values are considered false:

* ″None″

* ″False″

* zero of any numeric type, for example, ″0″, ″0.0″, ″0j″.

* any empty sequence, for example, ″''″, ″()″, ″[]″.

* any empty mapping, for example, ″{}″.

* instances of user-defined classes, if the class defines a
  ″__bool__()″ or ″__len__()″ method, when that method returns the
  integer zero or ″bool″ value ″False″. [1]

All other values are considered true --- so objects of many types are
always true.
```

if-else 语法练习

判断奇数或偶数 odd-or-even.py

```
#odd-or-even.py
x=int(input("please input a number: "))
if x % 2==1:
    print(x,"is an odd number")
else:
    print(x,"is an even number")
```

列表中的字符串判断 city.py

```
#city.py
cities=["New York","Hong Kong","Shanghai","London","Paris"]
for x in cities:
    if x=="Shanghai":
        print("We are in",x)
    else:
        print("We are not in",x)
```

if-else 语法练习: 闰年判断

四年一闰，
百年不闰，
四百年再闰

1. 对于不是整百的年份，能被4整除的为闰年。(如2016年就是闰年,2017年不是闰年)

2.对于是整百的年份，能被400整除的是闰年。(如2000年是闰年，1900年不是闰年)

闰年判断程序 leap-year.py

y不是100倍数 **并且** y是4倍数

或者

y是400倍数

```python
#leap-year.py
y=int(input("What year is it? "))
if (y % 100 !=0 and y % 4 ==0) or (y % 400 ==0):
    print(y,"is a leap year.")
else:
    print(y,"is not a leap year.")
```

if-elif-else 语法练习

三的倍数判断 mutiple-of-three.py

```
#mutiple-of-three.py
x=int(input("Please give me a number: "))
if x % 3 == 0:
    print(x,"is a mutiple of 3")
elif x % 3 ==1:
    print(x,"is 1 plus a mutiple of 3")
else:
    print(x,"is 2 plus a mutiple of 3")
```

驾驶员年龄判断 driver.py

```
#driver.py
age=int(input("how old are you? "))
if age>=70:
    print("Sorry, you can't drive a car. But you can ride a bicycle.")
elif age>=18:
    print("You can drive a car.")
else:
    print("Sorry, you can't drive a car. But you can have a toy car.")
```

if-elif-else 语法练习：成绩判断

成绩判断程序score.py

学校规定：

[90分-100分]：	A
[80分-90分)：	B
[70分-80分)：	C
[60分-70分)：	D
[50分-60分)：	E
[0分-50分)：	F

```
x=float(input("What is your score? [0-100] "))
if x>=90.0:
    grade="A"
elif x>=80.0:
    grade="B"
elif x>=70.0:
    grade="C"
elif x>=60.0:
    grade="D"
elif x>=50.0:
    grade="E"
else:
    grade="F"
print("Your grade is",grade)
```

判断+循环：if 配合 for 语法练习

计算：

$x=1^2-2^2+3^2-4^2+5^2-6^2+7^2-8^2+\ldots+99^2-100^2$

程序文件名compute.py

```
#compute.py
x=0
for i in range(100):
    if i % 2 == 1:
        x=x+i*i
    else:
        x=x-i*i
print(x)
```

判断+循环终止：break 语句练习

希望提前结束循环，可以使用break语句

```
>>> for i in range(10):
        print(i)
        if i>5:
            break
0
1
2
3
4
5
6
```

```
>>> tot=0
>>> for i in range(100):
        tot=tot+i
        if tot>50:
            break
>>> print(i)
10
```

质数判定：单个判定

文件名prime1.py

