

## Podstawy XML i XML Schema

### Ćwiczenie 1: Podstawy XML i XML Schema - sprawozdanie

Imię, nazwisko, nr indeksu:

W tabeli należy umieścić zrzuty ekranu zgodnie z zaleceniami zawartymi w instrukcji ćwiczenia

### Punkt 3

The screenshot shows a Visual Studio Code editor with an XML file named HH0.xml. The XML content is as follows:

```
<?xml version="1.0" encoding="utf-8"?>
<course>
  <author>
    [REDACTED]
  </author>
  <classes kind="lecture">
    <component id="1">
      <topic>Hypertext and hypermedia</topic>
      <theme>Hypertext & hypermedia</theme>
      <theme>HTML CSS</theme>
      <theme>XML</theme>
      <theme>XML Schema</theme>
      <theme>DTD</theme>
      <theme>XSLT</theme>
      <score>30</score>
    </component>
  </classes>
  <classes kind="laboratory" obligatory="yes">
    <component id="1">
      <topic>HTML + CSS</topic>
      <theme>structure of the page</theme>
      <theme>links</theme>
      <theme>forms</theme>
      <theme>css</theme>
      <score>10</score>
    </component>
    <component id="2">
      <topic>XML + XML Schema</topic>
      <theme>correctly formed XML file</theme>
      <theme>creating a hierarchy</theme>
      <theme>declaring elements, attributes</theme>
      <theme>defining types</theme>
      <theme>validating XML file</theme>
      <score>10</score>
    </component>
    <component id="3">
      <topic>XSLT</topic>
      <theme>XML -> HTML transformation</theme>
      <theme>XML -> XML transformation</theme>
      <score>10</score>
    </component>
  </classes>
  <classes kind="project">
    <component id="1">
      <topic>HTML, XML, XSLT</topic>
      <score>20</score>
    </component>
    <component id="2">
      <topic>XML, XML Schema, DTD</topic>
    </component>
  </classes>

```

The XML file is being validated using the CoreFiling XML Schema Validator. The results show the following errors:

TYPE	LOC	MESSAGE
Validation	3, 10	cvc-complex-type.2.4.a: Invalid content was found starting with element 'author'. One of '{classes, information}' is expected.
Validation	7, 26	cvc-complex-type.3.2.2: Attribute 'kind' is not allowed to appear in element 'classes'.
Validation	8, 21	cvc-complex-type.3.2.2: Attribute 'id' is not allowed to appear in element 'component'.

The validator also displays a message: "We use cookies to ensure that we give you the best experience on our website. By continuing to use this site, you agree that you are happy for us to do so." with an "OK" button.

## HTML5 Canvas WebGL

HH0.xml

```
HH2 > HH2 POPRAWNY > HH0.xml
30 <theme>correctly formed XML file</theme>
31 <theme>creating a hierarchy</theme>
32 <theme>declaring elements, attributes</theme>
33 <theme>defining types</theme>
34 <theme>validating XML file</theme>
35 <score>10</score>
36 </component>
37 <component id="3">
38 <topic>XSLT</topic>
39 <theme>XML -> HTML transformation</theme>
40 <theme>XML -> XML transformation</theme>
41 <score>10</score>
42 </component>
43 </classes>
44 <classes kind="project"><!--BLAD-->
45 <component id="1">
46 <topic>HTML, XML, XSLT</topic>
47 <score>20</score>
48 </component>
49 <component id="2">
50 <topic>XML, XML Schema, DTD</topic>
51 <score>20</score>
52 </component>
53 </classes>
54 <information>
55 <facts about="hypertext and hypermedia">
56 <author>
57 <name>Jakob</name>
58 <surname>Nielsen</surname>
59 </author>
60 <title>Multimedia and Hypertext: The Internet and Beyond</title>
61 <text>
62 Vannevar Bush (1890-1974) is normally considered the "grandfather" of hyper
63 <subtitle>Hypertext, in other words!</subtitle>
64 In addition to the establishment of individual links, Bush wanted the Memes
65 </text>
66 </facts><!--BLAD-->
67 <links>
68 <link source="https://www.w3schools.com/html/">HTML w3schools</link>
69 <link source="https://www.w3schools.com/xml/default.asp">XML w3schools</link>
70 <link source="https://enauczanie.pg.edu.pl/moodle/">Moodle</link>
71 </links>
72 <media>
73 <image source="img/Vannevar-Bush.jpg">Vannevar Bush</image><!--BLAD-->
74 </media>
75 </information>
76 </course>
```

Online XML schema validator - CoreFiling

https://www.corefiling.com/opensource/schemaValidate/

### CoreFiling XML Schema Validator

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: INVALID

The following errors were found:

TYPE	LOC	MESSAGE
Validation	3, 10	cvc-complex-type.2.4.a: Invalid content was found starting with element 'author'. One of '{classes, information}' is expected.
Validation	7, 26	cvc-complex-type.3.2.2: Attribute 'kind' is not allowed to appear in element 'classes'.
Validation	8, 21	cvc-complex-type.3.2.2: Attribute 'id' is not allowed to appear in element 'component'.

We use cookies to ensure that we give you the best experience on our website. By continuing to use this site, you agree that you are happy for us to do so.

OK

# Punkt 6

The screenshot shows a development environment with Visual Studio Code and a web browser. In Visual Studio Code, two XML files are open: HH.xsd and HH.xml. HH.xsd defines an XML schema for a course, including complex types for 'course', 'classesType', 'componentType', 'informationType', and 'factsType'. HH.xml is an instance of this schema, containing an 'author' element, a 'classes' element with a 'component' child, and an 'information' element. The 'author' element in HH.xml is highlighted with a red box, and its content is being edited in the browser's online XML schema validator. The browser window shows the 'CoreFiling XML Schema Validator' website, which reports that the XML is 'Well Formed: VALID' and 'Schema Validation: VALID'. The taskbar at the bottom shows various open applications, including a search bar, a PDF viewer, and the online XML schema validator.

HH.xsd

```

1 <?xml version="1.0"?>
2 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
3   <xs:element name="course">
4     <xs:complexType>
5       <xs:sequence>
6         <xs:element name="author" />
7         <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
8         <xs:element name="information" type="informationType" />
9       </xs:sequence>
10    </xs:complexType>
11  </xs:element>
12
13  <xs:complexType name="classesType">
14    <xs:sequence>
15      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
16    </xs:sequence>
17  </xs:complexType>
18
19  <xs:complexType name="componentType">
20    <xs:sequence>
21      <xs:element name="topic" type="xs:string" />
22      <xs:element name="theme" type="xs:string" minOccurs="0" maxOccurs="unbounded" />
23    </xs:sequence>
24  </xs:complexType>
25
26  <xs:complexType name="informationType">
27    <xs:sequence>
28      <xs:element name="facts" type="factsType" />
29    </xs:sequence>
30  </xs:complexType>
31
32  <xs:complexType name="factsType">
33    <xs:sequence>
34      <xs:element ref="author" />
35      <xs:element name="title" type="xs:string" />
36      <xs:element name="text" type="xs:string" />
37    </xs:sequence>
38    <xs:attribute name="about" type="xs:string" />
39  </xs:complexType>
40
41  <xs:element name="author" type="authorType" />
42
43  <xs:complexType name="authorType">
44    <xs:sequence>
45      <xs:element name="name" type="xs:string" />
46      <xs:element name="surname" type="xs:string" />
47    </xs:sequence>
48  </xs:complexType>
49
50 </xs:schema>

```

HH.xml

```

1 <?xml version="1.0" encoding="utf-8"?>
2 <course xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3   xsi:noNamespaceSchemaLocation="HH.xsd">
4   <author>
5     [redacted]
6   </author>
7   <classes>
8     <component>
9       <topic>Hypertext & hypermedia</topic>
10      <theme>Hypertext & hypermedia</theme>
11      <theme>HTML CSS</theme>
12      <theme>XML</theme>
13      <theme>XML Schema</theme>
14      <theme>DTD</theme>
15      <theme>XSLT</theme>
16    </component>
17  </classes>
18  <information>

```

Online XML schema validator - x +

https://www.corefiling.com/opensource/schemaValidate/

CoreFiling XML Schema Validator

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: VALID

[Validate another document](#)

# Punkt 9

The screenshot shows a Visual Studio Code workspace with two XML files: HH.xsd (schema) and HH.xml (instance). The HH.xsd file defines a schema for a course, including elements like author, classes, and component. The HH.xml file is an instance of this schema, containing a single component with a score of 30. A browser window in the foreground shows the CoreFiling XML Schema Validator, which has validated the schema and instance successfully.

