

1975: (A), (B) are over two particles

1975  $t=0$ : (A), (B) level

$t=1$  (B)  $\uparrow$  4.9m gap.  
(A)

Redefine problem in terms of what is happening at 1sec after A starts

$S_A = 9m$  one second

$$dist_A = ut + \frac{1}{2}at^2 = 0 + \frac{1}{2}(9.8)1^2 = 4.9m$$

$$speed_A = u + at = 0 + (9.8)1 = 9.8ms^{-1}$$

$$accel_A = 9.8ms^{-2}$$

So if set (reset) clock to zero ~~when B starts~~  
we can write

$$u_A = 9.8ms^{-1}$$

$$a_A = 9.8ms^{-2}$$

$$S_A = 9.8t + \frac{1}{2}(9.8)t^2 + [4.9]$$

dist given by A in  
1 second head start  
it had,

and  $u_B = 14.7$

$$a_B = 9.8ms^{-2}$$

$$S_B = 14.7t + \frac{1}{2}(9.8)t^2$$

$$\therefore u_{AB} = 9.8 - 14.7 = -4.9ms^{-1}$$

$$a_{AB} = 0$$

$$S_{AB} = S_A - S_B = -4.9t + 4.9$$

$\therefore$  let  $t_c$  = time when they collide.

$$|S_{AB}| = 0$$

$$-4.9t + 4.9 = 0$$

$$1 = t_c$$

$\therefore$  1 second after B starts they collide.  
 $\Rightarrow$  2 seconds after A starts they collide.

For B  $t = 1$ .  $S = ut + \frac{1}{2}at^2$   
 $= 14.7(1) + \frac{1}{2}(9.8)t^2$   
 $= 19.6m$

