

COSC 440 – Assignment #2

Fall 2012

1.) (75%) Develop a finite-tape Turing Machine simulator. You may choose any language to create the simulator in. To test the machine, use it to test machines that you develop for the following languages:

- a.) $A = \{0^n 1^n 2^n \mid n \geq 0\}$
- b.) $B = \{ww^R \mid w \in \{0, 1\}^*\}$ (w^R is w reversed)
- c.) $C = \{0^n 1^{n^2} \mid n \geq 0\}$

All of the languages are Turing-decidable.

Your simulator should, step-by-step, show the execution of your machine for each of the languages. This means showing both the tape, and any information about the finite state machine as applicable. You may do this as a full graphical user interface for up to 15 extra points.

Your interface should allow for the selection of one of the three machines, allow the user to input a string, then allow the user to choose either a verbose or simple output. The simple output will just return either accept or reject depending on whether or not the string is a member of the language. The verbose output will show, step-by-step the execution and require the user to hit Enter before moving between steps.

2.) (25%) Write a one-page paper (one full page), single-spaced, 12 pt., Times New Roman font with normal (1") margins about the life of Alan Turing. In your paper, you are required to comment on something about Alan Turing that you found surprising. Any sources that you use should be included on a separate sheet.

Due: November 14th at the start of class. The simulator may be turned in via email, but the paper must be printed and handed in. You may work in groups of 1-3 for the coding part of the project. If you work in a group of >1 person, you must provide a document stating what work each member of the group performed (to be included with your code). Each member of the group will submit papers independent of each other.