



A small ball of iron is at height  $h$  above the ground. On the ground there is a spring with elastic constant  $k$  and neglectable mass. On top of the spring there is a block of iron of mass  $M$ . The spring and the block are at rest, with the top of the block at height  $b$  and the point of junction between the block and the spring at height  $a$  (it is clear if you look at the picture). At time  $t_0$  the ball is released and starts falling down. What is the maximum height (above the ground) of its first bounce?  
 (Assume that the collision between the ball and the block is perfectly elastic.)