Introduction to Python - II

Overview

- Error management
- Built-in functions
- Modules and packages
- Namespaces
- Standard modules and packages
- Real world example

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ZeroDivisionError: float division by zero
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Note: the exception mechanism allows the programmer to manage the error at the proper level.

E.g.: in `error1.py` the exception is catch in the caller of the function where the error happens.

The principle is: in case of error the exception climbs up the sequence of nested calls until catch. If it is not catch somewhere, the program terminates with the default behavior

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The exception mechanism provides for more detailed management:

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file: `error2.py`

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import error

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    except ZeroDivisionError:
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Exceptions -4

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Traceback (most recent call last): ← 2
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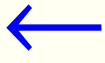

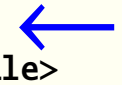

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The Python interpreter has a number of functions and types built into it that are always available. They are listed here in alphabetical order.

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abs()	dict()	help()	min()	setattr()
all()	dir()	hex()	next()	slice()
any()	divmod()	id()	object()	sorted()
ascii()	enumerate()	input()	oct()	staticmethod()
bin()	eval()	int()	open()	str()
bool()	exec()	isinstance()	ord()	sum()
bytearray()	filter()	issubclass()	pow()	super()
bytes()	float()	iter()	print()	tuple()
callable()	format()	len()	property()	type()
chr()	frozenset()	list()	range()	vars()
classmethod()	getattr()	locals()	repr()	zip()
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bytearray()	filter()	issubclass()	pow()	super()
bytes()	float()	iter()	print()	tuple()
callable()	format()	len()	property()	type()
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```
"Module for the computation of Fibonacci series"

MAXFIBO=1000

def fibo(n):
    "Returns the Fibonacci series up to n"
    if n > MAXFIBO: return []
    result = []
    a, b = 0, 1
    while b < n:
        result.append(b)
        a, b = b, a+b
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if __name__=='__main__':
    print(fibo(34))
```

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Module: A block of code contained in a single file, to be used by other Python programs.

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"Module for the computation of Fibonacci series"   ← 1

MAXFIBO=1000   ← 2

def fibo(n):   ← 3
    "Returns the Fibonacci series up to n"   ← 4
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if __name__=='__main__':   ← 5
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    "Returns the Fibonacci series up to n"   ← 4
    if n > MAXFIBO: return []
    result = []
    a, b = 0, 1
    while b < n:
        result.append(b)
        a, b = b, a+b
    return result

if __name__=='__main__':   ← 5
    print(fibo(34))
```

1. The module documentation string
2. A constant named: **MAXFIBO**
3. A function named: **fibo()**
4. The function documentation string

Modules -1

Module: A block of code contained in a single file, to be used by other Python programs.

file: `fibo.py`

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"Module for the computation of Fibonacci series"   <-- 1

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Modules -2

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1. A module must be **imported**

Modules -2

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Modules -2

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When a module is imported for the first time, its code is executed and is made available to the importer.

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- Variable `__name__` holds the module's name (`"fibo"` in the example), but **only** when the module is imported

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namespaces and *scope* -1

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- In a program there is a hierarchy of namespaces.

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file: `prcube.py`

```
note = "The cube of %d is: %d"

cube = 3.1415926

def print_cube(n):
    cube = n*n*n
    print(note % (n, cube))
```

namespaces and *scope* -1

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file: `prcube.py` ← 1

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1. Module `prcube` is a namespace containing names: **note**, **cube**, **print_cube**

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1. Module `prcube` is a namespace containing names: **note**, **cube**, **print_cube**
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namespaces and *scope* -2

Let's experiment with the Python interpreter:

namespaces and *scope* -2

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```
$ python
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Type "help", "copyright", "credits" or "license" for more information.

>>> cube = "The third power"

>>> import prcube

>>> prcube.print_cube(11)
The cube of 11 is: 1331

>>> cube
'The third power'

>>> prcube.cube
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namespaces and *scope* -2

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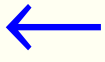


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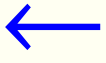


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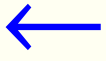


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The three variables named **cube** do not conflict because they belong to different namespaces.

namespaces and *scope* -3

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namespaces and *scope* -3

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namespaces and *scope* -3

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namespaces and *scope* -3

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namespaces and *scope* -3

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cube = 3.1415926
def print_cube(n):
    cube = n*n*n
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....
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namespaces and *scope* -3

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2. The name **cube**$_1$ is created here

namespaces and *scope* -3

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Let's now suppose we also want to change the value of `CURRENT_DISK` variable when the procedure is called...

