Assignments

Purpose

- Problem solving practice
- Programming challenges and implementation practice

Instructions

This assignment sheet specifies the compulsory assignments for the Advanced Programming course. They are divided into six specific sections consisting of 3–4 programming challenges each. Pass or fail of each challenge is decided by the online judge and is thus completely unbiased. After you have passed all the challenges within a section you can register the completion of the section with the course tutor.

Due to the restrictions of the online judge, challenges have to be implemented using one of the languages *Pascal*, *C*, *C++*, *Java* or *Python*. Choose the language you are most familiar with or that is closest to your preferred language.

The online judge can be accessed on the web, `http://uva.onlinejudge.org`

You have to register to the site after which you can submit your code in the *Quick Submit* area. This is done by either pasting it into the text box or by uploading a file containing your code sample. You will find the problems in the *Browse Problems* area. Every problem is numbered, from 100 to 1290 for test problems and from 10000 to 12481 for contest problems.

NOTE that very little interaction will have to be implemented. At most, the software will have to read from the standard input and write to the standard output. Emphasis lies on problem solving rather than fancy interaction.

HOWEVER, be *very careful* to make certain that your output follows the exact specification. A single spurious character or line feed will make the online judge fail your code even though the answers, in principle, are correct.

The first five sections should be solved individually, but you are allowed to discuss solution methods in groups. **However, implementation is to be done individually!** The last section (6) will emulate the structure of an ACM programming contest given limited actual time for the solution of problems within a group. Group assignment and venue will be revealed later.

Programming Challenges

Solve the following challenges given as pairs of identifying numbers and names.

Section 1. Startup problems

10300 - Ecological Premium, 591 - Box of Bricks, 10878 - Decode the tape.

Section 2. Data structures and graph traversals

839 - Not so Mobile, 10608 - Friends, 10307 - Killing Aliens in Borg Maze

Section 3. Arithmetics, divide & conquer and greedy algorithms

374 - Big Mod, 11054 - Wine trading in Gergovia, 10340 - All in All

Section 4. Dynamic programming and heuristics

10943 - How do you add?, 116 - Unidirectional TSP, 185 - Roman Numerals

Section 5. Computational geometry

920 - Sunny Mountains, 10078 - The Art Gallery, 10245 - The Closest Pair Problem

Section 6. Group work, to be announced!