Stateless vs. stateful protocols

In **stateless** protocols, a request carries all the information required to service it. Neither the client nor server need maintain any history of previous requests. For example, a GET request for a resource (like an HTML document) on a public site always generates the same response.
A **Stateful** client and/or server must keep track of the previous requests issued. Depending on the server's state (client's sequence past of requests) the same request might generate different responses. For example, two users log into Moodle as a lecturer and student. The URI to the same course page shows different views (e.g. an additional edit button on the lecturer's course page.)

Idempotent HTTP methods

HTTP methods that always return the same result whenever called are called **idempotent**. Typically GET, PUT and DELETE requests should be made idempotent. That is, making these requests repeatedly should return the very same result every time. POST is used for requests that are non-idempotent updates.

Quiz

Giving suitable reasons, state which of the following are stateless protocols

- IP
- TCP
- UDP
- DNS
- HTTP
- TLS

State diagrams

State diagrams are a notation to model how a stateful client or server transitions between different states. Each transitions can have a **precondition**, an **action (or event)** and a **postcondition**. Pre and post conditions are boolean expressions. An operation corresponds to a piece of code (usually a method or function.)

> A transition can only be taken once its precondition becomes true.
> When an action is executed or an event occurs, a transition is taken and its postcondition becomes true.

Exercise

Model the following description of shopping on an E-commerce site as state diagram. Note that you must also include possible failures (e.g. invalid credit card) in your model.

Initially a user shops adding items to and removing items from the shopping cart. Once the user opts to checkout, their delivery address is entered. Then, the total bill for goods plus delivery is shown. Finally the payment (e.g. credit card) is checked for validity and if valid the payment is deducted.

References

https://en.wikipedia.org/wiki/Stateless_protocol
http://www.dummies.com/programming/databases/building-protocol-state-machines-in-uml-2
http://www.stateworks.com/active/download/TN9-Flowchart-is-not-State-Machine.pdf
http://restcookbook.com/HTTP%20Methods/idempotency/