file: `scope2.py`

```
CURRENT_DISK = 3

def new_disk():
    if CURRENT_DISK:
        print("Current disk:", CURRENT_DISK)
        CURRENT_DISK = 5

if __name__ == "__main__":
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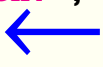


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Let's run the new version:

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$ python scope2.py
Traceback (most recent call last):
  File "scope2.py", line 9, in <module>
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  File "scope2.py", line 4, in new_disk
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UnboundLocalError: local variable 'CURRENT_DISK' referenced before assignment
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namespaces and *scope* -6

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global namespace -1

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file: `scope3.py` – Working version

```
CURRENT_DISK = 3

def new_disk():
    global CURRENT_DISK
    if CURRENT_DISK:
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Now we can run it

```
$ python scope3.py
Current disk: 3
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global namespace -1

file: scope3.py – Working version

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CURRENT_DISK = 3

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The `sys` standard module

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Some examples:

```
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>>> os.sep
'/'
>>> os.defpath
':/bin:/usr/bin'
>>> os.environ
environ({'LC_MEASUREMENT': 'it_IT.UTF-8', 'DISPLAY': ':0.0', 'EDITOR': 'vim',
   ...})
>>> os.getenv("HOME")
'/home/lfini'
>>> os.environ["HOME"]
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>>> os.curdir
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The os standard package -2

Let's explore at the Python prompt:

- os.access("a.py",os.R_OK)
- os.chdir("newdir")
- os.listdir("dirname")
- os.mkdir("/dir1/dir2/name")
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More examples:

```
>>> os.access("a.py",os.R_OK)
False
>>> tree=os.walk("code")
>>> for dp,dnames,fnames in tree:
...   for fn in fnames:
...     print(os.path.join(dp,fn))
...
code/scope3.py
code/prcube.py
code/decorator.py
    ....
code/data/img-611.fit
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Functions to manipulate file names and paths in a portable way

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- os.path.abspath(path)
- os.path.basename(path)
- os.path.dirname(path)
- os.path.split(path)
- os.path.commonprefix(list)
- os.path.exists(path)
- os.path.getatime(path)
- os.path.getmtime(path)
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Let's explore at the `Python` prompt:

- help(math), to be noted:
  - fsum
  - expm1
  - log1p

Modules: `math`, `cmath`, `random`

Functions on real numbers (`math`) complex numbers (`cmath`) and random numbers generation (`random`)

Let's explore at the `Python` prompt:

- help(math), to be noted:
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→

Example 1: Sending e-mail

Sending mail messages from a procedure may be useful in many cases:

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- To manage mailing lists

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Sending mail messages from a procedure may be useful in many cases:

- To manage mailing lists
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- To send error messages to a program's development team
- ...

→

file: `simplemail.py` - function `send()` /1

```
import smtplib
import sys
import getpass

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"
    def log_debug(msg):
        "Print debug messages"
        if _debug:
            print("DBG>", msg)

    _debug = debug
    header = '\r\n'.join(("From: %s" % sender,
                          "To: %s" % ', '.join(recipients),
                          "Subject: %s" % subj,
                          ""))
```

file: simplemail.py - function send() /1

```
import smtplib ← 1
import sys
import getpass ← 2

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"  ← 3
    def log_debug(msg): ← 4
        "Print debug messages"
        if _debug:
            print("DBG>", msg)

    _debug = debug ← 5
    header = '\r\n'.join(("From: %s" % sender, ← 6
                          "To: %s" % ', '.join(recipients),
                          "Subject: %s" % subj,
                          ""))
```

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

```
import smtplib   <-- 1
import sys
import getpass   <-- 2

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"   <-- 3
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    header = '\r\n'.join(("From: %s" % sender,   <-- 6
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1. The core module used in this example

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

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```

1. The core module used in this example
2. This module is used only in the test section

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

```
import smtplib   <-- 1
import sys
import getpass   <-- 2

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"   <-- 3
    def log_debug(msg):   <-- 4
        "Print debug messages"
        if _debug:
            print("DBG>", msg)

    _debug = debug   <-- 5
    header = '\r\n'.join(("From: %s" % sender,   <-- 6
                          "To: %s" % ', '.join(recipients),
                          "Subject: %s" % subj,
                          ""))
```

1. The core module used in this example
2. This module is used only in the test section
3. `send()` is the function to be used to send e-mail messages

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

```
import smtplib          <-- 1
import sys
import getpass          <-- 2

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"          <-- 3
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    header = '\r\n'.join(("From: %s" % sender,          <-- 6
                          "To: %s" % ', '.join(recipients),
                          "Subject: %s" % subj,
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```

1. The core module used in this example
2. This module is used only in the test section
3. `send()` is the function to be used to send e-mail messages
4. Python allows to define a function within another function. As a result function `log_debug()` is ”visible” only within `send()`

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

```
import smtplib   <- 1
import sys
import getpass   <- 2

def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"   <- 3
    def log_debug(msg):   <- 4
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        if _debug:
            print("DBG>", msg)

    _debug = debug   <- 5
    header = '\r\n'.join(("From: %s" % sender,   <- 6
                          "To: %s" % ', '.join(recipients),
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3. `send()` is the function to be used to send e-mail messages
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Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

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import smtplib ← 1
import sys
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def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
    "Send a single message to a list of recipients"  ← 3
    def log_debug(msg): ← 4
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        if _debug:
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    header = '\r\n'.join(("From: %s" % sender, ← 6
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Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /1

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def send(mailhost, sender, recipients, subj, body, auth=None, debug=False):
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    def log_debug(msg):   <- 4
        "Print debug messages"
        if _debug:
            print("DBG>", msg)

    _debug = debug   <- 5
    header = '\r\n'.join(("From: %s" % sender,   <- 6
                          "To: %s" % ', '.join(recipients),
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```

1. The core module used in this example
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5. This enables/disables verbose output for debug
6. `header` is a string to format the mail message. It is generated by joining several lines of text

→

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)
        if auth:
            server.starttls()
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])
        log_debug('Sendmail ...')
        server.sendmail(sender, recipients, str(header)+str(body))
        log_debug('quit ...')
        server.quit()
    except Exception as excp:
        print("SMTP exception:", str(excp))
```

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)   <-- 2
        if auth:   <-- 3
            server.starttls()   <-- 3.1
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])   <-- 3.2
        log_debug('Sendmail ...')
        server.sendmail(sender, recipients, str(header)+str(body))   <-- 4
        log_debug('quit ...')
        server.quit()   <-- 5
    except Exception as excp:
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```

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)   <-- 2
        if auth:   <-- 3
            server.starttls()   <-- 3.1
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])   <-- 3.2
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```

1. Here we make the mail body as a string

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

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    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
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        server = smtplib.SMTP(mailhost)   <-- 2
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            server.starttls()   <-- 3.1
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])   <-- 3.2
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        log_debug('quit ...')
        server.quit()   <-- 5
    except Exception as excp:
        print("SMTP exception:", str(excp))
```

1. Here we make the mail body as a string
2. Activate the SMTP connection

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)   <-- 2
        if auth:   <-- 3
            server.starttls()   <-- 3.1
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])   <-- 3.2
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```

1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)   <-- 2
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            server.starttls()   <-- 3.1
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1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...
   1. Initialize authentication protocol

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)   <-- 1
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```

1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...
   1. Initialize authentication protocol
   2. Authenticate with userid and password

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

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    body = '\r\n'.join(body)   <-- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)   <-- 2
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            server.login(auth[0], auth[1])   <-- 3.2
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1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...
   1. Initialize authentication protocol
   2. Authenticate with userid and password
4. Send the message

Example 1: Sending e-mail

file: `simplemail.py` - function `send()` /2

```
    body = '\r\n'.join(body)          <- 1
    log_debug('Opening connection to: %s' % mailhost)
    try:
        server = smtplib.SMTP(mailhost)          <- 2
        if auth:                     <- 3
            server.starttls()        <- 3.1
            log_debug('Login as %s ...' % auth[0])
            server.login(auth[0], auth[1])       <- 3.2
        log_debug('Sendmail ...')
        server.sendmail(sender, recipients, str(header)+str(body))   <- 4
        log_debug('quit ...')
        server.quit()                <- 5
    except Exception as excp:
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```

1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...
   1. Initialize authentication protocol
   2. Authenticate with userid and password
4. Send the message
5. Close SMTP connection

Example 1: Sending e-mail

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    log_debug('Opening connection to: %s' % mailhost)
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        server = smtplib.SMTP(mailhost)   <-- 2
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1. Here we make the mail body as a string
2. Activate the SMTP connection
3. If authenticating ...
   1. Initialize authentication protocol
   2. Authenticate with userid and password
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→

file: simplemail.py - Test code /1

```
def main():
    """
Test code usage:

    1. python simplemail.py server.net rec@pient.com
       (to send through unauthenticated server)

    2. python simplemail.py server.net userid rec@pient.com
       (to send through authenticated server)
"""
    sender = 'fake.sender@somewhere.eu'
    subj_fmt = 'Test message via %s'
    msg_body = ['', 'Test message generated by simplemail.py', '']

    if len(sys.argv) == 3: # Sending via non authenticating server
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[2]],
             subj, msg_body, debug=True)
```

file: simplemail.py - Test code /1

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def main():
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Test code usage:

    1. python simplemail.py server.net rec@pient.com
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Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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        print("Sending: ", subj)
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```

1 ← 1

2 ← 2

3,4 ← 3,4

5,6 ← 5,6

1. We set up test message elements

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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def main():
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        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[2]],
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1 ← 1

2 ← 2

3,4 ← 3,4

5,6 ← 5,6

1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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def main():
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1 ← 1

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3,4 ← 3,4

5,6 ← 5,6

1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication
3. We call the sending function ...

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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def main():
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Test code usage:

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2

3,4

5,6

1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication
3. We call the sending function ...
4. First argument is the mail server address, second argument is the recipient

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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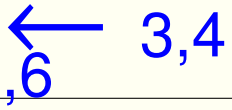
```



1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication
3. We call the sending function ...
4. First argument is the mail server address, second argument is the recipient
5. The optional argument `auth` is not specified: authentication is not performed

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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    if len(sys.argv) == 3: # Sending via non authenticating server
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        send(sys.argv[1], sender, [sys.argv[2]],
             subj, msg_body, debug=True)
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1 2 3,4 5,6

1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication
3. We call the sending function ...
4. First argument is the mail server address, second argument is the recipient
5. The optional argument `auth` is not specified: authentication is not performed
6. The optional argument `debug` is set to `True` to have debugging printouts

Example 1: Sending e-mail

file: `simplemail.py` - Test code /1

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Test code usage:

    1. python simplemail.py server.net rec@pient.com
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"""
    sender = 'fake.sender@somewhere.eu'
    subj_fmt = 'Test message via %s'
    msg_body = ['', 'Test message generated by simplemail.py', '']

    if len(sys.argv) == 3: # Sending via non authenticating server
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[2]],
             subj, msg_body, debug=True)
```

1

2

3,4

5,6

1. We set up test message elements
2. If the script is called with 2 arguments, send test message without authentication
3. We call the sending function ...
4. First argument is the mail server address, second argument is the recipient
5. The optional argument `auth` is not specified: authentication is not performed
6. The optional argument `debug` is set to `True` to have debugging printouts

→

file: simplemail.py - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)
    else:
        print(main.__doc__)

if __name__ == '__main__':
    main()
```

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)
    else:
        print(main.__doc__)

if __name__ == '__main__':
    main()
```

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)
    else:
        print(main.__doc__)

if __name__ == '__main__':
    main()
```

1 ← 1
2 ← 2
3 ← 3
4 ← 4
5 ← 5
6 ← 6

1. With three arguments, send via an authenticating server

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server   <- 1
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])   <- 2
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],   <- 3
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)   <- 4
    else:   <- 5
        print(main.__doc__)

if __name__ == '__main__':   <- 6
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)
    else:
        print(main.__doc__)

if __name__ == '__main__':
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password
3. Argument 1 is the mail server address, argument 2 is the access userid, argument 3 is the recipient

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server   <- 1
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])   <- 2
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],   <- 3
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)   <- 4
    else:   <- 5
        print(main.__doc__)

if __name__ == '__main__':   <- 6
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password
3. Argument 1 is the mail server address, argument 2 is the access userid, argument 3 is the recipient
4. When optional argument `auth` is specified it contains the authorization data (userid and password)

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)
    else:
        print(main.__doc__)

if __name__ == '__main__':
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password
3. Argument 1 is the mail server address, argument 2 is the access userid, argument 3 is the recipient
4. When optional argument `auth` is specified it contains the authorization data (userid and password)
5. If an unexpected number of arguments is specified, just provide some help

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server   <- 1
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])   <- 2
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],   <- 3
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)   <- 4
    else:   <- 5
        print(main.__doc__)

if __name__ == '__main__':   <- 6
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password
3. Argument 1 is the mail server address, argument 2 is the access userid, argument 3 is the recipient
4. When optional argument `auth` is specified it contains the authorization data (userid and password)
5. If an unexpected number of arguments is specified, just provide some help
6. Conditional execution of the test function `main()`

Example 1: Sending e-mail

file: `simplemail.py` - Test code /2

```
    elif len(sys.argv) == 4: # Sending via authenticating server   <- 1
        pwd = getpass.getpass(prompt="Password for %s: "%sys.argv[2])   <- 2
        subj = subj_fmt % sys.argv[1]
        print("Sending: ", subj)
        send(sys.argv[1], sender, [sys.argv[3]],   <- 3
             subj, msg_body, auth=(sys.argv[2], pwd), debug=True)   <- 4
    else:   <- 5
        print(main.__doc__)

if __name__ == '__main__':   <- 6
    main()
```

1. With three arguments, send via an authenticating server
2. Prompt for password
3. Argument 1 is the mail server address, argument 2 is the access userid, argument 3 is the recipient
4. When optional argument `auth` is specified it contains the authorization data (userid and password)
5. If an unexpected number of arguments is specified, just provide some help
6. Conditional execution of the test function `main()`

→

The End

End of Part II