

Lab 2

Create an XML file and the corresponding XSD schema. When developing XSD, use simple and complex types, enumerations, templates and limit values, necessarily using attributes and the ID type. Generate (create) a Java class corresponding to this description.

Create a Java application for parsing an XML document and initializing a collection of objects with information from an XML file. Use SAX, DOM and StAX parsers for analysis.

Use the Comparator interface to sort objects.

Validate the XML document using XSD.

Define a method that converts the generated XML document into the document specified in each task.

Avoid copy-past code. All code must be covered by unit tests.

1. Greenhouse. The plants in the greenhouse have the following characteristics:

- Name – the name of the plant.
- Soil – soil for planting, which can be of the following types: podzolic, soil, sod-podzolic.
- Origin - place of origin of the plant.
- Visual parameters (there should be several) – external parameters: stem color, leaf color, average plant size.
- Growing tips (there should be several) - preferred growing conditions: temperature (in degrees), lighting (photophilic or not), watering (mole per week).
- Multiplying - reproduction: leaves, cuttings or seeds. The root element is called Flower.

2. Diamond Fund. Precious and semi-precious stones contained in the pavilion have the following characteristics:

- Name – the name of the stone.
- Preciousness - can be expensive or semi-precious.
- Origin – place of extraction.
- Visual parameters (there should be several) - can be: color (green, red, yellow, etc.), transparency (measured in percentages 0-100%), cutting methods (number of faces 4-15).
- Value – the weight of the stone (measured in carats). The root item is called a Gem.

3. Tariffs of mobile companies. Tariffs of mobile companies can have the following structure:

- Name – name of the tariff.

- Operator name – the name of the mobile operator to which the tariff belongs.
- Payroll - monthly subscription fee (0 - n rubles).
- All prices (must be several) – prices for calls: within the network (0 - n rubles per minute), outside the network (0 - n rubles per minute), to landlines (0 - n rubles per minute).
- SMS price – price per SMS (0 - n rubles).
- Parameters (there must be several) – availability of a favorite number (0 - n), tariffing (12-second, minute), fee for connection to the tariff (0 - n rubles). The root element is called Tariff.

4. Medicines. Medicines have the following properties.

- Name – the name of the drug.
- Pharm – a manufacturing company.
- Group – a group of drugs that includes medicines (antibiotics, painkillers, vitamins, etc.).
- Analogs (possibly several) – contains the name of the analog.
- Versions – execution options (consistency/type: tablets, capsules, powder, drops, etc.). For each execution option, there may be several manufacturers of medicinal products with the following characteristics:
- Certificate – a certificate of drug registration (number, dates of issue/expiration, registering organization);
- Package – package (type of package, quantity of package, price of package);
- Dosage – drug dosage, frequency of administration. The root element is called Medicine.

5. Computers. Computer components have the following characteristics:

- Name – the name of the component.
- Origin – the country of production.
- Price - price (0 - n rubles).
- Type (there must be several) – peripheral or not, power consumption (watts), presence of a cooler (is it or not), component group (input-output devices, multimedia), ports (COM, USB, LPT).
- Critical – is the availability of components critical for the operation of the computer. The root element is called Device.

6. Firearms. Firearms can be structured according to the following scheme:

- Model – name of the model.
- Handy – one- or two-handed.
- Origin – the country of production.
- TTC (there must be several) – tactical and technical characteristics: range (close [0 – 500 m], medium [500 – 1000 m], long range [1000 – n meters]), aiming range (in meters), presence of a clip, presence optics
- Material – manufacturing material. The root element is called Gun.

7. Cold weapons. Cold weapons can be structured according to the following scheme:

- Type – type (knife, dagger, saber, etc.).
- Handy – one or two-handed.
- Origin – the country of production.
- Visual (must be several) – visual characteristics: blade (blade length [10 – n cm], blade width [10 – n mm]), material (blade [steel, cast iron, copper, etc.]), handle (Wooden [if yes, specify the type of wood], plastic, metal), the presence of bleeding (whether or not).

