1. Complete DTD
2. Class worksheet – DTD
3. XPath rehearsal
4. Class worksheet – XPath
5. Intro to RDF
6. Home reading: rdf slides 33-63, 75-83
   + משאל המרצה והמתרגל
Question 1(a)

Show a valid XML document with a minimal number of elements.

```xml
<!DOCTYPE A [
  <!ELEMENT A ((B+)|(E,F?))>
  <!ATTLIST A ref IDREF #REQUIRED>
  <!ELEMENT B EMPTY>
    <!ATTLIST B serial CDATA #REQUIRED>
      ref CDATA #IMPLIED>
  <!ELEMENT E (A)>    <!ELEMENT F EMPTY>
  <!ATTLIST E ref CDATA #IMPLIED>
  <!ATTLIST F serial ID #REQUIRED>
       ref IDREF #REQUIRED>
]

<A ref="a">
  <E>
    <A ref="a"> <B serial="b"/> </A>
  </E>
</A>
```
• Prove that the XPath query //A[B] returns a nonempty result on every valid XML document.

• Proof:
  – The root is of type A
  – An A element has either at least one B child, or an E child and, hence, an A grandchild
  – Therefore, at least one A should have a B child, or otherwise the XML document is infinite

```xml
<!DOCTYPE A [ 
  <!ELEMENT A ((B+)|(E,F?))> 
  <!ATTLIST A ref IDREF #REQUIRED>
  <!ELEMENT B EMPTY> 
  <!ATTLIST B serial CDATA #REQUIRED 
    ref CDATA #IMPLIED> 
  <!ELEMENT E (A)> 
  <!ELEMENT F EMPTY> 
  <!ATTLIST F serial ID #REQUIRED 
    ref IDREF #REQUIRED> ]>
```
Write down an XPath query that returns elements of type F that are referenced (via the “ref” attribute) by elements of type B.

```
//F[@serial = //B/@ref]
```
Question 1 (d)

Change the XML document of (a) so that the XPath of (c) returns at least 2 elements.

```xml
<!DOCTYPE A [  
  <!ELEMENT A ((B+)|(E,F?))>  
  <!ATTLIST A   ref    IDREF    #REQUIRED>  
  <!ELEMENT B EMPTY>  
  <!ATTLIST B serial CDATA #REQUIRED  
                      ref   CDATA #IMPLIED>  
  <!ELEMENT E (A)>  
  <!ELEMENT F EMPTY>  
  <!ATTLIST F serial ID #REQUIRED  
                      ref    IDREF #REQUIRED>  
]>  

<A ref="a">  
  <E>  
    <A ref="a">  
      <E>  
        <A ref="a">  
          <B serial="b1" ref="a"/>  
          <B serial="b2" ref="c"/>  
        </A>  
      </E>  
    </A>  
  </E>  
  <F serial="a" ref="a"/>  
</A>  
</E>  
<F serial="c" ref="a"/>  
</A>
```