CS 245 — Assignment #9
Spring 2006

Due Date: Tuesday, July 25 at 5pm.

Use `makeCover` to produce a cover page for your assignment and hand in your assignment in the CS 245 assignment box. Assignments are to be done individually.

1. (12 points) Prove that the following triple (pre-condition, program, post-condition) is satisfied under partial correctness. Use natural deduction or transformational proof techniques to prove any implied conditions. Clearly state your loop invariant.

   $(\!|n \geq 1|\!)$
   ```
   i = 1;
   z = 1;
   while (i != n) {
      i = i + 1;
      z = z + (2*i - 1);
   }
   ```
   $(\!|z \;=\; n * n|\!)$

2. (13 points) Prove that the following triple (pre-condition, program, post-condition) is satisfied under partial correctness. Use natural deduction or transformational proof techniques to prove any implied conditions. Clearly state your loop invariant.

   $(\!|n \geq 1|\!)$
   ```
   max = A[1];
   for i = 2 to n {
       if (max < A[i]) {
           max = A[i];
       }
   }
   ```
   $(\!|\forall k \bullet 1 \leq k \leq n \;\Rightarrow\; max \geq A[k]|\!)$