**2. What is dynamic binding?**

Dynamic binding refers to the ability to defer the data typing of objects until run time. This would allow a message such as compute employee pay to be interpreted differently at run time by 'salaried employee" and "hourly employee" objects.

**9. What is the Law of Demeter?**

The law minimizes the number of objects that can receive messages from a given object.

* The law states that an object should only send messages to itself,
* to an object that is contained in an attribute of the object (or one of its super classes)
* to an object that is passed as a parameter to the method,
* an object that is created by the method
* or to an object that is stored in a global variable.

1. **What are constraints? What are the three different types of constraints?**

Constraints are limitations on the range of values that are acceptable within the business problem domain. The three types are pre-conditions, post-conditions, and invariants.

1. **How are factoring and normalization used in designing an object system?**

Factoring is the process of separating out aspects of a method or class into a new method or class to simplify the overall design.

Normalization is a technique aimed at helping to identify new classes and insure that all attributes are dependent on their assigned classes and only on their assigned classes.

1. **What is the most popular kind of database today? Provide three examples of products that are based on this database technology**

Relational databases are most popular today due to their ease of use and conceptual simplicity. Examples of relational DBMSs on the market include MS Access, Oracle, DB@, Sybase, Informix, and MS SQL Server.

**7. What is referential integrity and how is it implemented in a relational database?**

Referential integrity refers to the need to make sure that the values linking the table together through the primary and foreign keys are valid and correctly synchronized. For example, if a customer is placing an order, we need to have information on the customer in the customer table, The RDBMS will check to see if there is a record for that customer in the Customer table before it will let an order be entered. Checking for known required relationships helps assure referential integrity.

1. **What is the purpose of normalization?**

Normalization is a process that optimizes relational data storage for storage efficiency and for minimization of update anomalies. The rules of normalization help assure that the data is stored as efficiently as possible.

1. **How does a model meet the requirements of third normal form?**

First, the model must be in 1st normal form (all repeating fields or groups of fields have been removed to separate tables). Second, the model must be in 2nd normal form with all partial dependencies removed. Third normal form then requires that all transitive dependencies are removed (i.e., that no fields are dependent on other, non-primary key fields).

1. **Explain three important user interface design principles.**

The authors list six principles of user interface design:

1. Layout - the interface should be a series of areas on the screen that are used consistently for different purposes.
2. Content Awareness - the user is always aware of where they are in the system and what information is being displayed.
3. Aesthetics - interfaces should look inviting and should be easy to use.
4. User Experience - experiences users prefer ease of use, while inexperienced users prefer ease of learning.
5. Consistency - users can predict what will happen before a function is performed.
6. Minimize User Effort - interface should be simple to use.
7. **What are three fundamental parts of most user interfaces?**
8. Navigation mechanism - the way the user gives instructions to the system and tells it what to do.
9. Input mechanism - the way in which the system captures information.
10. Output mechanism - the way the system provides information to the user or to other systems.
11. **Describe the basic process of user interface design.**

First, identify 'use cases' that describe commonly used patterns of actions that users will perform. These use cases will be valuable in ensuring that the interface permits the users to enact these use cases quickly and smoothly. Next, develop the interface structure diagram, defining the basic structure of the interface (screens, forms, and reports) and how the interface components connect. Third, develop interface standards, the basic design elements that will be used throughout the interface. Fourth, create prototypes of the various interface components (navigation controls, input screens, output screens, forms, and reports). Finally, evaluate the prototypes and make changes as needed.

1. **Compare and contrast the three types of interface design prototypes.**

Storyboards are really just pictures or drawings of the interface and how the system flows from one interface to another. HTML prototypes are web pages that show the fundamental parts of the system. Users can interact with the system by clicking buttons and entering data, moving from page to page to simulate navigating through the system. Language prototypes create models of the interface in the actual language that will be used to implement the system. These will show the user exactly what the interface will look like, which is not possible with the other two methods.

