REVIEW #2

1. Is following a regular set $\{1^p$, where p is a prime and p < 10000} ? Prove your answer.

2. Is following a regular set $\{1^p$, where p is a prime and p > 10000} ? Prove your answer.

3. Show that every infinite regular set has an infinite regular subset.

4. Show that every finite regular set has an infinite regular complement.

5. Show that every infinite regular set has a finite regular subset.

6. Give a regular expression for strings (over the alphabet {0,1}) that contain the string: 101 as a prefix or as a suffix (or both).

7. Give a regular expression for odd-length strings (over the alphabet {0,1}) that contain 101 as a prefix or as a suffix (or both).

8. Is this a regular language: a set consisting of strings *x* such that *x* is of prime length or *x* is of odd length. Prove your answer.

9. Is this a regular language: a set consisting of strings *x* such that *x* is of prime length or *x* is of even length. Prove your answer.

10. Is the language of binary strings *x* such that *x* MOD *x* = 0 a regular set? Prove it.

11. Is the language of binary strings *x* such that *x* MOD 4 = 0 a regular set? Prove it.

12. Show that a Turing machine can decide whether two FSAs are not equivalent.

13. Is the language {*xx*, where *x*, is an arbitrary string over {0}} a regular set? Prove it.

14. Is the language {*xx*, where *x*, is an arbitrary string over {0,1}} a regular set? Prove it.

15. Is the language {*xyx*, where *x*,*y* are arbitrary strings over {0,1}} a regular set? Prove it.

16. Prove that the class of regular sets is closed under the union operation.

17. Prove that the class of regular sets is not closed under an infinite union operation.

18. Prove that PDAs can recognize regular sets; also show that PDAs can do much more.

19. Is the halting problem solvable for PDAs? Justify your answer.

20. Is the halting problem solvable for LBAs? Justify your answer.