CAP5515: Computational Molecular Biology - Homework 1

Due at the **beginning** of the lecture on **02-05-2009**. **No late** assignment will be accepted.

Do the following 3 required problems, 10 pts each.

Problem 1. Prove or disprove the following: A (d, k)-disjunct matrix is a k-error-correcting \overline{d} -separable matrix.

Problem 2. When there are exactly d positive clones with at most k errors, we can use the (d, k)-disjunct matrix to identify these clones based on Theorem 6 (in the poolingDesigns.ppt file). However, if there are at most d positive clones with at most k errors, we do not know how many smallest one should be selected as discussed in class. Present a solution to solve this problem. (Hint: Can we test on (d + k)-disjunct or (d + 2k)-disjunct matrix (instead of (d, k)-disjunct)? You also need to show the decoding algorithm.)

Problem 3. Show that the minimum number of rows required for a *d*-disjunct matrix is at least $\min\{\binom{(d+2)}{2}, n\}$.