

UNIVERSITY OF OSLO

Faculty of Mathematics and Natural Sciences

Exam in INF3331
Day of exam: 2010-12-01
Exam hours: 4
This examination paper consists of 30 pages including 26 pages of appendices.
Appendices: 2 (documentation for modules email and smtp lib)
Permitted materials: None

Make sure that your copy of this examination paper is complete before answering.

It is possible to answer the exam in either Norwegian or English.

1: Vectorization (5 points)

In high-level languages like Python, vectorization plays an important role in some cases. Explain when and why this is important, and give an example.

2: Reading data from file (5 points)

Write a function that takes a file name as only argument and returns a flat list of all the numbers that occurred in the file. The content of the file is a mix of text and numbers.

3: Implement a specialized sort function (5 points)

Write a function "age_sort" that takes a list of dates on the format "dd.mm.yyyy" as input argument and returns a new list sorted by the age of the date entries. The following program illustrates the use of the function:

```
>>> dates = ["19.05.1968", "21.08.1968", "31.12.1911"]
>>> new_dates = age_sort(dates)
>>> print new_dates
["31.12.1911", "19.05.1968", "21.08.1968"]
>>> print dates
["19.05.1968", "21.08.1968", "31.12.1911"]
```

4: Class programming (7 points)

Consider the following class:

```
class Foo(object):
    def __init__(self, i, j):
        self.i, self.j = i, j

    def __str__(self):
        return("(%d, %d)" % (self.i, self.j))

    def __setitem__(self, idx, v):
        if idx == 0:
            self.i = v
        elif idx == 1:
            self.j = v
        else:
            raise RuntimeError("Index out of bounds [0,1]")
```

Make a subclass of Foo, named Bar, that implements the special methods `__eq__` and `__repr__`, such that the following code works:

```
>>> f = Bar(1,2)
```

```
>>> g = Bar(2,2)
>>> f == g
False
>>> g == eval(repr(g))
True
>>> g[0] = 1
>>> f == g
True
```

5: Corporate spammer (10 points)

You're an assistant at Foomatic Inc., where you've been assigned to send emails to every previous customer of the business by the end of the week. Your problem is that it is already Friday noon, you have made an appointment with some friends to play computer games all weekend, and the number of contacts you have to send personalized emails to is several thousands. Desperately thinking back on your education, you remember that Python has libraries for sending emails, even with attachments, and you look up docs.python.org to find the module documentation.

Write a computer program (Python script) that reads contacts from a csv (comma separated values) file named "contacts.csv" on the form:

```
Surname1, Given Name1, Company1, Email-address1,
Surname2, Given Name2, Company2, Email-address2,
```

For each of these contacts, the following personalized email should be written and sent:

”

Dear Given NameX SurnameX,

it is a pleasure for me to inform you that CompanyX, as a valued customer of Foomatic Inc., has been given the great and exclusive opportunity to buy our new software FooChart at a reduced rate. Please see the enclosed leaflet, and do not hesitate to contact me on Monday if you have any further questions.

Sincerely,
Corporate Weasel
Foomatic Inc.
”

The subject of the email should be:

“Pre-sale on FooChart from Foomatic Inc.”

Here, Given NameX, SurnameX, and CompanyX should be replaced with the contact information read from "contacts.csv". An image file named "FooChart.jpg" should be attached with each email. The image file resides in the same directory as "contacts.csv".

The attached module documentation for `email` and `smtplib` should be helpful when answering this assignment.