Consider initially the two drunkards start from $x=0$ (origin). Each drunkard can move left or right with equal probability $= 1/2$.

Consider at any time ~~time~~ t the position or the displacement from origin of the drunkards.

Now, the position of the drunkard is given by displacement P

$P =$ No. of steps towards right − No. of steps towards left.

Let the drunkard take r steps right.

$$\Rightarrow P = r-(N-r)$$
$$= r-N+r$$
$$= 2r-N$$

Probability of taking r steps towards right

$$P(x=r) = {}^{N}C_{r}\,(1/2)^{r}\,(1/2)^{N-r}$$
$$= {}^{N}C_{r}\,(1/2)^{N}$$

$P = 2r - N \rightarrow r = \frac{P+N}{2}.$

Now.

$$Pr[X = (P+N/2)] = \frac{N!}{\left(\frac{P+N}{2}\right)!\left(N - \left(\frac{P+N}{2}\right)\right)!}\left(\frac{1}{2}\right)^N$$

$$= \frac{N!}{\left(\frac{P+N}{2}\right)!\left(\frac{N-1}{2}\right)! \times 2^N}$$

If the two drunkards meet after N steps relative displacement $P = 0$.

$$\Rightarrow Pr[X = N/2] = N! / (N/2)!\,(N/2)!\,2^N$$

For two drunkards total steps taken is $2N$

Probability that they meet each other at same position $= \frac{(2N)!}{2^{2N}(N!)^2}$