

Exercise 1: To which category or categories of the web applications belongs “Klips” <https://klips.uni-koblenz-landau.de/>. (1 points)

- Interactive (it is possible to create your own timetable);
- Transactional (you update the internal database by registering to a course or exam and the system know how many students have registered);
- Portal oriented (uni-Koblenz student community portal).

Exercise 2: What are the differences between Dom and SAX parsers?
Please explain (2 differences). (2 points)

1. DOM creates a tree model, SAX doesn't.
2. SAX allows you to work with a little RAM, while DOM can have problems with RAM while parsing large documents.
3. SAX allows you to sort out the data, that is useless for you. DOM will load whole data regardless.
4. With SAX you need to do a lot more book-keeping yourself, depending on what data you need to extract and how complicated the XML structure is.
5. With SAX you naturally cannot modify the structure of the XML tree, because you never have it in hand as a whole.
6. SAX reads the XML file from top to bottom and backward navigation is not possible. With DOM backward and forward search is possible for searching the tags and evaluation of the information inside the tags. So this gives the ease of navigation.

Exercise 3: Provide the sequence of events that would be handled when parsing the XML document below using a SAX parser. (3 points).

```
<?xml version="1.0"?>
<note id="1.0">
  <to>John</to>
  <from>Jenny</from>
  <heading>Reminder</heading>
  <body>Don't <b>forget</b> our meeting!</body>
</note>
```

```
startDocument
startElement note
attribute (id, 1.0)
startElement to
characters John
endElement to
startElement from
characters Jenny
endElement from
startElement heading
characters Reminder
endElement heading
startElement body
characters Don't
startElement b
characters forget
endElement b
characters our meeting!
endElement body
endElement note
endDocument
```

Exercise 4: Provide a DTD for a XML document, which describes a student semester plan. Express the following rules in DTD.

A student semester plan contains:

- The personal information of the student, namely name, family, birthday (provided as day, month, year), and address (provided as street, number, code, city).
- The educational information, namely semester (mandatory), and field of study (optional).
- The registered course(s) and their relevant information, namely name of the course, time, and room.