**HH.xsd (Schema):**

```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="information" type="informationType" />
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="classesType">
    <xs:sequence>
      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="componentType">
    <xs:sequence>
      <xs:element name="topic" type="xs:string" />
      <xs:element name="theme" type="xs:string" minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="score" type="xs:decimal" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:byte" />
  </xs:complexType>

  <xs:complexType name="informationType">
    <xs:sequence>
      <xs:element name="facts" type="factsType" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="factsType">
    <xs:sequence>
      <xs:element ref="author" />
      <xs:element name="title" type="xs:string" />
      <xs:element name="text" type="xs:string" />
    </xs:sequence>
    <xs:attribute name="about" type="xs:string" />
  </xs:complexType>

  <xs:element name="author" type="authorType" />

  <xs:complexType name="authorType">
    <xs:sequence>
      <xs:element name="name" type="xs:string" />
      <xs:element name="surname" type="xs:string" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

**HH.xml (Instance):**

```
<?xml version="1.0" encoding="utf-8"?>
<course xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="HH.xsd">
  <author>
    <name>[REDACTED]</name>
    <surname>[REDACTED]</surname>
  </author>
  <classes>
    <component id="1">
      <topic>Hypertext & hypermedia</topic>
      <theme>Hypertext & hypermedia</theme>
      <theme>HTML CSS</theme>
      <theme>XML</theme>
      <theme>XML Schema</theme>
      <theme>DTD</theme>
      <theme>XSLT</theme>
      <score>30</score>
    </component>
  </classes>
</course>
```

**Online XML schema validator - CoreFiling XML Schema Validator**  
 Version: 1.2.0.r278285  
 Well Formed: VALID  
 Schema Validation: VALID  
[Validate another document](#)

# Punkt 11

The image shows a development environment with Visual Studio Code and a web browser. The Visual Studio Code editor displays an XML schema file named HH.xsd. The schema defines several complex types and elements. Key elements include:

- ComponentType**: A complex type containing a sequence of `topic` (string), `theme` (string, minOccurs=0, maxOccurs=unbounded), and `score` (decimal), plus an `id` attribute (byte).
- InformationType**: A complex type containing a sequence of `facts` (factsType) and `links` (linksType).
- linkType**: A complex type containing a simple content that extends from `xs:string` with an attribute `source` of type `xs:anyURI`.
- factsType**: A complex type containing a sequence of `author` (authorType), `title` (string), and `text` (string), plus an `about` attribute (string).
- authorType**: A complex type containing a sequence of `name` (string) and `surname` (string).
- linksType**: A complex type containing a sequence of `link` (linkType).

The browser window shows the CoreFiling XML Schema Validator (Version: 1.2.0.r278285). It reports that the XML document is "Well Formed: VALID" and "Schema Validation: VALID". The sample XML document is as follows:

```
<author>
  <name>Jakob</name>
  <surname>Nielsen</surname>
</author>
<title>Multimedia and Hypertext: The Internet and Beyond</title>
<text>
  Vannevar Bush (1890-1974) is normally considered the "grandfather" of hypertext, since he
  Hypertext, in other words!
  In addition to the establishment of individual links, Bush wanted the Memex to support
</text>
</facts>
<links>
  <link source="https://www.w3schools.com/html/">HTML w3schools</link>
  <link source="https://www.w3schools.com/xml/default.asp">XML w3schools</link>
  <link source="https://enauczanie.pg.edu.pl/moodle/">Moodle</link>
</links>
</information>
</course>
```

# Punkt 14

The screenshot shows a Visual Studio Code workspace with two main components: an XML schema file (HH.xsd) on the left and its validation results on the right.

**XML Schema (HH.xsd):**

```

<xs:sequence>
  <xs:element name="topic" type="xs:string" />
  <xs:element name="theme" type="xs:string" minOccurs="0" maxOccurs="unbounded" />
  <xs:element name="score" type="xs:decimal" />
</xs:sequence>
<xs:attribute name="id" type="xs:byte" />
</xs:complexType>

<xs:complexType name="informationType">
  <xs:sequence>
    <xs:element name="facts" type="factsType" />
    <xs:element name="links" type="linksType" />
    <xs:element name="media" type="mediaType" />
  </xs:sequence>
</xs:complexType>

<xs:complexType name="factsType">
  <xs:sequence>
    <xs:element ref="author" />
    <xs:element name="title" type="xs:string" />
    <xs:element name="text" type="xs:string" />
  </xs:sequence>
  <xs:attribute name="about" type="xs:string" />
</xs:complexType>

<xs:element name="link" type="linkType" />

<xs:complexType name="linksType">
  <xs:sequence>
    <xs:element ref="link" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
</xs:complexType>