- Value – collectable or not. The root element is called Knife.

8. Military aircraft. Military aircraft can be described according to the following scheme:

- Model – name of the model.
- Origin – country of production.
- Chars (must be several) – indicators, can be: type (support aircraft, escort, fighter, interceptor, scout), number of seats (1 or 2), ammunition (is there or not [recon], if, then: missiles [0 - 10]), the presence of a radar.
- Parameters – length (meters), width (meters), height (meters).
- Price – price (in thalers). The root element is called Plane.

9. Candies.

- Name – the name of the candy.
- Energy – calorie content (kcal).
- Type (there must be several) – type of candy (caramel, toffee, chocolate [with filling or not]).
- Ingredients (must be several) – ingredients: water, sugar (in mg), fructose (in mg), type of chocolate (for chocolate), vanillin (in mg)
- Value - nutritional value: proteins (in grams), fats (in grams) and carbohydrates (in grams).
- Production – a manufacturing enterprise. The root element is called Candy.

10. Beer.

- Name – the name of the beer.
- Type – type of beer (dark, light, camp, lively).
- Al - alcoholic or not.
- Manufacturer – a manufacturing company.
- Ingredients (must be several) – ingredients: water, malt, hops, sugar, etc.
- Chars (must be several) – indicators: turnover (if alcoholic), transparency (in percentage), filtered or not, nutritional value (kcal), bottling method (volume and material of containers)
- Name the root element Beer.

11. Periodicals.

- Title – name of the publication.
- Type – type of publication (newspaper, magazine, booklet).
- Monthly - monthly or not.
- Chars (must be several) – characteristics: color (yes or no), volume (n pages), glossy (yes [only for magazines and booklets] or no [for newspapers]), has signature index (only for newspapers and magazines)). The root element is called Paper.

12. Internet pages.

- Title – name of the page.
- Type – page type (advertising, news page, portal, mirror).
- Chars (must be several) – availability of an electronic mailbox (only for portals, mirrors and news pages), availability of news (only for news pages), availability of archives for downloading (only for mirrors), availability of voting (if , then anonymous or with using authorization] or not), paid (information available for download, free or not).
- Authorize – authorization is required or not. The root element is called Site.

13. Tourist vouchers. Tourist vouchers offered by the agency have the following characteristics:

- Type – type of tour (weekend, excursion, vacation, pilgrimage, etc.).
- Country – country for travel.
- Number days/nights - number of days and nights.
- Transport – type of tourist transportation (air, rail, car, liner).
- Hotel characteristic (must be several) - number of stars, whether meals are included and which (HB, BB, AI), which room (1, 2, 3-bed), whether there is a TV, air conditioning, etc.
- Cost – the cost of the ticket (how much and what is included). The root element is called Tourist voucher.

14. Concerts of the dance team. The dance number presented at the concert has the following characteristics:

- Type – dance direction (ballroom, folk, pop, oriental, etc.).
- Scene – place of performance (assembly hall, street playground, television studio, etc.).
- Number of dancers – mass, solo, pair.
- Music – a type of musical accompaniment (phonogram, "live" music). • Dancers (there must be several) – name or name of the team, age, how many years of practice, etc.
- Number – what number is in the program. The root element is called Dance.

15. Old postcards.

- Thema – theme of the image (cityscape, nature, people, religion, sports, architecture...).
- Type – type of postcard (greeting, advertising, ordinary). Was it sent?
- Country – country of production.
- Year – year of publication.
- Author – the name of the author(s). If known.
- Valuable – historical, collectible or thematic value. The root element is called Old Card.

16. Bank deposits.

- Name – name of the bank
- Country – country of registration.
- Type – type of deposit (on demand, urgent, settlement, accumulative, savings, metal).

- Depositor – the name of the depositor.
- Account id – account number.
- Amount on deposit – deposit amount.
- Profitability – annual percentage.
- Time constraints – term of deposit. Name the root element Bank