Algorithms & Complexity 5/1/17 – 5/5/17

0145-344-001

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ANNOUNCEMENTS

Final – 5/18/17

Review Topics: <http://home.adelphi.edu/~siegfried/cs344/344FinalReview.html>

* Review PowerPoint on sorting
* Review trees
* Review polyphase external sort
* Review minimum spanning tree
* Review pattern matching & Finite state machine
* what does truly random mean? pseudorandom? quasirandom?
* Lehmer’s method given a, m, c
* why do we use p and q instead of m and a in computing random
* Recurrence relations

**Pattern Matching**

1. Brute-Force Method  
   Best-case - Pattern (length m) is at beginning of text (length n): **O(m)**  
   Worst-case – nested for loop: **O(mn)  
     
   Code:**  
   public static int findPatternInText(String pattern, String text) {

// this loop controls starting index we search from in text

for (int i =0; i < text.length() - pattern.length() + 1; i++) {

boolean noMatch = false;

// this loop controls index of pattern

for (int j =0; j<pattern.length(); j++) {

if (pattern.charAt(j) != text.charAt(i+j)) {

noMatch = true;

break;

}

}

if (!noMatch){

return i;

}

}

return -1;

}

1. Knuth Morris Pratt – uses Finite State Machine (review HW on FSM [here](http://home.adelphi.edu/~siegfried/cs344/344hw7.html))  
   Best-case: **O(m)**  
   Worst-Case: **O(m+n) – O(m)**