```
 1  from numpy import array,arange
 2
 3  g = 9.81          # Acceleration due to gravity
 4  a = 0.0           # Initial time
 5  b = 10.0          # Final time
 6  N = 1000          # Number of Runge-Kutta steps
 7  h = (b-a)/N       # Size of Runge-Kutta steps
 8  target = 1e-10    # Target accuracy for binary search
 9
10  # Function for Runge-Kutta calculation
11  def f(r):
12      x = r[0]
13      y = r[1]
14      fx = y
15      fy = -g
16      return array([fx,fy],float)
17
18  # Function to solve the equation and calculate the final height
19  def height(v):
20      r = array([0.0,v],float)
21      for t in arange(a,b,h):
22          k1 = h*f(r)
23          k2 = h*f(r+0.5*k1)
24          k3 = h*f(r+0.5*k2)
25          k4 = h*f(r+k3)
26          r += (k1+2*k2+2*k3+k4)/6
27      return r[0]
28
29  # Main program performs a binary search
30  v1 = 0.01
31  v2 = 1000.0
32  h1 = height(v1)
33  h2 = height(v2)
34
35  while abs(h2-h1)>target:
36      vp = (v1+v2)/2
37      hp = height(vp)
38      if h1*hp>0:
39          v1 = vp
40          h1 = hp
41      else:
42          v2 = vp
43          h2 = hp
44
45  v = (v1+v2)/2
46  print("The required initial velocity is",v,"m/s")
47
```