

**Problem 1.** Moe, whose favorite color is red, has a large drawer filled with single red socks. The socks are in 21 different shades of red from very very light red to very very dark red. On a nearby wall Moe has a color chart showing the 21 shades, in order from lightest to darkest. Moe decides he can wear a pair of sock if the socks in the pair are of the same shade or if the two socks have shades that are adjacent shades on his chart. One dark morning when the power is out, Moe, who cannot see the socks, pulls several socks from his drawer, planning to examine them in the light from a window. Moe needs *two* wearable pairs of socks to get through the day. What is the minimal number of socks that Moe must choose to be certain that he has *two* wearable pairs among the selected socks? You may assume that there are several socks of each shade in the drawer. Solutions must have the correct answer and proof that the answer is indeed the minimum.

Solutions due by 12:00 noon, Tuesday, January 21.