Exercise 1 (Expressivity, 11 minutes) *Recall that CCS! denotes CCS with the replication or bang process* $!P$. *Given a CCS! process* P, *recall that the language generated by* P, $L(P)$, *is the set of all finite maximal sequences generated from the labeled transitions of* P. *More precisely,*

$$L(P) = \{s \in \mathcal{L}^* \mid \exists Q : P \overset{s}{\Longrightarrow} Q \land \forall \alpha \in \mathcal{L} \cup \{\tau\} : Q \overset{\alpha}{\not\longrightarrow}\}.$$

where $\mathcal{L}$ *denote the set of visible actions in CCS!.*

- *Question: The regular set*

  $$\{a^n \mid n \geq 0\}$$

  is generated by one of the following of processes. Which one?

  1. *The process* $!(a.0)$
  2. *The process* $(\nu u)(\overline{u}.0 \mid !(u.a.\overline{u}.0) \mid u.0)$
  3. *The process* $(\nu u)(\overline{u}.0 \mid !(u.a.0) \quad \mid u.0)$