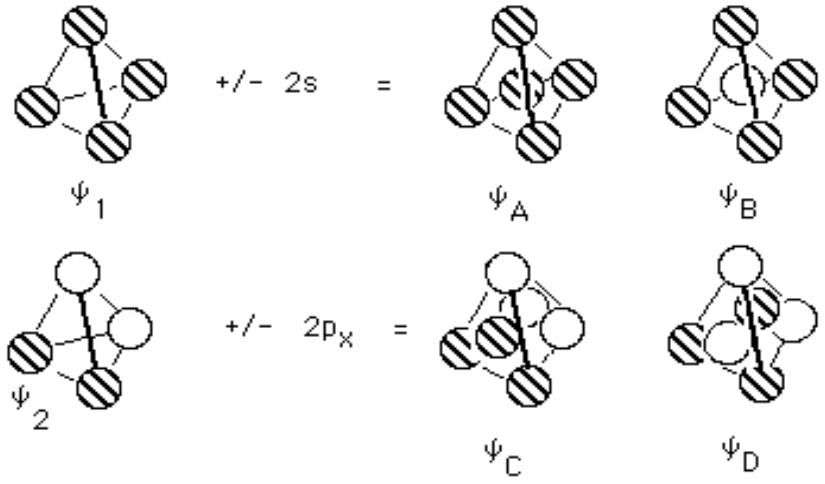
An answer to ad hoc problem set #1 - constructuion of the molecular orbitals of methane:

Let the orbitals of tetrahedral H_4 interact with the atomic orbitals of carbon of the proper symmetry. This means Ψ_1 +/- 2s, Ψ_2 +/- $2p_x$, Ψ_{2a} +/- $2p_y$ and Ψ_{2b} +/- $2p_z$.



The levels and electronic occupancy for the eight-electron system (4 from C, 4 x 1 from the H's) will be: