University of Waterloo
CS 234 - Data Types and Structures
Spring 2014
Assignment 1

Assignment Guidelines

- Clarifications about the assignment will be posted on Piazza in the thread "Assignment 1 [Official]."
- Instructions on how to submit your assignments to MarkUs will also be posted in Piazza. Your programs must work in the linux.student.cs.uwaterloo.ca environment using Python 2.7.3.
- Use A1-coversheet.pdf for the first page of your assignment or format the top of the first page of your assignment in *exactly* the same manner.
- You may lose up to 20% on a question because it is difficult to read or difficult to understand.

Question 1. Modify Simple Web Server [10 marks]

a) Download the script webServer.py from the assignment section of Learn. For one of the following browser, Firefox, Internet Explorer, Chrome, Safari, configure it so that it communicates with the webServer.py script. This is done by setting the browser to use an http web proxy at address 127.0.0.1and port 8080. There will be instructions for each of these browsers posted in Piazza. You will need to be able to do this for testing purposes. You are allowed to collaborate with others and post and answer questions in Piazza about the problems students are having for 1a) of the assignment.

b) Modify webServer.py in the following way:

Create a function called messageInHTML() which takes as parameters two strings (aMessageTitle, aMessage). This function will return a string which places the *aMessageTitle* and *aMessage* in HTML format suitable for a web browser. In future assignments you will be using this function to format error messages to send back to the browser.

Create another function called runWebFilter(HTTP_port) which takes as input the HTTP port number (an integer) and creates a webServer at that port number. The server will just repeat back to the browser whatever message the browser sent to it. Use the function messageInHTML() to format the message. The message title will be "This is what the browser sent …"

Submitted the answer to 1b) via MarkUs. No collaborating with other students forthis part of the assignment.

Question 2. Modify Simple Web Client [5 marks]

a) Download the script webClient.py and run it. Verify that when you run it you do get a response back from Google. You are allowed to collaborate with others and post questions and answers in Piazza about the problems students are having for 2a) of the assignment.

b) Modify webClient.py in the following way: create a function called sendMessage (aWebsiteName, aMessage) that will send *aMessage* to the web site *aWebsiteName*. Both *aWebsiteName* and *aMessage* are strings. This part of the question will be submitted via MarkUs. No collaborating with other students for this part of the assignment.

Question 3. Integer Matrix Class [10 marks]

In a file called intMatrix.py, create a class called IntMatrix which represents 2 x 2 matrices with integer entries. Support the following five operators {+, -,*, ==, !=} and the methods str() to create a string representation of the matrix and det() which returns the determinant of the matrix. When creating the matrix using the constructor IntMatrix(11, 12, 21, 22), the first two integers represent the first row of the matrix and the second two represent the second row.

The string representation will print on two rows and assume a width of four decimal places for each entry with a space between them in each row, i.e. print(str(IntMatrix (11, 12, 21, 22))) will print

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 11   12
 21   22
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and the width of each row will be 4+1+4 = 9 characters.

You may assume for testing purposes that the entry of any matrix will be between -999 and 999 inclusive. Submit this question via MarkUs.

Question 4. Copying a File [10 marks]

Create a function call copy(srcFile, destFile) which takes as input the name of a source file and a destination file and copies the source file to the destination file.

a) What are all the assumptions you would have to make in order to assume this function will work (i.e. what are all the preconditions that would have to be met)?

b) Create the function in python and take care of as many assumptions as possible (i.e. test that the assumption is true and if it is not, print out a meaningful error message) and list the rest of the assumptions in the documentation string for the function under the heading "Assumptions."

Submit the answer to this question on paper in the assignment slots on the fourth floor of the MC building. Use A1-coversheet.pdf as your coversheet.