Quiz 2, CSCI 210, Spring 2004

Name: __________________________

1. [10 pts] Suppose we were to run the program at right. Which of the following outputs might occur? (Place a checkmark to each possible output.)

   a. 1 1 2 4
   b. 1 2 3
   c. 1 2 3 4
   d. 1 2 4
   e. 3 1 2 4
   f. 4
   g. 4 3 2 1
   h. 4 4 4 4

   #include <stdio.h>
   int i = 1;
   int main() {
       while(i < 4 && fork() != 0) {
           i++;
       }
       printf("%d ", i);
       exit(0);
   }

2. [10 pts] Because the CPU can run only one thread of execution at once, when a user program is running, the operating system cannot be. How, then, can the OS manage to preempt a running program that runs for a long period of time and attempts to run beyond its time slice?

3. [10 pts] At right, complete the Java program so that it runs two threads. One thread should execute the following code to continually update total:

   for(int i = 1; true; i++) total += i;

   The other thread should execute the following code to periodically display the current total:

   while(true) {
       System.out.println(total);
       try { Thread.sleep(40);
               } catch(InterruptedException e) {}    
   }

   public class Counter extends Thread {
       static int total = 0;
   }

   public static void main(String[] args) {
       
   }

   Hint: The main method runs in its own thread. After it initiates a thread for one of the tasks, main can continue on to perform the the other task in its own thread.