9. Sam has a large collection of $1 \times 1 \times 1$ cubes, each of which is either red or yellow. Sam makes a $3 \times 3 \times 3$ block from twenty-seven cubes, so that no cubes of the same colour meet face-to-face.

What is the difference between the largest number of red cubes that Sam can use and the smallest number?

A 0 B 1 C 2 D 3 E 4

---

9. **B** Let the centre cube in the $3 \times 3 \times 3$ block be red. As no cubes of the same colour meet face-to-face then the 6 centre cubes on the outer faces must be yellow. All six outer faces are as shown alongside.

Y	R	Y
R	Y	R
Y	R	Y

Thus 14 faces are yellow and 13 faces are red. If the centre cube is yellow then the situation is reversed. Hence the difference between the largest number of red cubes that Sam can use and the smallest number is 1.