

1	2	3	4	$\sum (6+2)$

**Blatt 9**

(Abgabe am 18. January 2016)

**Theoretical Assignment - *Overlap and Layout*****Theoretical Assignment - *Overlap graph figure*****Theoretical Assignment - *Computing all overlaps using suffix tree***

Finding all overlaps is basically a APSP (All-pairs-suffix-prefix) problem. Solving such a problem with a suffix tree approach has a time complexity of  $O(n + k^2)$  where  $n$  is the total length of all strings and  $k$  is the count of strings. First all reads will be concatenated with a separation character between all reads and a terminal character at the end. Now it is rather simple to check, whether the prefix of one read matches with the suffix of another read. This can be done using the suffix tree since we know that each prefix starts with an separation character (one could put one separation character at the beginning of the string to make this statement true) and every suffix ends either with the separation character or the terminal character. Since one has to go through the whole concatenated string and compare the prefix of each read with the suffix of every other read, this approach has a total runtime complexity of  $O(n + k^2)$ .

**Bonus - *Challenges of your Project***