1. **Describe three basic principles of navigation design.**

The navigation component of the interface enables the user to enter commands to navigate through the system and perform actions to enter and review information it contains. The three basic principles of navigation design are:

1. Prevent Mistakes: The first principle of designing navigation controls is to prevent the user from making mistakes. Mistakes can be reduced by labeling commands and actions appropriately and by limiting choices.
2. Simplify Recovery from mistakes: No matter what the system designer does, users will make mistakes. The system should make it as easy as possible to correct these errors.
3. Use consistent grammar order: One of the most fundamental decisions is the grammar order*.* The grammar order should be consistent throughout the system, both at the data element level as well as at the overall menu level
4. **Describe five types of input.**

There are many different types of inputs:

1. Text: As the name suggests, a text box is used to enter text. Text boxes can be defined to have a fixed length or can be scrollable and can accept a virtually unlimited amount of text. In either case, boxes can contain single or multiple lines of textual information.
2. Numbers: A number box is used to enter numbers. Some software can automatically format numbers as they are entered, so that 3452478 becomes $34,524.78. Dates are a special form of numbers that sometimes have their own type of number box.
3. Selection Boxes: A selection box enables the user to select a value from a predefined list. The items in the list should be arranged in some meaningful order, such as alphabetical for long lists, or in order of most frequently used. The default selection value should be chosen with care. There are different types of Selection boxes
   * Check boxes
   * Radio buttons
   * Onscreen list boxes
   * Drop-down list boxes
   * Combo boxes
   * Sliders
4. **Name three cultural dimensions that are relevant to user interface design identified by Hall. Why are they relevant? (answer on pg 461-462)**

- Speed of messages, context, and time. The speed of messages dimension deals with how fast a member of a culture is expected to understand a message and how “deep” the content of a typical message will be in a culture. Context deals with the level of implicit information that is used in the culture versus the information needing to be made explicit. Time addresses how a culture deals with many different things going on simultaneously. Polychromic time culture, members of the cluture tend to do many things at the same time but are easily distracted and view time commitments as very flexible. Monochronic time cultures, members of the culture solve many things by focusing on one thing at a time, are single-minded, and consider time commitments as something that is set in stone.

1. **Name the four cultural dimensions that are relevant to user interface design identified by Hofstede. Why are they relevant? (answers p. 462-463)**

- Power distance, uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity. Power distance addresses how the distribution of social power is dealt with in the culture. Uncertainty avoidance addresses to what degree a culture is comfortable with uncertainty. Individualism versus collectivism is based on the level of emphasis the culture places on the individual or the collective, or group. Masculinity versus femininity does not mean how men and women are treated by the culture. But instead, this dimension addresses how well masculine and feminine characteristics are valued by the culture.

**Chapter 11**

**Physical Architecture Layer Design**

1. **What are the four basic functions of any information system?**

The four basic functions of any information system are:

* Data storage
* Data access logic
* Application logic
* Presentation logic

1. **Define scalable. Why is this term important to system developers?**

Scalability refers to the ability to increase or decrease the capacity of the computing infrastructure in response to changing capacity needs. This term is important to the system developers because they can plan the design of the system to handle multiple servers as the application usage and data storage needs grow.

1. **What six criteria are helpful to use when comparing the appropriateness of computing alternatives?**

The six important criteria to use are:

1. Cost of the infrastructure
2. Cost of development.
3. Ease of development
4. Interface capabilities
5. Control and security and
6. Scalability.
7. **Compare and contrast the terms test, test plan, and test cases.**

A test is a particular aspect of the system that needs to be evaluated. The test plan outlines all of the tests that need to be performed on the system. Test cases are the sample data that will be run through or entered into the system. A test will state its objective, list the test cases that will check the desired feature or function, and define the expected results. Actual test results will also be recorded on the test.

1. **What is the primary goal of system testing?**

System testing evaluates the entire system, not only to verify that it runs without error or breakdown particularly under the stress of heavy workload and potential security violation, but also that it fulfills the business requirements of the system. It also tests the system documentation.