1a. Let's call the number of solutions for n seating positions arranged in a straight line as $S(n)$. In any such solution, either the nth seat is chosen or not. The number of solutions for the latter case is $S(n-1)$, and that for the former case is $S(n-2)$ (because when the nth seat is chosen, the $(n-1)$th seat cannot be). Thus, $S(n) = S(n-1) + S(n-2)$. For the base case, we can easily see that $S(0) = 1$ (because the act of not choosing anything is itself a solution) and $S(1) = 2$ (because we can either choose the only seat or not). Thus, we see that $S(n)$ has the same recurrence as $F(n)$, the Fibonacci sequence, but $S(0) = F(1)$ and $S(1) = F(2)$. Therefore, by induction, $S(n) = F(n+1)$. This concludes the proof.

1b. Let's call the number of solutions for n seating positions arranged in a circle as $T(n)$. We can see that almost any solution the problem where seats are arranged in a straight line can be a solution to the case where the seats are arranged in a circle. The only cases we must exclude are those where seat 1 and seat n are both chosen. For $n >= 4$, the number of such cases is $S(n-4)$, since both 1 and n are chosen, neither seat 2 nor seat $n-1$ can be. So, the number of solutions for n seats arranged in a circle is simply $S(n) - S(n-4) = F(n+1) - F(n-3) = F(n) + F(n-1) - F(n-3) = F(n) + F(n-2)$. For the cases $n = 3$ and $n = 2$, we can manually verify that this equation holds. This concludes the proof.