Based on the finite difference method beam-propagation method (FDMBPM), please write a computer program to simulate the propagation of optical wave in a 2D slab waveguide with the following S-bend structure,

where $2a = 8 \ \mu\text{m}$, $n_c=1.5032$, $n_0 = 1.5$, $s_b = 25 \ \mu\text{m}$, $L = 1000 \ \mu\text{m}$, $R = 10000 \ \mu\text{m}$, $D = 102.4 \ \mu\text{m}$, $N = 512$ divisions, $\Delta x = D/N = 0.2 \ \mu\text{m}$, $\Delta z = h = 0.5 \ \mu\text{m}$, with the offset for the two arcs

1) $O_f = 0 \ \mu\text{m}$
2) $O_f = 1.4 \ \mu\text{m}$,

then plot the optical intensity distribution (i.e., $|\phi|^2$) for the two cases.