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Självständigt arbete i matematik

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## **Julia Uddén: Space limitations in the formal language acquisition of $a^n b^n$**

### **Sammanfattning**

In the attempt to relate cognitive and neural descriptions of mental functions, with the unique human language faculty as a model, a fundamental difficulty is to determine which theoretical description to start with. When comparing theories, it is of great importance to develop concepts describing biologically relevant properties common to all languages and other mental functions, such as recursive structures. We describe the symmetric language pattern  $a^n b^n$  as generated through a recursive process, adding the component  $ab$  in the middle of the pattern in each step. Our contribution is to formalize this intuition through implementing recognition of this pattern in abstract system descriptions of cognition (theoretical machines such as finite automata and neural networks). As a result of taking space limitation in the physical brain into account, we propose finite state machines as an interesting conceptual framework.