1. True or False (4 points per correct answer)
   T _ F _ Sprite LFS stores its i-node map at a fixed location.
   T _ F _ AFS/Coda servers do not trust their clients.
   T _ F _ RAID level 6 protects against triple disk failures.
   T _ F _ Coda is stateless.
   T _ F _ BSD-LFS assumes that the disk controller will never reorder write requests.

2. Consider a RAID level 5 array with nine data blocks \( b_0 \) to \( b_9 \) and one parity block \( p \) per stripe.
   a) How much of the total disk space is used by data blocks? (10 easy points) 90 percent
   b) What is the best way to update block \( b_8 \) and its parity block \( p \)? (10 points)
      Fetch old block \( b_8 \) and old p block; store new block \( b_8 \) and new p block

3. Which are the main advantage and the main disadvantage of using soft updates compared to using journaling with synchronous log updates?
   a) Main advantage: (10 points)
      Soft updates are much faster than journaling with synchronous log updates.
   b) Main disadvantage: (10 points)
      Soft updates do not guarantee the durability of metadata updates.

4. When the ticket granting service of a Kerberos system replies to a client request, it sends an encrypted ticket for a given service and an encrypted session key \( K_{c,s} \).
   a) How is this key encrypted? (10 points)
      With the user’s secret key \( K_c \).
   b) What will the client do with it? (10 points)
      It will use it to encrypt its authenticators.

5. What are safe asynchronous writes? (10 points) What is their main advantage? (10 points)
   Safe asynchronous writes allow safe non-blocking writes at the server. When a client issues these writes, it keeps a local copy of all blocks it has sent to the server until they are properly committed to disk as the result of a COMMIT request it has issued.
   Safe asynchronous writes have a great impact on the performance on the server because they allow the server to batch multiple writes to the same block into a single disk write.