<xs:complexType name="linkType">
  <xs:simpleContent>
    <xs:extension base="xs:string">
      <xs:attribute name="source" type="xs:anyURI" />
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>

<xs:element name="image" type="linkType" />

<xs:complexType name="mediaType">
  <xs:sequence>
    <xs:element ref="image" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
</xs:complexType>

<xs:element name="author" type="authorType" />

```

**Validation Results (CoreFiling XML Schema Validator):**

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: VALID

[Validate another document](#)

The validation results show that the XML document is well-formed and valid against the schema. The document content is displayed below the validation results:

```

<author>
  <name>Jakob</name>
  <surname>Nielsen</surname>
</author>
<title>Multimedia and Hypertext: The Internet and Beyond</title>
<text>
  Vannevar Bush (1890-1974) is normally considered the "grandfather" of hypertext, since he
  first proposed the concept of hypertext, in other words!
  In addition to the establishment of individual links, Bush wanted the Memex to support
  the concept of "associative searching".
</text>
</facts>
<links>
  <link source="https://www.w3schools.com/html/">HTML w3schools</link>
  <link source="https://www.w3schools.com/xml/default.asp">XML w3schools</link>
  <link source="https://enauczenie.pg.edu.pl/moodle/">Moodle</link>
</links>
<media>
  <image source="img/Vannevar-Bush.jpg">Vannevar Bush</image>
</media>
</information>
</course>

```

## HTML5 Canvas WebGL

The image shows a Visual Studio Code editor with two XML schema files open. The left pane shows `HH.xsd` and the right pane shows `HH.xml`. A third window, "Online XML schema validator", is open in the foreground, displaying the "CoreFiling XML Schema Validator" interface. The validator shows the URL `https://www.corefiling.com/opensource/schemaValidate/` and reports "Well Formed: VALID" and "Schema Validation: VALID".

**HH.xsd (Left Pane):**

```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="information" type="informationType"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="classesType">
    <xs:sequence>
      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="componentType">
    <xs:sequence>
      <xs:element name="topic" type="xs:string" />
      <xs:element name="theme" type="shortStringType" minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="score" type="xs:decimal" />
    </xs:sequence>
  </xs:complexType>

  <xs:element name="id" type="xs:byte" />

  <xs:simpleType name="shortStringType">
    <xs:restriction base="xs:string">
      <xs:maxLength value="30" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="longStringType">
    <xs:restriction base="xs:string">
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="authorType">
    <xs:sequence>
      <xs:element name="name" type="shortStringType" />
      <xs:element name="surname" type="longStringType" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

**HH.xml (Right Pane):**

```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="information" type="informationType"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="classesType">
    <xs:sequence>
      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="componentType">
    <xs:sequence>
      <xs:element name="topic" type="xs:string" />
      <xs:element name="theme" type="shortStringType" minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="score" type="xs:decimal" />
    </xs:sequence>
  </xs:complexType>

  <xs:element name="id" type="xs:byte" />

  <xs:simpleType name="shortStringType">
    <xs:restriction base="xs:string">
      <xs:maxLength value="30" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="longStringType">
    <xs:restriction base="xs:string">
      <xs:maxLength value="50" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="authorType">
    <xs:sequence>
      <xs:element name="name" type="shortStringType" />
      <xs:element name="surname" type="longStringType" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

**Online XML schema validator (Foreground Window):**

CoreFiling XML Schema Validator  
Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: VALID

[Validate another document](#)



## Punkt 16

The image shows a development environment with two main windows. The left window is Visual Studio Code, displaying an XML schema file named HH.xsd. The schema defines several complex types: 'classesType', 'componentType', 'informationType', 'textType' (mixed), 'factsType', and 'linksType'. The 'textType' is highlighted with a red box, showing it is a mixed type containing a 'subtitle' element. The 'factsType' is also highlighted, showing it contains an 'author' element, a 'title' element, a 'text' element (which is of type 'textType'), and an 'about' attribute. The 'linksType' is also highlighted, showing it contains a sequence of 'link' elements. The right window is a web browser showing the CoreFiling XML Schema Validator interface. The validator reports that the schema is 'Well Formed: VALID' and 'Schema Validation: VALID'. Below the browser, an XML document (HH.xml) is shown, containing an <author> element with <name>Jakob</name> and <surname>Nielsen</surname>, and an <information> element with <title>Multimedia and Hypertext: The Internet and Beyond</title>, <text> containing a paragraph about Vannevar Bush, <links> with three links, and <media> with an image source.



## Punkt 19

The screenshot shows a Visual Studio Code workspace with two XML files: HH.xsd (schema) and HH.xml (instance). The HH.xsd file defines a schema for a course, including elements like author, classes, and component. The HH.xml file is an instance of this schema, containing a <classes> element with a <component> element. A red box highlights the <classes kind="lecture"> element in HH.xml. Another red box highlights the <classes kind="laboratory" obligatory="yes"> element in HH.xml, with a red note "obligatory jeszcze nie jest zdefiniowane" (obligatory is not yet defined) next to it. A third red box highlights the <classes kind="project"> element in HH.xml. In the foreground, an online XML schema validator is open, showing the error: "cvc-complex-type.3.2.2: Attribute 'obligatory' element 'classes'".

HH.xsd