```
n=int(input(“Please input a number: "))
PRIME = True
for i in range(2,n):
    if n % i == 0:
        PRIME=False
        print(n,"=",i,"*",n//i)
        break
if PRIME:
    print(n,"is a prime number.")
```

标准输入得到n为待判定整数

通过循环来寻找n的质因数

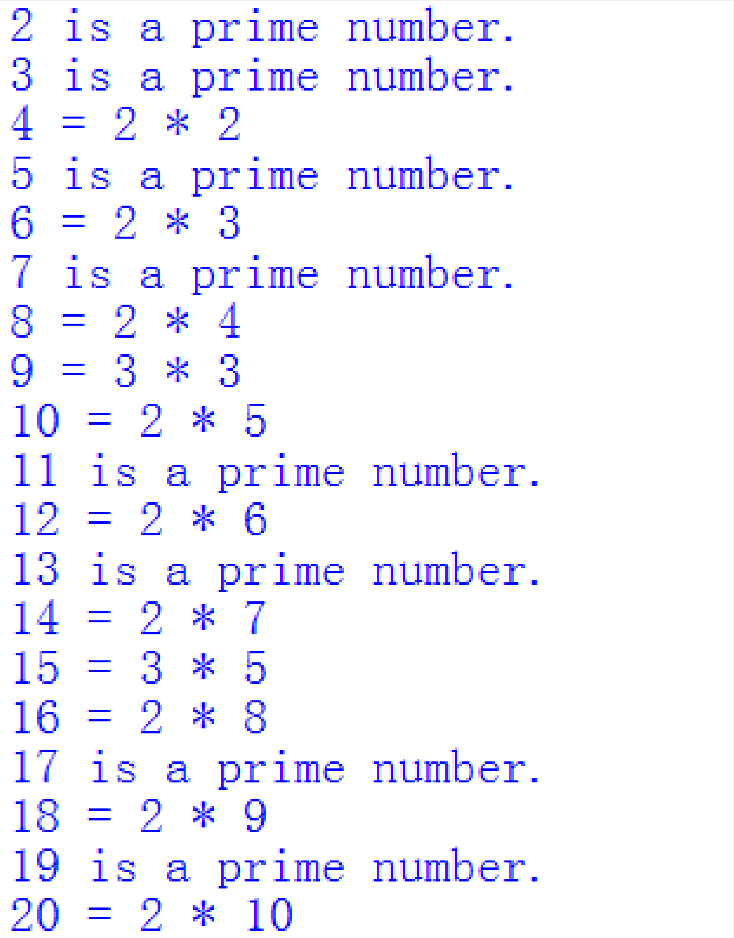
如果能找到n的质因数
那么n就不是质数

如果不能找到n的质因数
那么n就是质数

质数判定：循环判定

文件名prime2.py

```
for n in range(2,100):
    PRIME = True
    for i in range(2,n):
        if n % i == 0:
            PRIME=False
            print(n,"=",i,"*",n//i)
            break
    if PRIME:
        print(n,"is a prime number.")
```



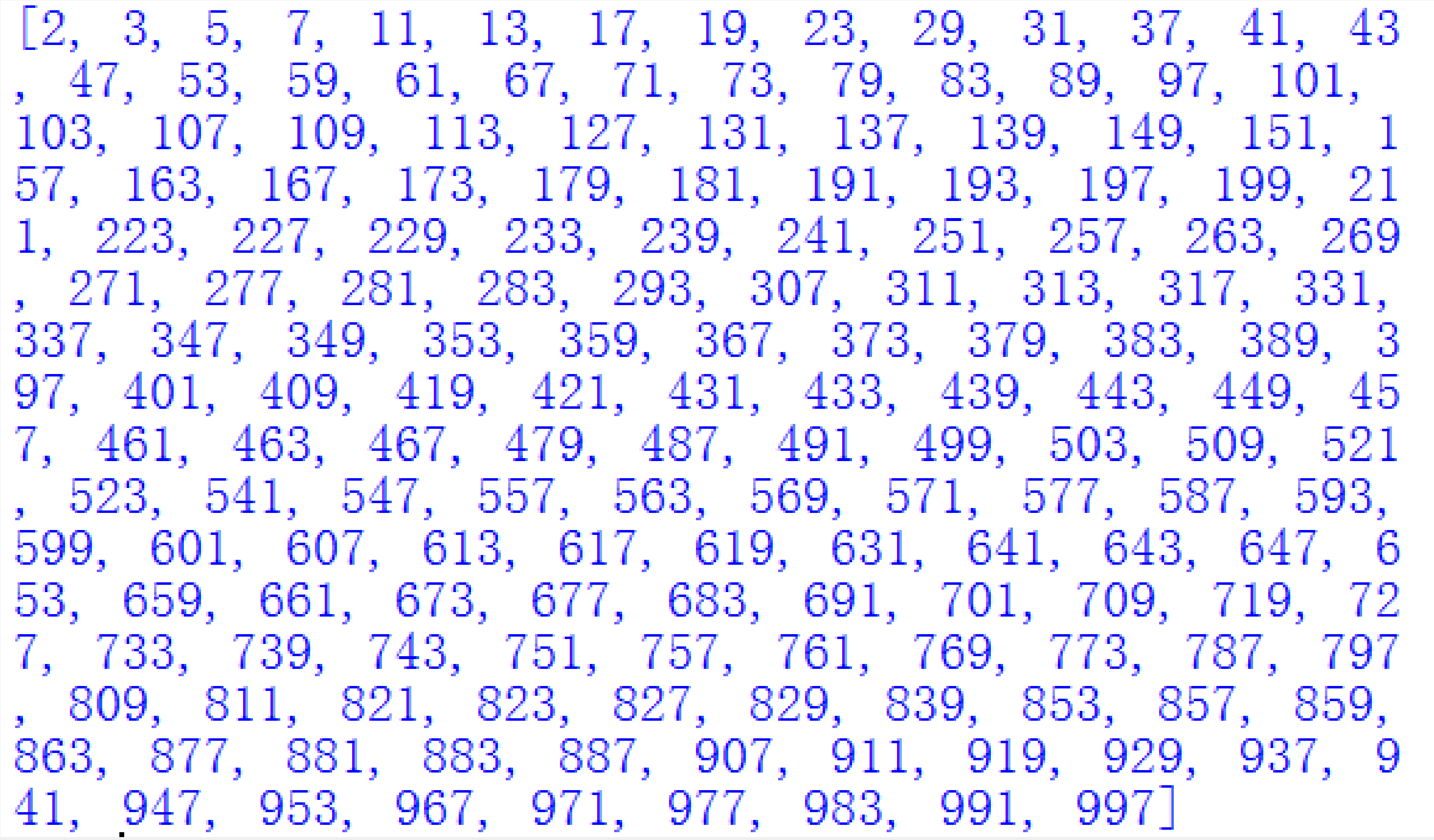
```
2 is a prime number.
3 is a prime number.
4 = 2 * 2
5 is a prime number.
6 = 2 * 3
7 is a prime number.
8 = 2 * 4
9 = 3 * 3
10 = 2 * 5
11 is a prime number.
12 = 2 * 6
13 is a prime number.
14 = 2 * 7
15 = 3 * 5
16 = 2 * 8
17 is a prime number.
18 = 2 * 9
19 is a prime number.
20 = 2 * 10
```

质数列表

文件名prime3.py

