Jason Lawrence
A20381993

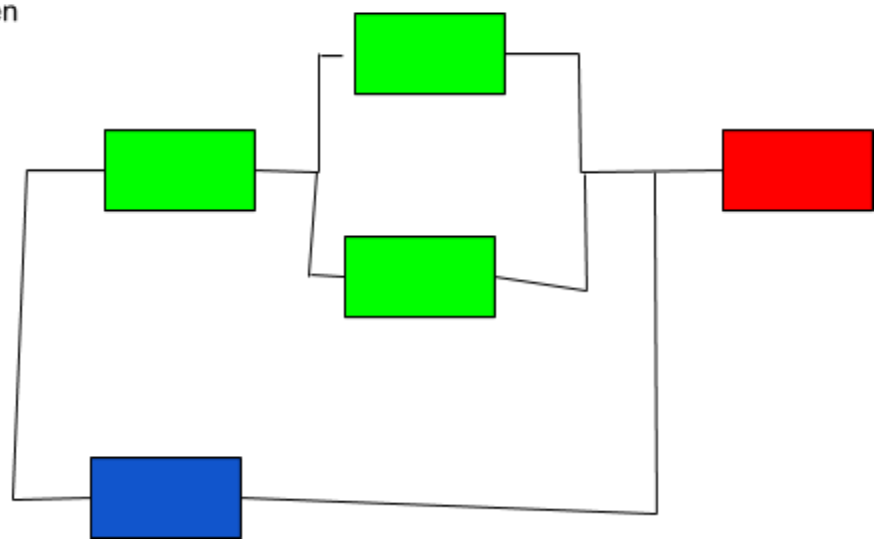
Written Assignment 3

1. (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)

2. Causal Consistency is sufficient in this case. Changes in stock values need to be reflected consistently across multiple computers. The order in which the stocks change shouldn't matter unless they dependant on some other value.
3. Linearizability can be implemented that way. It allows for several events to happen simultaneously with in the sma time slot and thus ranks them based off of sequential consistency.
4. 100 - 99.9996 = 0.0004%
   525,600 minutes in a year
   0.0004*525,600 = 2.1024 minutes

5. Breaking down the circuit yields 3 parts.

Part A = Red
Part B = Blue
Part C = Green



We first look at Part C:

Solving

$$R_C(t) = R(t)(1-(1-R(t))^2) = R(t)(1-(1-2R(t)+R^2(t))) = R(t)((2R(t)-R^2(t)) = 2R^2(t)-R^3(t)$$

Next we use the calculation from part C to find R of part B

$$R_B(t) = 1-(1-R_C(t))(1-R(t)) = 1-(1-2R^2(t)-R^3(t))(1-R(t)) = R(t)+2R^2(t)-3R^3(t)+R^4(t)$$

Putting it all together

$$R_{System}(t) = R_B(t)R(t) = R^5(t)-3R^4(t)+2R^3(t)+R^2(t)$$

6. Initially the sender encrypts the message using the receivers public key but uses their private key to make their signature. The receiver then decrypts the message and send back and acknowledge using the original sender's public key to encrypt it but uses their private key to make the signature.

7. ACL is split into three different groups - Owner, groups, and users. Each group can have any of the three permissions, execution, write, and read. This information is stored as metadata in the inode for the file as a bit string.

8. Since clients access remote directories by mounting them NFS should not be considered a true distributed file system. The protocols for accessing files are similar to mounting protocols and not in a distributed style.

9. The client sends a path for the file and the server then returns the file handle for the file. Within the file handle the file path would need to be stored.

10. Yes NFS supports file locking. When it creates a lock it gives the lock a range of bytes. The owner of the lease to the lock is the only one that can mutate those bytes. This prevents two different processes from writing to the same byte range at the same time. This mechanism provides entry consistency.