Hacettepe University

Computer Engineering Department

Programming in  python

BBM103 Introduction to Programming Lab 1

Week 8

Fall 2016

Dictionary Example 1: Dictionaries with dictionaries as values

```
meltem = {
    "name": "Meltem",
    "assignments": [90.0,97.0,75.0,92.0],
    "quizzes": [88.0,40.0,94.0],
    "exams": [75.0,90.0]
}
ahmet = {
    "name": "Ahmet",
    "assignments": [100.0, 92.0, 98.0, 100.0],
    "quizzes": [82.0, 83.0, 91.0],
    "exams": [89.0, 97.0]
}
ebru = {
    "name": "Ebru",
    "assignments": [0.0, 87.0, 75.0, 22.0],
    "quizzes": [0.0, 75.0, 78.0],
    "exams": [100.0, 100.0]
}

students = {
    meltem["name"]:meltem,
    ahmet["name"]:ahmet,
    ebru["name"]:ebru
}

for student,grade_data in students.items():
    print(student)
    for entry_type in grade_data.keys():
        if entry_type!="name":
            print("Grades from",entry_type,"-",grade_data[entry_type])
    print("-----------------")
```

Assigning dictionaries as values to the `students` dictionary

Output:

```
Meltem
Grades from exams - [75.0, 90.0]
Grades from quizzes - [88.0, 40.0, 94.0]
Grades from assignments - [90.0, 97.0, 75.0, 92.0]
-----------------
Ahmet
Grades from exams - [89.0, 97.0]
Grades from quizzes - [82.0, 83.0, 91.0]
Grades from assignments - [100.0, 92.0, 98.0, 100.0]
-----------------
Ebru
Grades from exams - [100.0, 100.0]
Grades from quizzes - [0.0, 75.0, 78.0]
Grades from assignments - [0.0, 87.0, 75.0, 22.0]
-----------------
```

Exercise: Rewrite this example using a list named `students` instead of a dictionary.

Dictionary Example 2: Calculating the total cost of a shopping list

```
1  price_file=open("price_list.txt","r")
2  shopping_list_file=open("shopping_list.txt","r")
3
4  prices = {}
5
6  for line in price_file.readlines():
7      line=line.rstrip("\n")
8      entry = line.split("-")
9      prices[entry[0]]=entry[1]
10
11 shopping_list = {}
12
13 for line in shopping_list_file.readlines():
14     line=line.rstrip("\n")
15     entry = line.split(":")
16     check_for_unwanted_line = entry[1].replace(" ","")   #get rid of spaces
17     if not check_for_unwanted_line.isalpha():            #chech if not letters
18         shopping_list[entry[0]]=entry[1]
```

price_list.txt
fruit-price per kg
apple-3.0
orange-4.0
banana-7.0
lemon-5.0
kiwi-6.0
pomegranate-5.5
pear-3.5

