



Chap9 Exceptions

第9章 异常

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9.1

PYTHON中的异常

- 语法错误
- 运行时错误
- 逻辑错误



$6 = x * 2$

$x = 3 / 0$

$area = 2 * 3.14 * 3$

异常 (Exception)

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Source

```
>>> 1 / 0
```

Source

```
>>> y = x + 1
```

Traceback (most recent call last):

File "<pyshell#0>", line 1, in <module>
1/0

ZeroDivisionError: division by zero

Traceback (most recent call last):

File "<pyshell#1>", line 1, in <module>
y = x + 1

NameError: name 'x' is not defined

用异常对象 (exception object) 表示异常情况

- 查看异常类

`dir(__builtins__)`

类 名	描 述
BaseException	所有异常的基类
Exception	常规异常的基类
AttributeError	对象不存在此属性
IndexError	序列中无此索引
IOError	输入/输出操作失败
KeyboardInterrupt	用户中断执行(通常输入Ctrl-C)
KeyError	映射中不存在此键
NameError	找不到名字(变量)
SyntaxError	Python 语法错误
TypeError	对类型无效的操作
ValueError	传入无效的参数
ZeroDivisionError	除(或取模)运算的第二个参数为0

```
if y != 0:
```

```
    print(x / y)
```

```
else:
```

```
    print('division by zero')
```

VS

try-except
异常处理语句

9.2

捕捉异常

F
ile

Filename: prog9-1.py

```
num1 = int(input('Enter the first number: '))  
num2 = int(input('Enter the second number: '))  
print(num1 / num2)
```

Enter the first number: a

Traceback (most recent call last):

File "C:\Python\programs\exception1.py", line 1, in <module>

num1 = int(input('Enter the first number: '))

ValueError: invalid literal for int() with base 10: 'a'

9.2.1 TRY-EXCEPT语句

try-except语句

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File

Filename: prog9-2.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except ValueError:

print('Please input a digit!')

try:

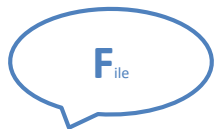
被检测的语句块

except Exception:

异常处理语句块

try-except语句

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Filename: prog9-3.py

try:

```
num1 = int(input('Enter the first number: '))  
num2 = int(input('Enter the second number: '))  
print(num1 / num2)
```

except ZeroDivisionError:

```
print('The second number cannot be zero!')
```

9.2.2 多个EXCEPT子句和一个EXCEPT块捕捉多个异常

多个except子句

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F_{ile}

Filename: prog9-4.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except ValueError:

print('Please input a digit!')

except ZeroDivisionError:

print('The second number cannot be zero!')

一个except块捕捉多个异常



File

Filename: prog9-5.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except (ValueError, ZeroDivisionError):

print('Invalid input!')

空except子句

File

Filename: prog9-6.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except:

print('Something went wrong!')

一了百了：except:



Filename: prog9-7.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except Exception as err:

print('Something went wrong!')

print(err)

try:

被检测的语句块

except 异常类名 as 错误原因名:

异常处理语句块

print(错误原因名)

9.2.3 ELSE子句



File

Filename: prog9-8.py

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except(ValueError, ZeroDivisionError):

print('Invalid input!')

else:

print('Aha, I am smart.')

Enter the first number: 3

Enter the second number: 5

0.6

Aha, I am smart.

F_{ile}

Filename: prog9-9.py

while True:

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

except ValueError:

print('Please input a digit!')

except ZeroDivisionError:

print('The second number cannot be zero!')

else:

break

Enter the first number: a

Please input a digit!

Enter the first number: 3

Enter the second number: 0

The second number cannot be zero!

Enter the first number: 3

Enter the second number: 5

0.6

break语句的位置

File

Filename: prog9-9.py

while True:

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

break

except ValueError:

print('Please input a digit!')

except ZeroDivisionError:

print('The second number cannot be zero!')

改写prog9-9.py

break语句的位置

F_{ile}

Filename: prog9-11.py

while True:

try:

num1 = int(input('Enter the first number: '))

num2 = int(input('Enter the second number: '))

print(num1 / num2)

break

except Exception **as** err:

print(err)

break语句的位置

File

Filename: prog9-12.py

```
aList = [1, 2, 3, 4, 5]
```

```
i = 0
```

```
while True:
```

```
    try:
```

```
        print(aList[i])
```

```
    except IndexError:
```

```
        print('index error')
```

```
        break
```

```
    else:
```

```
        i += 1
```

9.2.4 FINALLY子句

finally子句

File

Filename: prog9-13.py

```
def finallyTest():
```

```
    try:
```

```
        x = int(input('Enter the first number: '))
```

```
        y = int(input('Enter the second number: '))
```

```
        print(x / y)
```

```
        return 1
```

```
    except Exception as err:
```

```
        print(err)
```

```
        return 0
```

```
    finally:
```

```
        print('It is a finally clause.')
```

```
result = finallyTest()
```

```
print(result)
```

Enter the first number: 3

Enter the second number: 5

0.6

It is a finally clause.

1

Enter the first number: 3

Enter the second number: 0

division by zero

It is a finally clause.

0

9.3

上下文管理器和 WITH语句

上下文管理器 (Context Manager) 和with语句

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File

Filename: prog9-14.py

try:

f = open('data.txt')

for line in f:

print(line, end = '')

except IOError:

print('Cannot open the file!')

finally:

f.close()



上下文管理器

- 定义和控制代码块执行前的准备动作及执行后的收尾动作
- 通过with语句在支持上下文管理协议的对象（如文件对象）上方方便地进行使用



```
# Filename: prog9-15.py  
with open('data.txt') as f:  
    for line in f:  
        print(line, end="")
```

with 上下文管理表达式 **as** 变量:
语句序列

9.4

小结

- 异常
- try-except语句
- try-except-else语句
- try-finally语句
- raise语句
- with语句

