School of Information Technology
Department of Computer Science

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COS326 Database Systems:
Practical 5 2024

Release Date: 01 September 2024
Submission Date: 08 September 2024
Lecturer: Mr S.M Makura

Total: 50 Marks

Objectives

In this practical you will use BaseX to execute XQuery queries on XML data. As you know, XQuery uses Xpath and FLWOR expressions. The objectives of this practical are to learn how to query data in an XML database and appreciate the difference between structured and semi-structured data.

Submission Procedure:

When you are done:

1. You must submit the file named:
   a. **XQueries.txt which** contains all your queries.
   b. Compress the above document into an archive and upload it to the ClickUP link for practical submissions **before** the due date/time. The file name for the archive must have your student number as part of the file name, e.g. ***uXXXXXXXX.zip*** (*XXXXXXXX is your student number).*

Preparation

For this practical exercise, you will use the BaseX XML database software to execute XQuery queries on XML data. The BaseX software version that you will be using is BaseX 11.2. It can be downloaded from http://www.basex.org . You will also find documentation and a demo section at the URL.

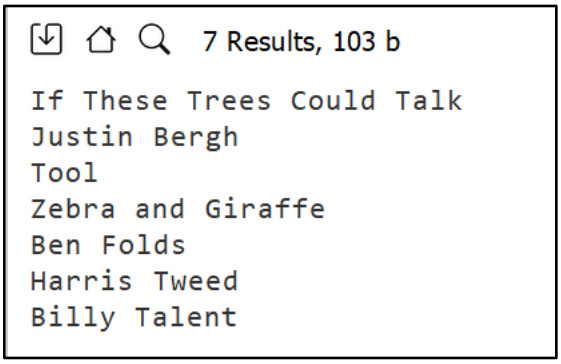
If you need more information on XPath and XQuery you can visit the http://www.w3schools.com website.

You are provided with the *Musicians.xml* file. Use BaseX to create a new database for the *Musicians.xml* file and write XQuery queries for the tasks listed below.

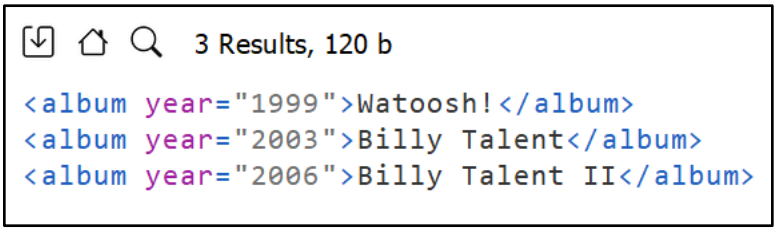
Task 1: XPath Expressions

(**Note:** you are supposed to write XPath expressions **only** here)

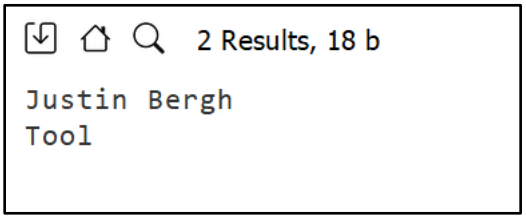
Question 1: List the names of all the musicians in the database. [3 Marks]
Expected output:



Question 2: For a specific musician, list the album names and their years. [3 Marks]
Expected output (for Billy Talent):

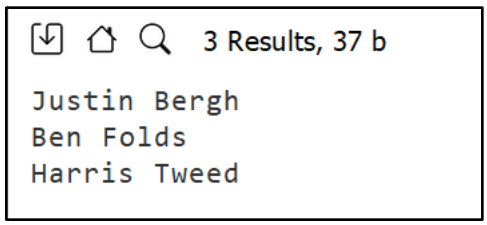


Question 3: List the names of all musicians who have released an album titled "Lateralus". [5 Marks]
Expected output:

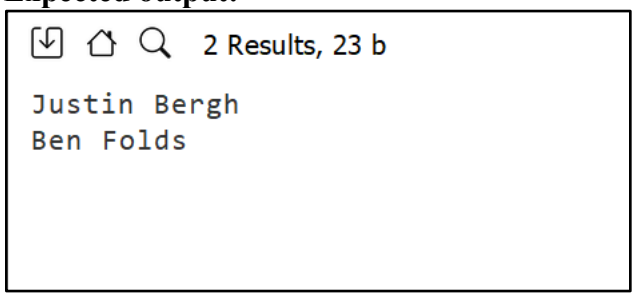


Question 4: List all musicians who have the word "Pop" anywhere in their genre. [5 Marks]

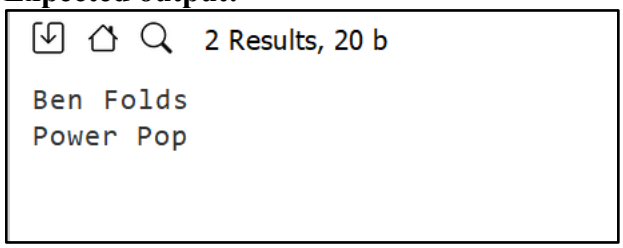
Expected output:



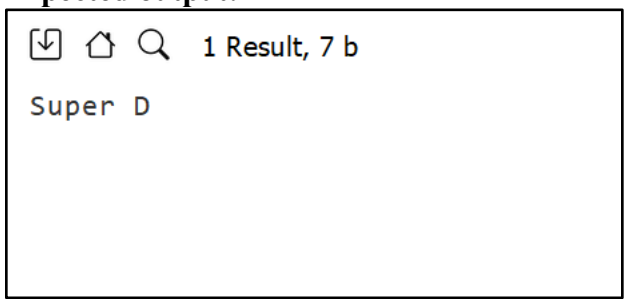
Question 5: List all the solo musicians. [5 Marks]
Expected output:



Question 6: Show the name and genre of the second solo musician. [5 Marks]
Expected output:

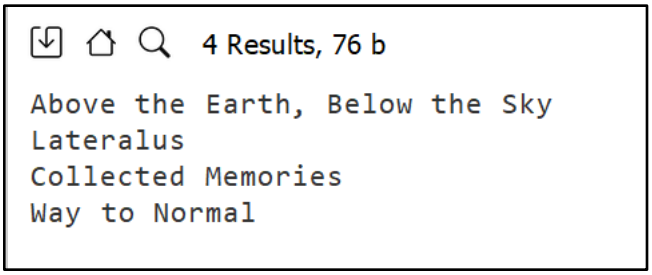


Question 7: Display the fourth album by the musician "Ben Folds". [5 Marks]
Expected output:



Question 8: List the names of albums that were released in 2008 or later. [5 Marks]

Expected output:



Task 2: FLWOR Expressions

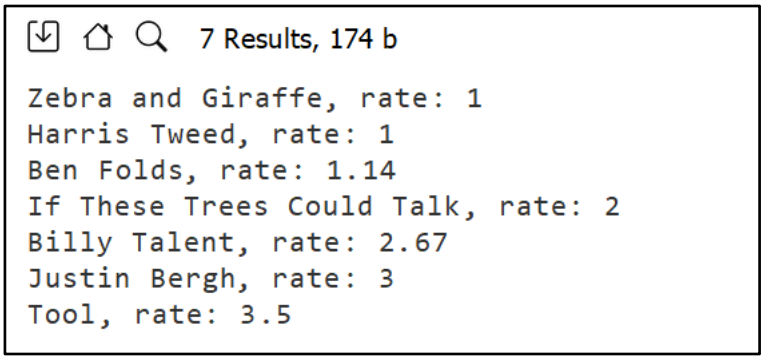
(**Note:** you are supposed to write FLWOR expressions **only** here)

Question 9:

Write a FLWOR query to determine the rate at which a specific musician produces albums. List all the musician names and their corresponding rates, ordering the results from the most frequent to the least frequent. For example, assume that a specific artist has released three albums in 2001, 2002 and 2004. To calculate the rate, divide the difference in years between the first and last album by the number of albums. The calculation for this example is then: (2004-2001+1)/3 = 1.3 years. Make sure that each artist is displayed on a new line.

[10 Marks]

Expected output:



Question 10

Design an interesting FLWOR query of your choice for the Musicians database. Marks will be awarded based on the level of interestingness and usefulness. [4 marks]