```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="information" type="informationType"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="classesType">
    <xs:sequence>
      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute ref="kind" use="required" />
  </xs:complexType>

  <xs:attribute name="kind" type="kindType" />
  <xs:simpleType name="kindType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="lecture" />
      <xs:enumeration value="laboratory" />
      <xs:enumeration value="project" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="componentType">
    <xs:sequence>
      <xs:element name="topic" type="xs:string" />
      <xs:element name="theme" type="shortStringType" minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="score" type="xs:decimal" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:byte" />
  </xs:complexType>

  <xs:complexType name="informationType">
    <xs:sequence>
      <xs:element name="facts" type="factsType" />
      <xs:element name="links" type="linksType" />
      <xs:element name="media" type="mediaType" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="textType" mixed="true">
    <xs:sequence>
      <xs:element name="subtitle" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

HH.xml

```
<?xml version="1.0" xsi:noNamespaceSchemaLocation="HH.xsd">
  <course>
    <author>
      <name>John Doe</name>
    </author>
    <classes kind="lecture">
      <component id="1">
        <topic>Hypertext & hypermedia</topic>
        <theme>Hypertext & hypermedia</theme>
        <theme>HTML CSS</theme>
        <theme>XML</theme>
        <theme>XML Schema</theme>
        <theme>DTD</theme>
        <theme>XSLT</theme>
        <score>30</score>
      </component>
    </classes>
    <classes kind="laboratory" obligatory="yes">
      <component id="1">
        <topic>HTML + CSS</topic>
        <theme>structure of the page</theme>
        <theme>links</theme>
        <theme>forms</theme>
        <theme>css</theme>
        <score>10</score>
      </component>
    </classes>
    <classes kind="project">
      <component id="1">
        <topic>HTML, XML, XSLT</topic>
        <score>20</score>
      </component>
    </classes>
    <information>
      <facts>
        <fact>XML is a markup language</fact>
      </facts>
      <links>
        <link>http://www.xml.org</link>
      </links>
      <media>
        <media>XML Schema</media>
      </media>
    </information>
    <text>
      <subtitle>XML Schema</subtitle>
    </text>
  </course>
</xml>
```

Online XML schema validator - CoreFiling XML Schema Validator

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: INVALID

The following errors were found:

TYPE	LOC	MESSAGE
Validation	20, 46	cvc-complex-type.3.2.2: Attribute 'obligatory' element 'classes'.

Validate another document

## Punkt 21

The image shows a Visual Studio Code workspace with two XML files: HH.xsd and HH.xml. The HH.xsd file defines an XML Schema for a course, and the HH.xml file contains an instance of the schema. A browser window in the foreground shows the CoreFiling XML Schema Validator results.

**HH.xsd (XML Schema):**

```
<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="information" type="informationType"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="classesType">
    <xs:sequence>
      <xs:element name="component" type="componentType" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute ref="kind" use="required" />
    <xs:attribute name="obligatory" type="obligatoryType" />
  </xs:complexType>

  <xs:simpleType name="obligatoryType">
    <xs:restriction base="xs:string">
      <xs:pattern value="yes|no" />
    </xs:restriction>
  </xs:simpleType>

  <xs:attribute name="kind" type="kindType" />
  <xs:simpleType name="kindType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="lecture" />
      <xs:enumeration value="laboratory" />
      <xs:enumeration value="project" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="componentType">
    <xs:sequence>
      <xs:element name="topic" type="xs:string" />
      <xs:element name="theme" type="shortStringType" minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="score" type="xs:decimal" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:byte" />
  </xs:complexType>

  <xs:complexType name="informationType">
    <xs:sequence>
      <xs:element name="facts" type="factsType" />
      <xs:element name="links" type="linksType" />
      <xs:element name="media" type="mediaType" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

**HH.xml (XML Instance):**

