

1. (6 points) Of the following statements, identify all that hold about XML.

- A. XML is valuable for e-business because it provides the desired level of conceptual modeling needed in e-business

Solution: A is false: XML doesn't offer conceptual modeling as such

- B. XML has a natural match with messaging middleware but can be effectively used even without messaging middleware

Solution: B is true:

- C. The XML Schema instance namespace offers some essential terms (elements or attributes) to be used within a schema-compliant XML document

Solution: C is true:

2. (6 points) Of the following statements, identify all that hold about names, identifiers, and namespaces.

- A. The main prerequisite for a unique identifier scheme is the existence of an architecture by which identifiers can be resolved

Solution: A is false: an identifier scheme requires only social agreement, not an architecture; unlike locations, identifiers don't need to be resolved as such

- B. A URL is simply a URI for which a resource exists

Solution: B is false: a URL purports to specify a resource location (based on a scheme that corresponds to an architecture for resolving said scheme) but many URLs fail to help locate resources; the existence or otherwise of a resource is irrelevant—what matters is there is an architecture for resolving it

- C. A URL of the http scheme for which the expected resource doesn't exist can still be a viable URI

Solution: C is true: as long as people agree that it identifies a resource, for example, with the XML Schema namespace URI: the existence of a resource is irrelevant

3. (30 points) Of the following statements, identify all that hold about XML keys, integrity constraints, and other aspects of relating XML to databases:

- A. Common business documents such as real-life purchase orders and repair manuals are typically better treated in the document-centric view than the data-centric view

Solution: A is true: business documents are typically structured in semiregular ways

- B. In the document-centric view, we would generally find real-life documents that have no or few elements with mixed content

Solution: B is false: although mixed content is not fundamentally needed, mixed content elements would be common in document-centric settings, e.g., in XHTML documents or snippets that contain natural language words, some of them marked up with formatting elements

- C. Minimizing NULL values is an important criterion in designing the relational schema corresponding to a set of XML documents

Solution: C is true: minimizing NULL values is an important criterion in general, and also in connection with relational schemas designed to capture XML documents

- D. Consider three tables capturing the typical Student–takes–Course scenario via suitable primary and foreign keys; then, it is possible to map all the information in these three tables into a single element $\langle \text{Student} \rangle$ with zero or more subelements $\langle \text{Course} \rangle$ and no explicit representation of takes

Solution: D is true:

- E. The XML representation proposed in Problem D above offers efficient query processing for finding all the students taking a particular course

Solution: E is false: the proposed representation places the course information within the student; thus this representation is efficient for finding all courses taken by a student but not efficient for finding all the students taking a particular course

- F. The XML Root as defined in SQL/XML is identical to the root of the XML InfoSet

Solution: F is false: XML Root as defined in SQL/XML allows a forest whereas the root in XML InfoSet allows only a single tree

- G. XML supports creating NULL elements for each element type that we wish to define as nillable

Solution: G is true:

- H. SQL/XML Publishing functions can be used in a SELECT query to output serialized representations of XML elements, possibly even including subelements and attributes

Solution: H is true:

- I. What makes it difficult to represent an XML document as a set of tables is that every table has a key but not every XML document has a key

Solution: I is false:

- J. Shredding is an approach for representing an XML document as a set of relations

Solution: J is true:

- K. If our goal is to capture the information in an XML document and not to require reconstructing the XML document, then it is safe to skip the so-called wrapper elements

Solution: K is true: the wrapper elements are not themselves informative

- L. Except for the introduction of XML Type as a data type, SQL/XML makes no substantial change to the traditional SQL DDL

Solution: L is true:

- M. In a number of settings, SQL/XML treats char, varchar, and clob as if they were more or less interchangeable string-like data types

Solution: M is true: for xmlparse, extractValue, and so on

- N. SQL/XML SELECT queries output rows some of whose cell values may be XML elements

Solution: N is true:

- O. When defining a table in SQL/XML, the XML Type must always be marked NOT NULL, since we should express a null value in the style of `<elem xsi:nil='true'/>`

Solution: O is false: our example schema allows NULL, for instance

4. (34 points) Of the following statements, identify all that hold about architecture.

