
**Question 1** (10%) Write the DTD for the XML document shown.

**Question 2** (60%) Using DTD of Fig. 23.16 of text, write the following queries in XQuery:
(a) List all books authored by Ullman.
(b) List articles published in Vol. 32 No. 2 of ACM Transactions on Database Systems.
(c) List journals that published an article on XML in 2001 (that is, “XML” appears in the title of the article).
(d) List authors that have published a book in 2001 and another book in 2003.
(e) List publishers, and for each publisher list the books they have published as subelements. Choose appropriate tags for your output.
(f) List every author, and for each author list the number of articles he/she published in 2001. Choose appropriate tags for your output.

**Question 3** (20%) Answer Question 23.1 of text.

**Question 4** (10%) Using your DTD of Question 1, write a query to list all majors, and for each major list the id’s of students in that major. Then for students whose major is not listed, list a major “undecided” and list the id’s of these students below it. Choose appropriate tags for your output.

10% of the assignment mark is for typesetting/typing
<?xml version="1.0"?>
<univ1>
  <student>
    <id>100</id>
    <fname>Ab</fname>
    <lname>Al</lname>
    <major>CSC</major>
    <classes>
      <course>
        <cno>529</cno>
        <title>AI</title>
        <creditHours>3</creditHours>
      </course>
    </classes>
  </student>
  <student>
    <id>200</id>
    <fname>Jo</fname>
    <lname>Bri</lname>
    <major>MAT</major>
  </student>
  <student>
    <id>400</id>
    <classes>
      <course>
        <cno>698</cno>
        <title>Proj</title>
        <creditHours>3</creditHours>
      </course>
    </classes>
  </student>
  <student>
    <id>500</id>
    <classes>
      <course>
        <cno>698</cno>
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        <creditHours>3</creditHours>
      </course>
      <course>
        <cno>529</cno>
        <title>AI</title>
        <creditHours>3</creditHours>
      </course>
    </classes>
  </student>
</univ1>