```
<?xml version="1.0" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:noNamespaceSchemaLocation="HH.xsd">
  <course>
    <author>
      <name>
        <value>
        </value>
      </name>
    </author>
    <classes kind="lecture">
      <component id="1">
        <topic>Hypertext & hypermedia</topic>
        <theme>Hypertext & hypermedia</theme>
        <theme>HTML CSS</theme>
        <theme>XML</theme>
        <theme>XML Schema</theme>
        <theme>DTD</theme>
        <theme>XSLT</theme>
        <score>30</score>
      </component>
    </classes>
    <classes kind="laboratory" obligatory="yes">
      <component id="1">
        <topic>HTML + CSS</topic>
        <theme>structure of the page</theme>
        <theme>links</theme>
        <theme>forms</theme>
        <theme>css</theme>
        <score>10</score>
      </component>
      <component id="2">
        <topic>XML + XML Schema</topic>
        <theme>correctly formed XML file</theme>
        <theme>creating a hierarchy</theme>
        <theme>declaring elements, attributes</theme>
        <theme>defining types</theme>
        <theme>validating XML file</theme>
        <score>10</score>
      </component>
      <component id="3">
        <topic>XSLT</topic>
        <theme>XML -> HTML transformation</theme>
        <theme>XML -> XML transformation</theme>
        <score>10</score>
      </component>
    </classes>
    <classes kind="project">
      <component id="1">
        <topic>HTML, XML, XSLT</topic>
        <score>20</score>
      </component>
      <component id="2">
        <topic>XML, XML Schema, DTD</topic>
        <score>20</score>
      </component>
    </classes>
  </course>
```

**CoreFiling XML Schema Validator Results:**

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: VALID

[Validate another document](#)

# Punkt 23

The screenshot displays a Visual Studio Code workspace with two main windows. The left window shows the XML schema file 'HH.xsd' with several sections highlighted in red boxes. The right window shows the 'CoreFiling XML Schema Validator' web application, which has validated the schema and returned 'Well Formed: VALID' and 'Schema Validation: VALID'.

**XML Schema (HH.xsd) Snippets:**

```

<?xml version="1.0"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:element name="course">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="author" />
        <xs:element name="classes" type="classesType" minOccurs="0" maxOccurs="unbounded" />
        <xs:element name="groups" type="groupsType" minOccurs="0" maxOccurs="1" />
        <xs:element name="information" type="informationType"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:complexType name="groupsType">
    <xs:sequence>
      <xs:element name="podzial" type="podzialType" minOccurs="0" maxOccurs="3" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="podzialType">
    <xs:sequence>
      <xs:element name="wychowawca" minOccurs="0" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:maxLength value="100" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="iloscOsob" type="mojTyp" />
      <xs:element name="profil" type="profilType" />
    </xs:sequence>
    <xs:attribute name="numerGrupy" type="xs:byte" />
  </xs:complexType>

  <xs:complexType name="profilType">
    <xs:choice>
      <xs:element name="informatycy" type="xs:string" />
      <xs:element name="teleinformatycy" type="xs:string" />
    </xs:choice>
  </xs:complexType>

  <xs:simpleType name="mojTyp">
    <xs:restriction base="xs:decimal">
      <xs:minExclusive value="1" />
      <xs:maxExclusive value="30" />
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="classesType">
    <xs:sequence>

```

**CoreFiling XML Schema Validator Results:**

Version: 1.2.0.r278285

Well Formed: VALID  
Schema Validation: VALID

[Validate another document](#)

**XML Document Snippet (HH.xml):**

```

<groups>
  <podzial numerGrupy="1">
    <iloscOsob>29</iloscOsob>
    <profil>
      <teleinformatycy>teleinformatycy</teleinformatycy>
    </profil>
  </podzial>
  <podzial>
    <wychowawca>Daniel Karnicki</wychowawca>
    <iloscOsob>15</iloscOsob>
    <profil>
      <informatycy>informatycy</informatycy>
    </profil>
  </podzial>
  <podzial>
    <iloscOsob>21</iloscOsob>
    <profil>
      <teleinformatycy>teleinformatycy</teleinformatycy>
    </profil>
  </podzial>
</groups>

<information>
  <facts about="hypertext and hypermedia">
    <author>
      <name>Jakob</name>
      <surname>Nielsen</surname>
    </author>
  </facts>
</information>

```

The bottom of the screen shows a Windows taskbar with the date and time: 17:33:00, poniedziałek, 9 listopada 2020.

## HTML5 Canvas WebGL