shopping_list.txt
fruit:wanted amount in kg
kiwi:2
apple:5.5
banana:1
grape:3

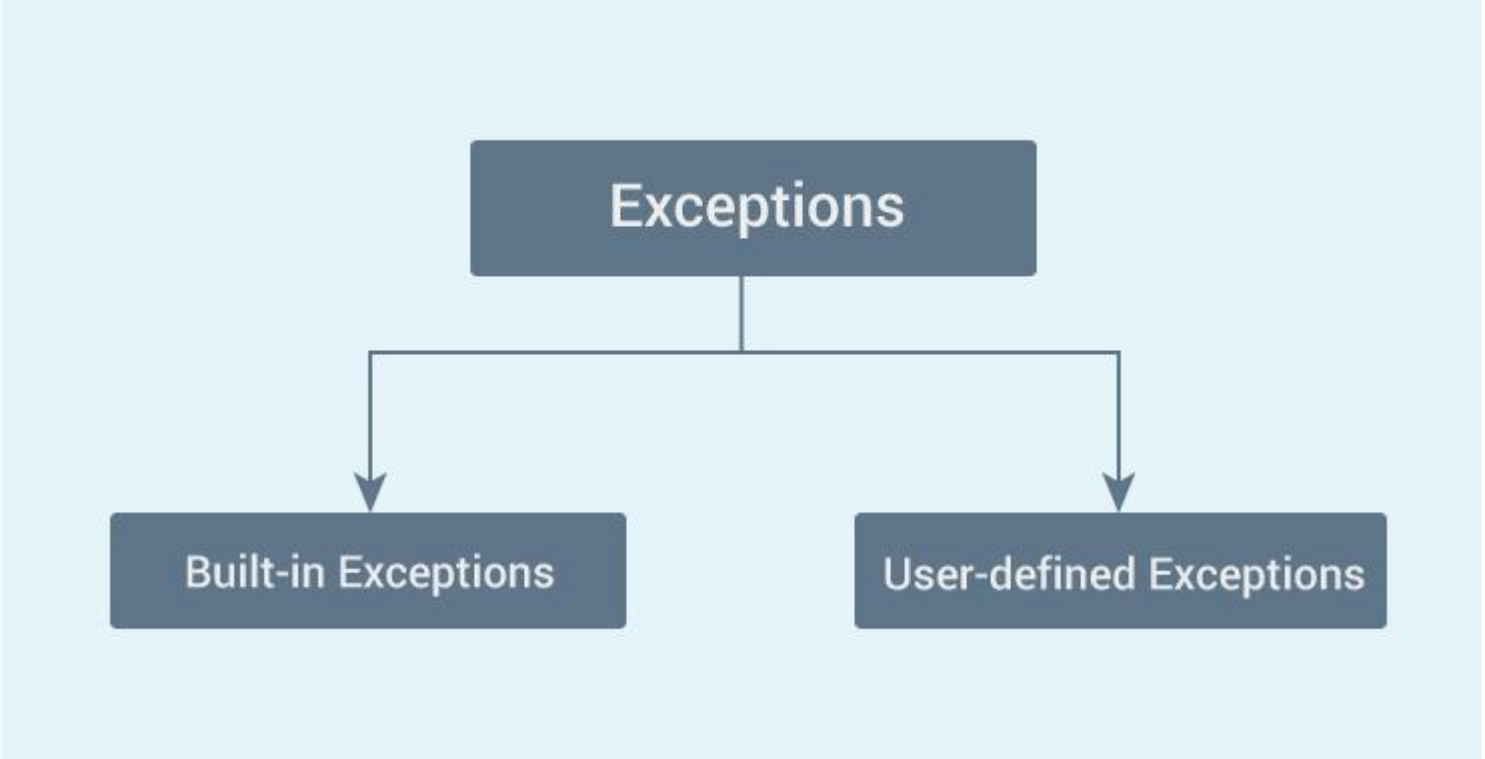
This example continues in the next slide ⟶

```
20 total_amount_to_pay = 0
21 missing_items = []
22
23 for item in shopping_list.keys():
24     print("You want to buy {} kg of {}".format(shopping_list[item],item))
25     if item in prices:
26         total_amount_to_pay += float(prices[item])*float(shopping_list[item])
27     else:
28         missing_items.append(item)
29
30
31 if len(missing_items)>0:
32     print("Fruits that were not available:")
33     for item in missing_items:
34         print(item)
35
36         print("The total cost for your fruits is:",total_amount_to_pay,"TL")
37
38 price_file.close()
39 shopping_list_file.close()
```

Output:

You want to buy 5.5 kg of apple
You want to buy 1 kg of banana
You want to buy 2 kg of kiwi
You want to buy 3 kg of grape
Fruits that were not available:
grape
The total cost for your fruits is: 35.5 TL

Exceptions



Built-in Exceptions

The simplest way to handle exceptions is with a "try-except" block:

Example 1:

```
(x,y) = (5,0)
try:
    z = x/y
except ZeroDivisionError:
    print ("divide by zero")
```

```
Output: divide by zero
```

Example 2: except ValueError:

```
first_number = input("First number: ")
second_number = input("Second number: ")
try:
    number1 = int(first_number)
    number2 = int(second_number)
    print(number1, "/", number2, "=", number1 / number2)
except ValueError:
    print("Error! Please enter number!")
```

Example 3: except ZeroDivisionError:

```
first_number = input("First number: ")
second_number = input("Second number: ")
try:
    number1 = int(first_number)
    number2 = int(second_number)
    print(number1, "/", number2, "=", number1 / number2)
except ValueError:
    print("Error! Please enter number!")
except ZeroDivisionError:
    print("You can't divide a number to 0!")
```

Example 4: except (ValueError, ZeroDivisionError)

```
first_number = input("First number: ")
second_number = input("Second number: ")
try:
    number1 = int(first_number)
    number2 = int(second_number)
    print(number1, "/", number2, "=", number1 / number2)
except (ValueError,ZeroDivisionError):
    print("Error!")
```

