

Projet d'Algorithmique Réparti Avancé

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Question 1 Draw a picture showing a Z-configuration on a square O6Grid of side 7. By convenience, design your picture using a grid representation (see for instance Figures 2 and 3).

Question 2 Give an algorithm for Phase Tower.

Question 3 Prove that the algorithm provided in Question 2 creates a tower with probability 1.

Question 4 Given a node u , if $atu \neq btu$ and $(atu \neq btu \neq S/2)$, then there exists an orientation of O-Grid such that $u = (atu, btu)$.

Question 5 Give a formal algorithm performing Phase 1.

Question 6 Show that the three above conditions together require $S \neq 7$.

Question 7 Similarly as in Figure 3, sketch the behavior of Phase 2 in an O-Grid. Choose $S = 15$.

Question 8 Try to provide either a formal algorithm or a sketch of Phase Setup. Include explanations.

Question 9 Do you think that it could be possible to achieve a deterministic algorithm with only 4 robots? If yes, then sketch your algorithm. If not, what about 5 robots?

Question 10 Would it be possible to achieve a probabilistic or deterministic algorithm with 3 robots?