Part 1. 90 minutes

Assume Python 2.5

Name:

Student-ID:

1. What does the main program do and print? (Answer in 2-3 sentences)

```
import random

class SomeClass:
    def __init__(self):
        self.last = None
    def getSomeStuff(self):
        a = random.random() * 6 + 0.99999999
        a = int(a)
        self.Last = a
        return a

def main():
    Mything = SomeClass()
    Another = input("How many times this time?")
    for i in range(Another):
        print Mything.getSomeStuff()

main()
```

2. What is fundamentally wrong in the main program? (Answer in 1 sentence)

```
import math

def DoSomeCleverThing(a):
    """This function returns a magic number"""
    return math.cos(a)**2 + math.sin(a)**2

def main():
    a = -1
    while (a < 0):
        d = DoSomeCleverThing(a)
        a -= 1
main()
```

3. What is the type of the variables, i.e. what does <u>print</u> output / suggest, a–i?

```
import math

a = 1
print type(a)

b = 1.0
print type(b)

c = "1.0"
print type(c)

d = {}
print type(d)

e = []
print type(e)

f = ()
print type(f)

g = type(a)==type(b)
print type(g)

h = math.sqrt
print type(h)

i = type(bin)
print type(i)
```

4. Where does the control go, i.e. what does this program print? (Give the string)

```
MyList = [3, 2, 1, 0, 1, 2, 3]
NumList = [8.0, 6.0, 4.0, 2.0]
PrintString = ""

for i in range(7):
   if NumList[MyList[i]] > 5:
       PrintString += "A"
   else:
       PrintString += "B"
print PrintString
```

5. What does this program print? (Give the output of the print statement in the for loop)

```
MyDict =  {}
MyWord = "MyWord"

for i in range(len(MyWord)):
    MyDict[i]=MyWord[i]

for i in range(5,-1,-1):
    print MyDict[i],
```

6. What does this program print? (In the 6 print statements)

```
a = 1
b = 1
print type(a) == type(b)
a = a/2
print type(a) == type(b)
a = a*2.0
print type(a) == type(b)
b = b*2
print a == b
print a
print b
```

7. What does this program print?

```
a = 1.00001
b = 1.0001
print "%0.5f %0.4f" % (a, b)
print "%0.3f %0.2f" % (a, b)
print "%0.1f %0.0f" % (a, b)
```

8. What does this program do? (Answer in 1-3 sentences)

```
i = 0
while (i < 1000):
    o = open("c:/temp/" + "%d" % i + ".txt", 'w')
    o.write(str(i))
    o.close()
    i += 2
```

Part 2. 90 mins

Send your source-code answers as e-mail attachments in a single e-mail to ilkka.korpela@helsinki.fi (have your msg + attachments stored in your sent -folder)
Use filenames: "firstname_surname_#.py" , where # is 1–5.

1. Write Python code that first assigns the numeric value "1" (one, whole number) to a variable **a**. Next it converts the type of **a** to a decimal number (such as 3.672). Following that, the program multiplies the value by (5.5 + random number) and converts the result into a string that is assigned back to the same variable **a**. Finally, the program uses a method that is valid for strings to get the integer part and the decimal part of the "number" stored as a string in variable **a**. These two parts are printed on the screen for the user. (~6 lines of code)

2. Write a code that reads the text file "c:\hy-temp\myfile.txt" and prints the number of "a" and "A" characters in that file. You can use this file for example: http://www.helsinki.fi/~korpela/jako/LiDAR_UK/readme.txt
(~7 lines of code)

3. Write a class definition for object Tree. Its attributes are species and color. Write methods for setting and getting the attribute values (Encapsulation). (~12 lines of code)

4. Write simple and short code that demonstrates how to use a dictionary – the code should store data (key, value -pairs), retrieve data (value for key), and delete data entries (key, value –pairs) in the dictionary. (~4 lines of code)

5. Write a program that fills a list data-structure, using a list-method, such that every second list item is an integer and every second is a dictionary. (~7 lines of code).