1 Preamble

This document lists the knowledge expected for the students after the first year course IN102. Consequently, these same elements are expected for students arriving in the second year by other ways. The importance of the points described below is represented by a scale from * to ***, indicating fundamental elements, important ones, and finally secondary ones. It is essential to master the first ones. Second ones allow a better understanding of coming aspects of courses, even allow to choose an orientation in second / third year requiring the usage of computer science. The last ones are either for culture or specific points for students who want to go on with an orientation in second / third year requiring an important usage of computer science.

2 Expected Knowledge

Students arriving in second year at ENSTA are assumed to have a certain number of competencies in programming, and more specifically in C. This must allow them to easily write programs to solve problems of medium difficulty. Knowledge in C language $^{(***)}$ follows:

- Compilation and execution of a program $^{(***)}$

- Scope of variables: local / global $^{(***)}$

- Syntactic constructs: arithmetic and logical operators, conditional, loops, `switch`, functions $^{(***)}$, bitwise operators $^{(**)}$

- Type constructs: `struct`, array / string, scalars $^{(***)}$, `enum`, `typedef`, "cast" $^{(**)}$

- Notion of preprocessing, `#define`, `#include`, prototypes of variables / functions $^{(***)}$

- Pointers, dynamic allocation, address passing style $^{(***)}$

- Specificities of scalars: sign, size, conversion issues `int` $\leftrightarrow$ `float`, overflows $^{(**)}$

- Recursivity $^{(**)}$

- Use of `Makefile`s and libraries $^{(*)}$

The expected knowledge in programming and data-structures $^{(**)}$ (implemented in C) follows:

- Linked-list $^{(***)}$

- Graph $^{(***)}$

- Stack $^{(**)}$

- File (queue / FIFO) $^{(**)}$

The documents given to the first year students may be used as a basis for students arriving in second year by other ways to check their knowledge. These documents are available on the dedicated WEB page: `http://perso.ensta-paristech.fr/~pessaux/teaching/in102/index.html`.

A version restricted to keep only points essential for students arriving in second year is available on the page: `http://perso.ensta-paristech.fr/~pessaux/teaching/in261/index.html`.