- A. Identity management is an important infrastructure module in enterprise architectures

Solution: A is false:

- B. The data management module in an enterprise is expected to ensure integrity of the data, to support recovery from various kinds of failures, and to host the application logic

Solution: B is false:

- C. In three-tier architecture, the business logic resides in the middle tier

Solution: C is true:

- D. The architecture of an IT system presents a high-level model of the system, including its key components and interconnections, and potentially any constraints on them

Solution: D is true:

- E. Just like architectures for buildings, all IT architectures are equally good; the only reasons for choosing one are matters of personal taste

Solution: E is false: business requirements are crucial in judging the relative goodness of different architectures

- F. An “ility” is any of the qualities of service typically associated with aspects other than its input-output behavior; these aspects include availability, reliability, maintainability, and such

Solution: F is true:

- G. An architecture in an established field such as networking or power systems is specified by the products that the major vendors promote in that field

Solution: G is false:

- H. IT Governance deals with the administration of an IT system from the perspective of its stakeholders (users, staff, business partners)

Solution: H is true:

- I. Under the data-centric view of XML documents, the Database Administrator (DBA) has an important role in IT Governance regarding designing document schemas and the storage of documents

Solution: I is true:

- J. Upgrading an IT system so it offers direct web access to users means that you might need to consider different peak loads, but nothing else changes

Solution: J is false: also questions of user satisfaction, user assistance, security, installing software upgrades, and backward compatibility

- K. A business service is characterized by the value it offers one or more stakeholders

Solution: K is true:

- L. A business service is characterized by an underlying or associated financial exchange

Solution: L is false: a business service is about value transfer. Notice the contrast here is between “business” service and “technical” service. Although a financial exchange can occur with some business services, finance doesn’t characterize business services. A business service can occur without financial exchange as when a consulting practice (such as IBM Global Services) installs network equipment from an equipment vendor (such as Cisco): their customer pays both parties but the vendor and the practice provide services to each other in addition to the services they provide their customer

- M. A business service offering is different from a goods offering in that a business service inherently involves coproduction

Solution: M is true: coproduction means that the parties to a service engagement (nominally, service consumer and provider) interact to realize the value transferred during the service engagement

- N. A business service is intangible but goods are tangible

Solution: N is false: many goods are intangible (e.g., digital media) and some services include components that are tangible (e.g., food at a restaurant)

- O. In linguistic terms, a business process corresponds to an achievement because it is directed toward a well-defined ending point

Solution: O is false: a business process has some duration, so it is an accomplishment

- P. Accounting and auditing are examples of business-level responsibilities that can be understood as cross-cutting concerns on par with logging at a technical level

Solution: P is true:

- Q. We define latency as a nonfunctional property because it has no bearing on the functionality of a given service

Solution: Q is false: as discussed in class, latency can be significant for the functionality—e.g., a 24-hour wire transfer service for funds depends upon being completed on time

5. (24 points) Of the following statements, identify all that hold about architecture.

- A. Software development is far and away the most important phase in the typical business service life cycle followed by an IT organization

Solution: A is false: identifying needs before development and operating and maintaining a service after development are both highly important; most of an IT organization's effort goes into such phases—and the operation and maintenance phases may potentially never end

- B. A connector in an architecture can sometimes be viewed as a component in its own right

Solution: B is true: as we discussed in class, a connector at one level of abstraction such as electrical wiring or a message queue can itself be viewed as a component at another level of abstraction

- C. The purpose of an architecture in an IT setting is to nail down the implementation of an IT system

Solution: C is false: an architecture ought not to nail down the implementation of an IT system

- D. In a well-defined approach for IT governance, each individual staff member, user, and other stakeholder plays exactly one organizational role

Solution: D is false: almost impossible to ensure such a restriction in real-life settings; moreover, the more well-defined the organization the more crisply defined its roles and the greater the odds that a stakeholder will play more than one role

- E. The main value of application servers is that they are an architectural component that integrate considerations of business logic with considerations of infrastructure

Solution: E is false: instead application servers help *separate* business logic from infrastructure: the developer creates programs without knowing infrastructure details and the IT administrators manage the infrastructure without knowing the business logic

- F. Middleware in an IT setting refers exclusively to networking components that come in the “middle” between interacting business partners

Solution: F is false: middleware is broader than that and includes messaging *within* an enterprise, for example

- G. One of the important payoffs of developing an open architecture is that it yields complete specifications of the architectural components that can function in the system being architected

Solution: G is false: an open architecture merely specifies how the components may interact, not the complete specifications of their implementations

- H. The emerging trend in middleware is the increasing development of explicit middleware to replace older implicit middleware

Solution: H is false: the trend is toward implicit middleware, employing which doesn't require changing the existing codebase

- I. DoDAF, The Department of Defense Architecture Framework, provides a standardized methodology for developing an enterprise architecture

Solution: I is true: DoDAF calls for a series of documents culminating in an architecture; how the architecture would itself be implemented in a running system is not an emphasis of DoDAF

- J. DoDAF, The Department of Defense Architecture Framework, was motivated to develop and maintain short-lived information systems that arise in agile environments in the military and elsewhere

Solution: J is false: DoDAF is intended for systems of lifetimes measured in decades

- K. ReST is an ideal architectural style for the web because it supports multiparty interactions, such as among a payer, a payee, a bank, and a credit-card company to handle payment

Solution: K is false: ReST deals with two parties at a time: one as a client; one as a server

- L. An architecture needs to consider system requirements but not factors like the skills of the enterprise staff or of the workforce broadly

Solution: L is false: