Mobile Processes in an Ant Simulation

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Abstract. The term self-organisation, or emergent behaviour, may be used to describe behaviour structures that emerge at the global level of a system due to the interactions between lower level components. Components of the system have no knowledge about global state; each component has only private internal data and data that it can observe from its immediate locality (such as environmental factors and the presence of other components). Resulting global phenomina are, therefore, an emergent property of the system as a whole. An implication of this when creating artificial systems is that we should not attempt to program such kinds of complex behaviour *explicitly* into the system. It may also help if the programmer approaches the design from a radically different perspective than that found in traditional methods of software engineering. This talk outlines a process-oriented approach, using massive fine-grained concurrency, and explores the use of occam-π's mobile processes in the simulation of a classical ant colony.

Keywords. process orientation, mobile processes, complex systems, emergence.