XML Lab

**Sample task**

Data to store

A sample XML file is given containing a description of the stock of the manufactory in which the centipedes are assembled. The file contains the letter:

• limbs - legs and heads (of course the head is a limb),

• centipedes.

There may be a limb

• leg:

– of metal and consist of:

∗ alloy – type of alloy from which it is made. The alloy is one of four values: steel, brass, bronze, tombac,

∗ id – a natural number, which is a unique identifier among legs of both types (metal and plastic),

– plastic and consist of:

\* material - one of two values: polyethylene, polypropylene,

∗ density – one of the two values LD, HD or a positive number,

∗ id – a natural number, which is a unique identifier among the legs of both types (metal

and plastic), • head and consist of:

– diameter – diameter being a positive number, greater than 5, written with exactly one decimal place,

– color – all known colors, i.e. a value from the set red, blue, white, black

– id – a natural number, which is a unique head identifier among all available heads,

Each centipede consists of:

• name – string of at least 3 characters

• number – serial number in the XX-YYY-Z format, where X is a capital letter of the Latin alphabet, Y – a number, Z – a character from the #$%\* set. The number must be unique.

• exactly one head, indicated by the link to the head identifier from the previous list,

• three or more legs defined by:

– leg type identifier from the list above

– color – one of the values red, blue, white, black

In addition to what is already in the file, you need to define a list of centipede enhancements. Each upgrade is supposed to describe exactly one limb (head or leg) added to a particular centipede, for example: AB-555-\* centipede extended by head 2 or centipede XW-086-\* extended by leg 3. Each centipede can have any number of extensions. The list of extensions must come after the list of centipedes.

Task

Writing time: 90 minutes. Submit the files: a modified version of the sample XML, an XSD file, and a C# solution. Send the whole thing by e-mail to the leading laboratory in the form of a zip file.

file name: login .zip

email subject: [ProjOb] XML1 2019

Note: All binaries (bin and obj directories from both projects) must be removed from the C# solution.

1. 2 p. Extend the XML structure with centipede improvements and prepare an XML Schema file defining the structure of the document, define the appropriate type constraints. Bind the elements in the sample XML file to the definitions from XML Schema.

2. 2 p. Do not define identical attributes multiple times in different types of legs.

3. 2 p. Enforce key uniqueness and valid references.

4. 1 p. Write a C# program that reads the XML given as a command line argument and writes to standard output the details of each centipede upgrade: a list of materials the limbs are made of (alloy or plastic or color for the head) after including the upgrade and name of the centipede .

5. 1 p. The solution is divided into two projects: a library with classes and auxiliary methods for deserialization, and a main project with a console application.

6. 1 p. Classes for deserialization are automatically generated from the XSD file during compilation.

7. 1 p. If the file given as an argument is not compliant with the XSD, the program prints an error and exits.