

**CS69001: Computing Lab – I**  
**Autumn 2009**

**Assignment 1**

**Some problems in computational geometry**

**Due: July 31, 2009 (Friday)**

**Part 1**

Define a data type `rectangle` to stand for a rectangle in the  $x$ - $y$  plane with sides parallel to the  $x$  and  $y$  axes. Such a rectangle is specified by the coordinates of the two end points of any of its two diagonals. **(10)**

Define a data type `circle` to stand for a circle in the  $x$ - $y$  plane. A circle is specified by the coordinates of its center and by its radius. **(10)**

**Part 2**

Write a function that, given a set of rectangles, finds the rectangle of the minimum possible area, that encloses all the given rectangles. **(20)**

**Part 3**

Write a function that, given a set of circles, finds the rectangle of the minimum possible area, that encloses all the given circles. **(20)**

**Part 4**

Write a function that, given a set of rectangles, finds the circle of the minimum possible area, that encloses all the given rectangles. **(20)**

**Part 5**

Write a `main()` function that reads two positive integers  $m$  and  $n$  from the user. The function then generates  $m$  random rectangles and  $n$  random circles, invokes the functions of Parts 2–4 and prints the outputs of these functions. **(20)**

Submit a single C/C++ file solving all the above parts. The file must contain your name and roll number.