1.

(a) Query2 should be selected.

The time should be set to 2:32:11.999+28/2=2:32:12.013

The accuracy is +/- 14ms.

(b) If so, the time doesn’t change, but the accuracy changes to +/- 12 ms.

(c) In this case, we can assume the time for the request to reach the server is 2ms longer than the request to reach the client from the server, which are respectively 15ms and 13 ms. We can set the time to be 2:32:11.999+13=2:32:12.012. The accuracy is +/- (28-6)/2=+/- 11ms.

2.

(a)

The skewed clock is 0.5 percent slow, so after a minute it is off by 0. 005 \* 60 sec, or 300 ms.

(b)

The skewed clock will be off 100 ms every 20 seconds. So we should re-synchronize it every 20 seconds.

3.

   A1        B4  C5  D6 E7  
P1---------------------------  
     \      /   /   /   \  
      \F2  / G3/   /     \H8  
P2--------/-------/----------  
  I1\    /J2\    /     \K4  
     \  /    \  /       \  
P3---------------------------  
     L2 M3   N4 O5       P6

4.

A        B   C   D  E  
P1---------------------------  
 \      /   /   /   \  
      \F   /  G/   /     \H  
P2--------/-------/----------  
   I\    / J\    /     \K  
     \  /    \  /       \  
P3---------------------------  
     L  M    N  O        P

A(1,0,0) B(2,1,2) C(3,4,0) D(4,3,4) E(5,3,4)

I(0,1,0) F(1,2,0) J(1,3,0) G(1,4,0) K(1,5,0) H(5,6,4)

L(0,1,1) M(0,1,2) N(1,3,3) O(1,3,4) P(1,5,5)

5.

(2, 0, 1) <C and (1, 2, 0)<C, so C chimed last.

(2, 0, 1) and (1, 2, 0) are not comparable. They are both like ot chime first.

6.

One possible outcome assuming that the time it takes for K, L and marker M to get from one server to another is close:

Stage1: P initiate the snapshot:

P state(7,5) Channel\_q->p<>, Channel\_r->p<>

Q (6,4)

R (6,5)

Stage2: Q receives K and L:

P state(7,5) Channel\_q->p<>, Channel\_r->p<>

Q (7,5)

R (6,5)

Stage3: Q and R receives M:

P state(7,5) Channel\_q->p<>, Channel\_r->p<>

Q state(7,5) Channel\_p->q<ɸ>done, Channel\_r->q<>

R state(6,5) Channel\_p->r<ɸ>done, Channel\_q->r<>

Stage4: P receives K and R receives L:

P state(7,5) Channel\_q->p<K>, Channel\_r->p<>

Q state(7,5) Channel\_p->q<ɸ>done, Channel\_r->q<>

R state(6,5) Channel\_p->r<ɸ>done, Channel\_q->r<L>

Stage5: P,Q,R receives M:

P state(7,5) Channel\_q->p<K>done, Channel\_r->p<>done

Q state(7,5) Channel\_p->q<ɸ>done, Channel\_r->q<>done

R state(6,5) Channel\_p->r<ɸ>done, Channel\_q->r<L>done

End