CS520: Homework 11    Due date: Tuesday, Nov 29, 2016
Reading: Chapter 7. Also class handouts on NP-completeness. We will skip
Chapter 6.

Please note that your reading assignment is an integral part of
your homework.

1. Show that it is undecidable whether a TM halts on all inputs.

2. Show that the following problems about C programs are undecidable:
   1. Whether a given program can loop forever on some input.
   2. Whether a given program can ever produce an output.
   3. Whether two given programs produce the same output on all inputs.

3. 5.17.

4. 5.18. (You may assume the PCP is undecidable over some fixed alphabet
   set.)
   The idea is that you should be able to “code up” any finite alphabet set
   in a binary alphabet set. But why doesn’t this argument prove that PCP
   is undecidable for the unary alphabet set?

5. 5.21.

6. 5.31.

7. 7.9

8. 7.12

9. 7.13

10. 7.19 (extra credit)
    (It is now known that PRIMES is in P.)

Note: You should get on to your homework as soon as possible. Don’t delay to the last minute.