7.10 (a) This part of the problem asks that we specify the Burgers vector for the simple cubic crystal structure (and suggests that we consult the answer to Concept Check 7.1). This Concept Check asks that we select the slip system for simple cubic from four possibilities. The correct answer is $\{100\}\langle 010 \rangle$. Thus, the Burgers vector will lie in a $\langle 010 \rangle$-type direction. Also, the unit slip distance is a (i.e., the unit cell edge length, Figures 4.3 and 7.1). Therefore, the Burgers vector for simple cubic is

$$\mathbf{b} = a\langle 010 \rangle$$

Or, equivalently

$$\mathbf{b} = a\langle 100 \rangle$$

(b) The magnitude of the Burgers vector, $|\mathbf{b}|$, for simple cubic is

$$|\mathbf{b}| = a(1^2 + 0^2 + 0^2)^{1/2} = a$$