Homework Assignment 8 Solutions
ECE 151 / CMPSC 171 - Spring 2013

MARKING SCHEME:
Problems 1,2,3,4 - 25 points

1. (a) In a distributed object-based system, describe the purpose of the stub on the client-side and the skeleton on the server-side.
(b) What do we mean by marshalling and unmarshalling of messages?

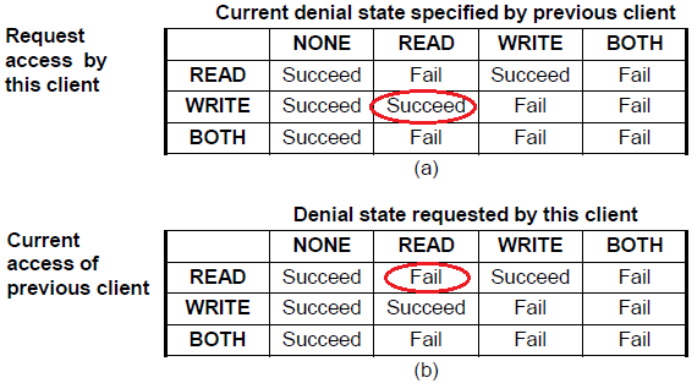
The client side stub acts as a proxy and the only thing it does is marshal method invocations into messages and unmarshal replies to return the result to the client. The skeleton provides the means for letting server middleware access user defined objects. It also marshals replies to client side proxy and unmarshals messages to invoke methods at objects interface in the server.

Marshalling is process of transforming data into a standard format before transmitting it over the network. Unmarshalling is the opposite process- reading standard format and reconstructing the original message from it.

2. The NFS distributed file system supports an implicit share reservations approach. Suppose that a client has opened a file for read and that the current denial state is READ.
(a) Is it possible for a second client to request to open the file for write? Explain why or why not.
(b) Suppose that the second client who is requesting to open a file for write also requests a denial state for READ. Will his request be granted? Explain why or why not.

(a) Yes.

(b) No.



Current denial state specified by previous client

Request access by this client	NONE	READ	WRITE	BOTH
READ	Succeed	Fail	Succeed	Fail
WRITE	Succeed	Succeed	Fail	Fail
BOTH	Succeed	Fail	Fail	Fail

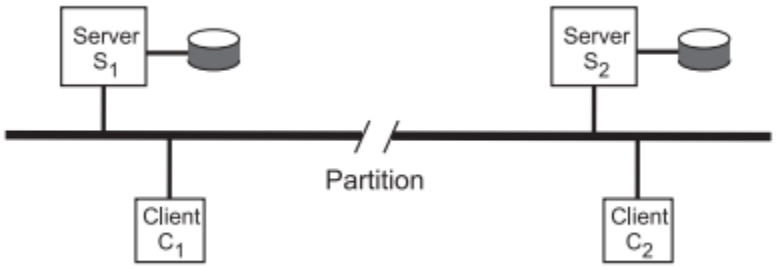
(a)

Denial state requested by this client

Current access of previous client	NONE	READ	WRITE	BOTH
READ	Succeed	Fail	Succeed	Fail
WRITE	Succeed	Succeed	Fail	Fail
BOTH	Succeed	Fail	Fail	Fail

(b)

3. In the Coda distributed file system, each file server Si maintains a Coda Version Vector CV Vi(f) for each file f that it stores. Initially, S1 sends version 1 of file f to S2.
(a) Consider the following scenario:
(i) Client C1 obtains a copy of the file f from S1, updates it, and sends the update to the servers S1 and S2.
(ii) Next, client C2 obtains a copy of the file f from server S2.
(iii) Then, a network partition occurs as shown in the figure below.
(iv) Client C2 updates the file, and sends the update to the servers S1 and S2.



After the sequence of events (i) through (iv), what are the Coda Version Vectors held by server S1 and by server S2?

$CVV_1(f) = [2,1]$ and $CVV_2(f) = [1,3]$

(b) Now, the network partition is healed, so that communication is restored. What happens next to reconcile the versions of the file that the servers S1 and S2 hold? After that reconcilation, what are the Coda Version Vectors held by server S1 and by server S2?

During the reconciliation the servers S1 and S2 share the information regarding the most recent/updated versions of the files they hold. Hence after the reconciliation the coda versions vectors are $CVV_1(f) = [3,3]$ and $CVV_2(f) = [3,3]$

4. (a) Explain the difference between a Web Server and a Web Service.

A Web Service is a service offered by one application to other applications on the World Wide Web. A Web Service can also stated to be a software designed to support interoperable machine-to-machine interactions over the Internet.

A Web Server refers to the hardware/machine that hosts the information which can be accessed by other machines connected to the network. It can also refer to the application that helps to access and distribution of the online information in the network.

(b) What do each of the acronyms HTTP and SOAP stand for, and what are each of these protocols used for?

HTTP stands for Hyper Text Transfer Protocol. The Hyper-Text Transport Protocol (HTTP) is an application-layer protocol that operates over TCP and that is used to access documents on the Web.

SOAP stands for Simple Object Access Protocol. The Simple Object Access Protocol (SOAP) is an application-level protocol that operates over HTTP. SOAP defines standards for XML messaging and mapping of data types, so that applications adhering to the standards can communicate with each other