Example 5: try... except... as...

```
first_number = input("First number: ")
second_number = input("Second number: ")
try:
    number1 = int(first_number)
    number2 = int(second_number)
    print(number1, "/", number2, "=", number1 / number2)
except (ValueError,ZeroDivisionError) as error:
    print("Error!")
    print("Original error message: ", error)
```

Example 6: try... except... else...

```
for arg in sys.argv[1:]:
    try:
        f = open(arg, 'r')
    except IOError:
        print('cannot open', arg)
    else:
        print(arg, 'has', len(f.readlines()), 'lines')
        f.close()
```

Example 7: try... except... finally...

```
try:
    file = open("dosyaadı", "r")
except IOError:
    print("error!")
finally:
    file.close()
```

Some Examples using Exceptions

```
except IOError:
        print('An error occured trying to read the file.')

except ValueError:
        print('Non-numeric data found in the file.')

 except ImportError:
        print ("NO module found«)

except EOFError:
        print('Why did you do an EOF on me?')

except KeyboardInterrupt:
         print('You cancelled the operation.')

except:
        print('An error occured.')
```

raise

Example 8:

```
tr_character = "şçğüöıİ"

password = input("Enter your password: ")

for i in password:
    if i in tr_character:
        raise TypeError("Yo can't use Turkish characters in password!")
    else:
        pass

print("Password is excepted!")
```

Example 9:

```
try:
    while True:
        if int(input('Guess a number: ')) == 5
            raise ZeroDivisionError
except ZeroDivisionError:
    print ('You got it!')
```

Example 10:

```
import sys

try:
    f = open('myfile.txt')
    s = f.readline()
    i = int(s.strip())
except OSError as err:
    print("OS error: {0}".format(err))
except ValueError:
    print("Could not convert data to an integer.")
except:
    print("Unexpected error:", sys.exc_info()[0])
    raise
```

User-Defined Exceptions

Example 11:

```
class MyException(Exception):
    def __init__(self, t=0):
        self.numtries = t
try:
    for tries in range(1, 6):
        if int(input('Guess a number: ')) == 5:
            raise MyException(tries)
except MyException as e:
    print ('You got it in only %d tries!'  % e.numtries)
else:
    print ('Too bad, you ran out of tries!')
```

Example 12 user-defined exceptions

```
class Error(Exception):
    """Base class for other exceptions"""
    pass

class ValueTooSmallError(Error):
    """Raised when the input value is too small"""
    pass

class ValueTooLargeError(Error):
    """Raised when the input value is too large"""
    pass

# our main program
# user guesses a number until he/she gets it right

# you need to guess this number
number = 10
```

This example continues in the next slide ⟶

Example 12 continued

```
while True:
    try:
        i_num = int(input("Enter a number: "))
        if i_num < number:
            raise ValueTooSmallError
        elif i_num > number:
            raise ValueTooLargeError
        break
    except ValueTooSmallError:
        print("This value is too small, try again!")
        print()
    except ValueTooLargeError:
        print("This value is too large, try again!")
        print()

print("Congratulations! You guessed it correctly.")
```

Assert

```
assert <some_test>, <message>
```

Example 13:

```
def test_set_comparison():
    set1 = set("1308")
    set2 = set("8035")
    assert set1 == set2

test_set_comparison()
```

Output:

```
C:\Users\necva\Desktop>py deneme.py
Traceback (most recent call last):
  File "deneme.py", line 8, in <module>
    test_set_comparison()
  File "deneme.py", line 4, in test_set_comparison
    assert set1 == set2
AssertionError
```

Example 14:

```
array = [0,1, 2, 3, 4, 5, 6, 7, 8, 9]

def number(input):
        assert (input in array)


number(10)
number(5)
```

Output:

```
C:\Users\necva\Desktop>py deneme.py
Traceback (most recent call last):
  File "deneme.py", line 7, in <module>
    number(10)
  File "deneme.py", line 4, in number
    assert (input in array)
AssertionError
```

Example 15:

```
def func (a,b):
    max= 0
    if a < b: max= b
    if b < a: max= a
    print(max)
    assert (max == a or max == b) and max >= a and max >= b

func(10,15)
```

Output:

```
C:\Users\necva\Desktop>py deneme.py
15
```