Organic Chemistry Review

Valence Bond Theory:
- covalent bond formed from overlap of atomic orbitals
- more simplistic than MO theory in its treatment of bonds
- bonds treated as waves - 2 waves approaching can interact in ways:
  - constructive interference = larger amplitude
  - destructive interference = canceling producing a node

- bond is simply the sharing of electron density between two or more atoms
  - example H2 - electron cloud overlap of two H atoms

- electron cloud of H2 is perpendicular bond axis - referred to as sigma bond - has circular symmetry with respect to bond axis
- all single bonds are \( \sigma \) (sigma) bonds - specifically pure sigma single bonds

MO Theory:
- VBT is at times in adequate: molecular bond theory works for more complicated cases
- MO theory also describes bonds in terms of constructive interference - but also uses mathematics
- mathematic: method is linear combination of atomic orbitals
- in theory - atomic orbitals are combined to form MO molecular orbitals
- atomic orbitals are associated with only 1 atom
- molecular orbital associated with entire molecule
- molecule is considered an entity made up of several electron clouds
- \( \phi \) molecular orbitals filled with electrons in a particular orbital