```
def RanWalk(nstep):
    x = np.random.rand(nstep)
    idx= np.where(x > 0.5)
    xp = 2*len(x[idx]) - nstep
    return xp

ntrial=1000
ns1=10000
ns2=100000
xf1=np.zeros(ntrial)
xf2=np.zeros(ntrial)
for i in range(ntrial):
    xf1[i]=RanWalk(ns1)
    xf2[i]=RanWalk(ns2)

bins = np.arange(-1000.,1000, 20)

xs=np.linspace(-1000,1000,1000)
Dt1=ns1/2.
Dt2=ns2/2.
p1=np.exp(-xs*xs/(4.*Dt1))/np.sqrt(4*np.pi*Dt1)
p2=np.exp(-xs*xs/(4.*Dt2))/np.sqrt(4*np.pi*Dt2)
plt.xlim(-1000.,1000.)
plt.ylim(0,0.005)
plt.plot(xs,p1,'b--')
plt.plot(xs,p2,'r--')

plt.hist(xf1, bins, normed=1, color='blue',label='$10^4$ steps')
plt.hist(xf2, bins, normed=1, color='red',label='$10^5$ steps',alpha=0.7)
plt.text(300,0.004,'$10^3$ realizations',fontsize=15)
plt.legend(loc=2)
plt.xlabel(r'$x_f$')
plt.ylabel('PDF')

plt.show()
```