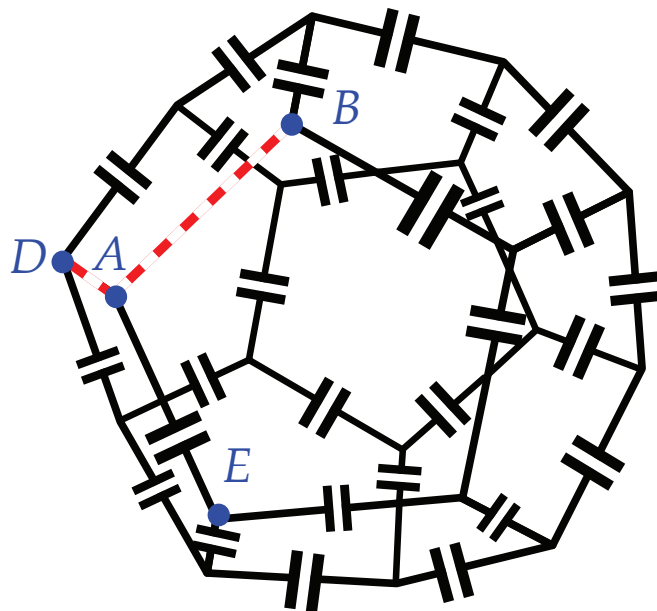


## Problem 6

Edges of a dodecahedron are made of wire of negligible electrical resistance; each wire includes a capacitor of capacitance  $C$ , see figure. Let us mark a vertex  $A$  and its three neighbours  $B$ ,  $D$  and  $E$ . The wire segments  $AB$  and  $AD$  are removed. What is the capacitance between the vertices  $B$  and  $E$ ?



### Hints after 1st week:

This problem has also a **short solution** which does not use brute force.

How to be sure that you have found the short solution: using the method of that short solution, it is possible to solve also a modified problem, where the dodecahedron is replaced by an infinite honeycomb lattice (two wires are cut off in the same way as for this dodecahedron).

Note that all the ten correct solutions listed below use a brute force approach; best-solution bonus will be given to the first non-brute-force solution(s).

Those who have already submitted a correct solution are also welcome to submit a new solution (your final bonus will be whatever is larger: the original speed bonus, or the new best-solution-bonus combined possibly with the new speed bonus according to the arrival time of the revised solution).

More hints will be given after the 2nd week.

### Intermediate conclusion after the 1st week.

Correct solutions have been submitted by (ordered according to the arrival time):

1. Lars Dehlwes (Germany)\*
2. Hrishikesh Menon (India)
3. Ly Nguyen (Vietnam)
4. Dan-Cristian Andronic (Romania)
5. Szabo Attila (Hungary)
6. Jan Ondras (Slovakia)
7. Ng Fei Chong (Malaysia)
8. Tudor Ciobanu (Romania)\*\*
9. Vũ Việt Linh (Vietnam)
10. Madhivanan Elango (United Kingdom)

\* Solution includes a typo at the very last line

\*\*Correct version submitted at the second attempt