[1] Construct homogeneous polynomial basis functions of the lowest order for all $C_{4v}$ IRREPs.

[2] Is $C_{4v}$ simply reducible? Why or why not? If yes, construct all its CGCs.

[3] Find all the SU(2) CGCs for $\frac{1}{2} \otimes 1 = \frac{1}{2} \oplus \frac{3}{2}$.

[4] By applying the raising and lowering operators, show that the SU(2) CGCs satisfy a recursion relation relating $\left( j_1 \begin{array}{c} j \end{array} m_1 \begin{array}{c} m \mp 1 \end{array} m_2 \right)$, $\left( j_1 \begin{array}{c} j \end{array} m_1 \mp 1 \begin{array}{c} m \end{array} m_2 \right)$, and $\left( j_1 \begin{array}{c} j \end{array} m_1 m_2 + 1 \begin{array}{c} m \end{array} \right)$. 
