

## Solution of Mid term

### Q1a.

- Testing consumes as much as 50% of the total development cost.
- Good testing improve reliability of the software
- Maintenance of the software lasts much longer than the development.
- Maintenance very often is not done by the same team as the development

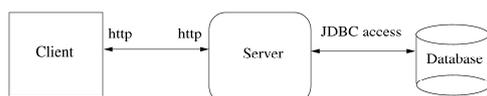
### Q1b

- As defect propagate through the development cycle, the cost of removal the defect increase significantly.
- A simple specification error, if not found, take a lot of effort, after the project enters the development phase

### Q1c.

- If process is predictable, we can expect a level of performance from the level
- Also, we will not get unexpected error, which will cause a lot of effort to eradicate.

## 2.



### Client Tier

- Client will provide a user interface to the user
- Client will get the required input from the user
- Send the input to the server
- Display the search result from the server

## Middle-tier

- The middle tier will process the input from the user, with the help of the database.
- For example, the user may perform the following operation
  - Search the catalogue with different criteria. The server will translate this as a MySQL query
  - On-line renewal. The server will obtain the current readers' record, calculate the new due date, and update the database.
  - Book Request. The server will check if the book is checked out or not. If not, then inform the librarian, and marked the book as requested. If the book is already checked out, the server need to inform the librarian when the book is returned.
  - Fine calculation. Calculate the fine for a particular user.

- In summary, the middle tier will do all the processing and display the output and update the database accordingly.
- May require an authentication server, or you can store the user authentication information in the database as well.

## Database tier

- Usually a database server.
- Database store:
  - Library catalogue
  - User information
  - Book Check-out information
  - Other information, such as user black listing

## Q3a

- The detail implementation of data structure is not important to the other part of the program
- We concentrate on how the data can be used. Only methods will be revealed and data hidden.
- If we need a new implementation of the object, we do not need to rewrite the entire program
- Can use pre-built objects.

## Q3b.

- Incremental coding is used to built a project phase by phase.
- By thoroughly testing the built part, we can ensure that problem is due to the newly added portion.
- Function can be delivered incrementally, with 1.0 version with core function, and 1.1, 1.2 etc.

## Q4a.

- True
- Because error may occur on the conditions of while/if statement, which is of high risk at the boundary.
- Neighboring data point will have similar behavior until they reach the boundary.
- If one data is OK, its neighbor is also likely to be OK.



Q4b.

- False
- Although path coverage checks all possible paths in a program, there may be errors in the implementation.
- The code may not truly implement the design.
- The design may not truly reflect the specification.



Q4c.

- False
- Unit testing is used to test a particular program segment.
- Requirement specification usually involves integration between program segments.