

CS520—Spring 2013—Homework 7
Wednesday March 20

Question 1

Outline the design of a garbage collector for the maTe virtual machine:

- Describe the marking phase. What are the roots of the garbage collection? How would you mark a particular block as reachable?
- Describe the sweep phase. How do you know the length of a block? How do you know a block is garbage? How do you mark a garbage block to indicate that it can be reused?
- How could you make the garbage collector do compaction? That is, how could the garbage collector gather all the garbage blocks together in order to avoid memory fragmentation over time? What would you need to change in the virtual machine to support this?

Question 2

Try to generalize the producer-consumer solution given in lecture to support k producers, n consumers and a shared buffer containing m elements. You can show your answer in pseudo code, like I used in lecture.

Big Hint: Use two condition variables and one mutex (lock).