Offline 4
Hashing, KMP, Suffix Array
(C++/ Java Implementation)

1. Given a text string T (|T| = n) and a pattern string P (|P| = m). You have to report all the occurrences pattern P in the text string T.

Method/ Algorithm	Complexity	Marks
Naive Method: Try all possible shift of P.	O(m*n)	1
Hashing: Don't compare when success. Keep more than one mod value as I discussed in the theory class.	O(n + m) [worst case]	4
KMP algorithm.	O(n + m)	4
Test Cases: Find at least a test case where naïve method fails to produce the expected results within time = 3 seconds.		1

2. Given a string T (|T| = n). Find the number of distinct substring of the given string.

Method/ Algorithm	Complexity	Marks
Naive Method: Use c++ set/ map of string)	Doesn't matter.	2
Suffix array & LCP.	O(n lg n) if you use radix sort (will carry 2 bonus) or, O(n (lgn)^2) if you use stl sort	7
Test Cases: Find at least a test case where naïve method fails to produce the expected results within time = 3 seconds.		1

N.B.: There will be an online on next lab.