Illinois Institute of Technology
Department of Computer Science

Homework Assignment 10

CS 535 Design and Analysis of Algorithms
Fall Semester, 2016

Due: Thursday, November 3, 2016

Remember the Honesty Pledge!

1. Rewrite COMPUTE-TRANSITION-FUNCTION (page 1001 of CLRS3) using *Prefix*[*i*] to compute the transition function in time $O(\#pattern|\Sigma|)$. (Remember, in the text m is used for what the notes calls $\#pattern$.)

2. There are four places in the discussion of correctness in the KMP lecture notes that "are left to the reader" (two on page 4, top-midddle of the page; two on page 5, lower-middle of the page.). Fill in those details.

3. Show how to use *extend* to pre-compute all the values in the array *Prefix*[*i*]—that is, to do the job of CLRS3's COMPUTE-PREFIX-FUNCTION on page 1006. Prove that your algorithm terminates and is correct. Analyze the amount of time required.

4. Professor Reingold claims that if we memoize the function *extend* (rather than *prefix*) you are constructing the FSA rather than the shift function. Is this claim correct? Explain.