```
primelist=[]
for n in range(2,1000):
    PRIME = True
    for i in range(2,n):
        if n % i == 0:
            PRIME=False
            break
    if PRIME:
        primelist.append(n)
print(primelist)
```

质数列表打印结果



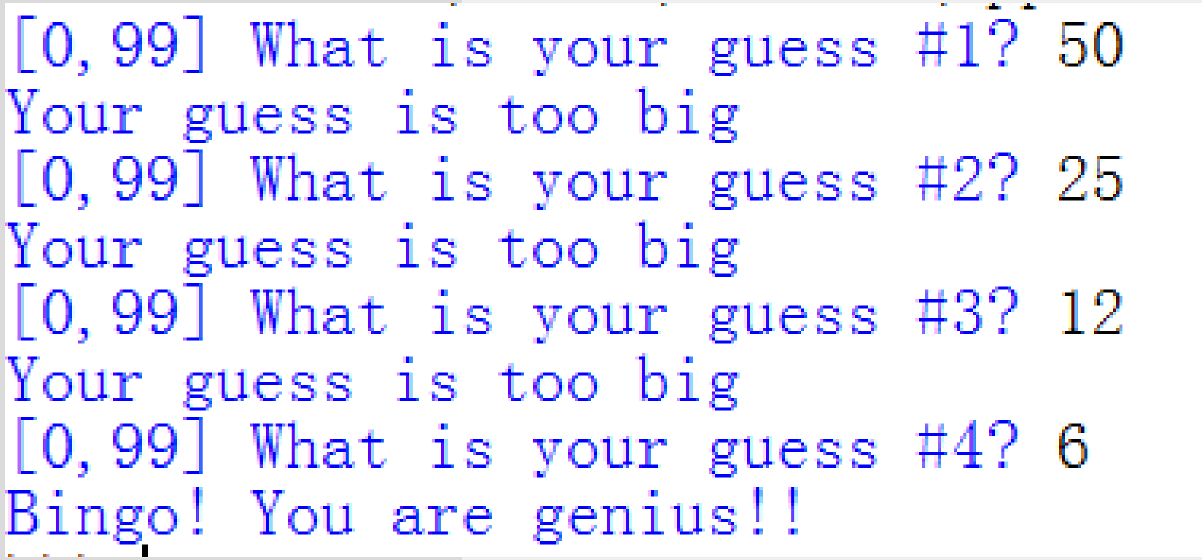
```
[2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43
, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101,
103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 1
57, 163, 167, 173, 179, 181, 191, 193, 197, 199, 21
1, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269
, 271, 277, 281, 283, 293, 307, 311, 313, 317, 331,
337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 3
97, 401, 409, 419, 421, 431, 433, 439, 443, 449, 45
7, 461, 463, 467, 479, 487, 491, 499, 503, 509, 521
, 523, 541, 547, 557, 563, 569, 571, 577, 587, 593,
599, 601, 607, 613, 617, 619, 631, 641, 643, 647, 6
53, 659, 661, 673, 677, 683, 691, 701, 709, 719, 72
7, 733, 739, 743, 751, 757, 761, 769, 773, 787, 797
, 809, 811, 821, 823, 827, 829, 839, 853, 857, 859,
863, 877, 881, 883, 887, 907, 911, 919, 929, 937, 9
41, 947, 953, 967, 971, 977, 983, 991, 997]
```

猜数字游戏I

文件名guess.py

