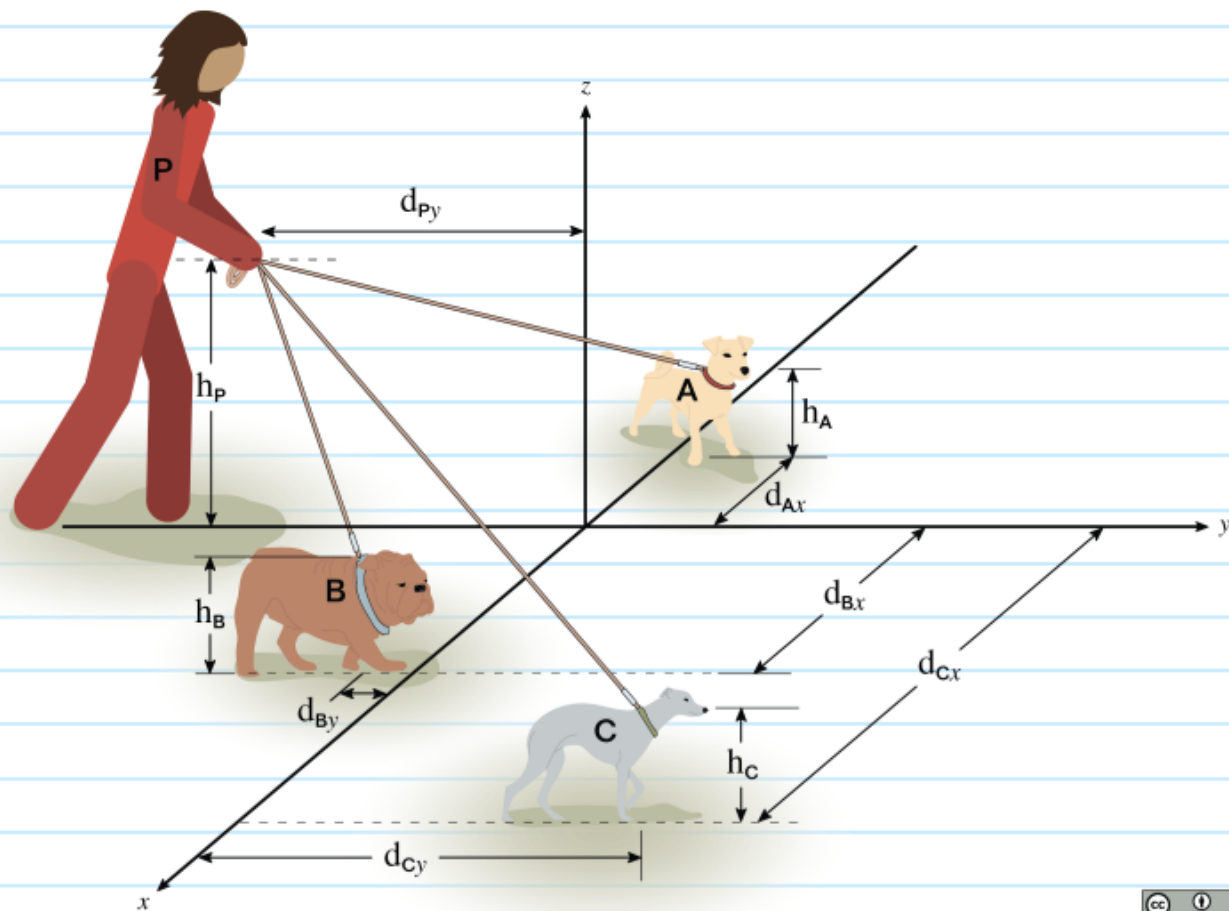You are walking 3 dogs which are pulling you along. Their positions can be described with the following measurements: $d_{Ax} = \underline{d_{Ax}}$ m, $h_A = \underline{h_A}$ m, $d_{Bx} = \underline{d_{Bx}}$ m, $d_{By} = \underline{d_{By}}$ m, $h_B = \underline{h_B}$ m, $d_{Cx} = \underline{d_{Cx}}$ m, $d_{Cy} = \underline{d_{Cy}}$ m, $h_C = \underline{h_C}$ m, $d_{Py} = \underline{d_{Py}}$ m, and $h_P = \underline{h_P}$ m.

What are the position vectors from your hand to the dogs' collars?

Add each position vector together, what is the resultant position vector? What are the unit vector components of the resultant?

Dog A

$$\vec{r}_A = \underbrace{-d_{Ax}}_{A_x} \hat{\imath} + \underbrace{d_{Py}}_{A_y} \hat{\jmath} + \underbrace{(h_A - h_P)}_{A_z} \hat{k}$$

Dog B

$$\vec{r}_B = \underbrace{d_{Bx}}_{B_x} \hat{\imath} + \underbrace{(-d_{By} - (-d_{Py}))}_{B_y} \hat{\jmath} + \underbrace{(h_B - h_P)}_{B_z} \hat{k}$$

Dog C

$$\vec{r}_C = \underbrace{d_{Cx}}_{C_x} \hat{\imath} + \underbrace{(d_{Cy} - (-d_{Py}))}_{C_y} \hat{\jmath} + \underbrace{(h_C - h_P)}_{C_z} \hat{k}$$

Resultant

$$\vec{r}_R = \underbrace{(A_x + B_x + C_x)}_{R_x} \hat{\imath} + \underbrace{(A_y + B_y + C_y)}_{R_y} \hat{\jmath} + \underbrace{(A_z + B_z + C_z)}_{R_z} \hat{k}$$

$$r_R = \sqrt{R_x^2 + R_y^2 + R_z^2}$$

$$\vec{u}_R = \frac{\vec{r}_R}{r_R} = \frac{R_x}{r_R} \hat{\imath} + \frac{R_y}{r_R} \hat{\jmath} + \frac{R_z}{r_R} \hat{k}$$