Work problems 5.1, 5.2, 5.5, and 5.8 in text, plus this one.

Given the vectors $x_1 = (4, 0, 0, 0)$, $x_2 = (4, 3, 0, 0)$, $x_3 = (4, 3, 2, 0)$, and $x_4 = (4, 3, 2, 1)$. Are these vectors a basis for $\mathbb{R}^4$? (The answer is yes.) Use Gram-Schmidt transformations to determine and orthonormal basis for $\mathbb{R}^4$ from $x_1, x_2, x_3, x_4$. The solution is not unique (because you may do the transformations in different orders.) You may be able to guess a solution, but show the Gram-Schmidt transformations explicitly.