```
import random
x=random.randrange(0,100)
for i in range(7):
    guess=int(input("[0,99] What is your guess #"+str(i+1)+"? "))
    if guess==x:
        print("Bingo! You are genius!!")
        break
    elif guess<x:
        print("Your guess is too small")
    else:
        print("Your guess is too big")

if guess!=x:
    print("Sorry! The answer is",x)
```

游戏演示结果



```
[0,99] What is your guess #1? 50
Your guess is too big
[0,99] What is your guess #2? 25
Your guess is too big
[0,99] What is your guess #3? 12
Your guess is too big
[0,99] What is your guess #4? 6
Bingo! You are genius!!
```

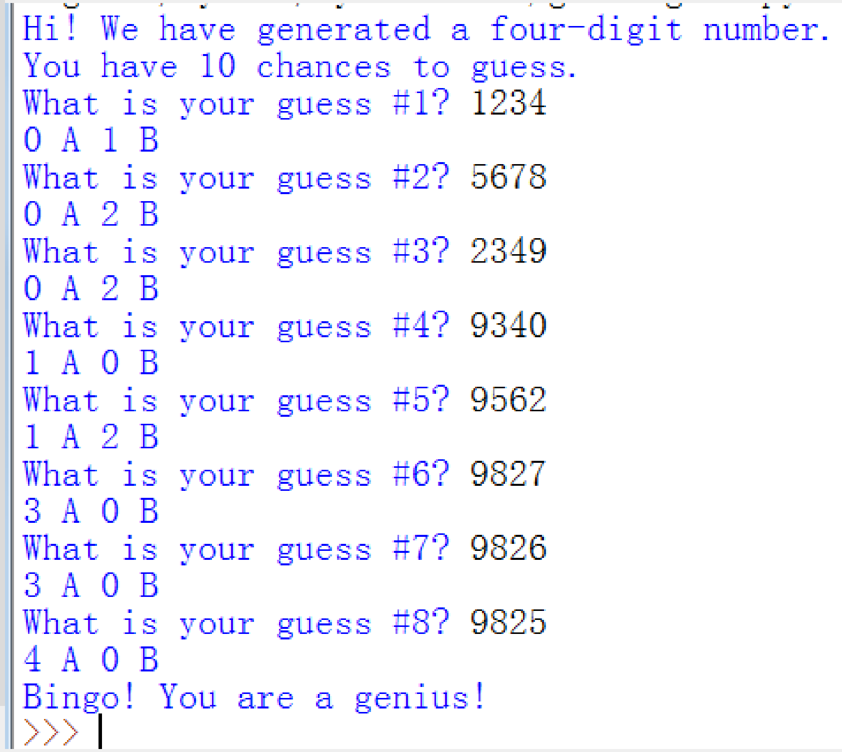
猜数字游戏II 高级版

游戏规则

猜数字是一种密码破译类游戏，可以由一个人和电脑玩。

- 电脑随机产生一个没有重复数字的4个数，不能让猜的人知道。猜的人每猜一个数字，电脑就要根据这个数字给出几A几B，其中A前面的数字表示位置正确的数的个数，而B前的数字表示数字正确而位置不对的数的个数。
- 如正确答案为 5234，而猜的人猜 5346，则是 1A2B，其中有一个5的位置对了，记为1A，而3和4这两个数字对了，而位置没对，因此记为 2B，合起来就是 1A2B。
- 接着猜的人再根据出题者的几A几B继续猜，直到猜中（即 4A0B）为止。

游戏演示结果



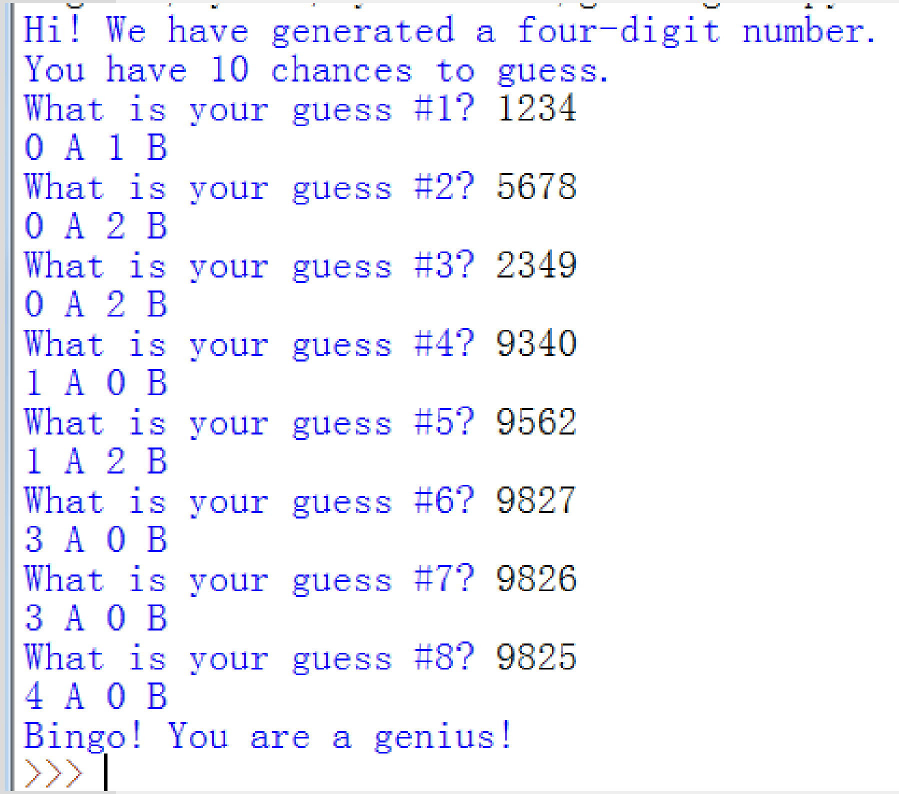
```
Hi! We have generated a four-digit number.
You have 10 chances to guess.
What is your guess #1? 1234
0 A 1 B
What is your guess #2? 5678
0 A 2 B
What is your guess #3? 2349
0 A 2 B
What is your guess #4? 9340
1 A 0 B
What is your guess #5? 9562
1 A 2 B
What is your guess #6? 9827
3 A 0 B
What is your guess #7? 9826
3 A 0 B
What is your guess #8? 9825
4 A 0 B
Bingo! You are a genius!
>>> 
```

猜数字游戏II 高级版

```
import random
#生成4个随机的不重复数字
seeds=list(range(10))
answer=""
for i in range(4):
   x=random.randrange(0,10-i)
   answer=answer+str(seeds[x])
   seeds.remove(seeds[x])
print("Hi! We have generated a four-digit number. You have 10 chances to guess.")
for i in range(10):
   x=input("What is your guess #"+str(i+1)+"? ")
   A,B=0,0
   for j in range(4):
      if x[j]==answer[j]:
         A=A+1
      elif x[j] in answer:
         B=B+1
   print(A,"A",B,"B")
   if A==4:
      print("Bingo! You are a genius!")
      break
if A!=4:
   print("Sorry, the answer is"+str(answer))
```

文件名guess-game.py

游戏演示结果



```
Hi! We have generated a four-digit number.
You have 10 chances to guess.
What is your guess #1? 1234
0 A 1 B
What is your guess #2? 5678
0 A 2 B
What is your guess #3? 2349
0 A 2 B
What is your guess #4? 9340
1 A 0 B
What is your guess #5? 9562
1 A 2 B
What is your guess #6? 9827
3 A 0 B
What is your guess #7? 9826
3 A 0 B
What is your guess #8? 9825
4 A 0 B
Bingo! You are a genius!
>>>
```

if-else 语法例题: 超市打折问题

派尚超市举行打折促销，皮皮虾每斤30元。

如果一次性购买大于等于10斤皮皮虾，每斤只需要25元。

请写程序用标准输入让用户输入购买多少斤，标准输出为总费用为多少元。

输入样例：8
输出样例：240

输入样例：20
输出样例：500

输入样例：12
输出样例：300

输入样例：1
输出样例：30

超市打折问题答案 discount.py

```
#discount.py
n=int(input("How much mantis shrimp? "))
if n<10:
    money=n*30
else:
    money=n*25
print("The total payment is",money,"RMB.")
```

作业

本次作业提交要求：

#作业提交请发送附件到stem888@qq.com 邮件主题为学生姓名拼音

#截止日期：2017年3月17日23:59