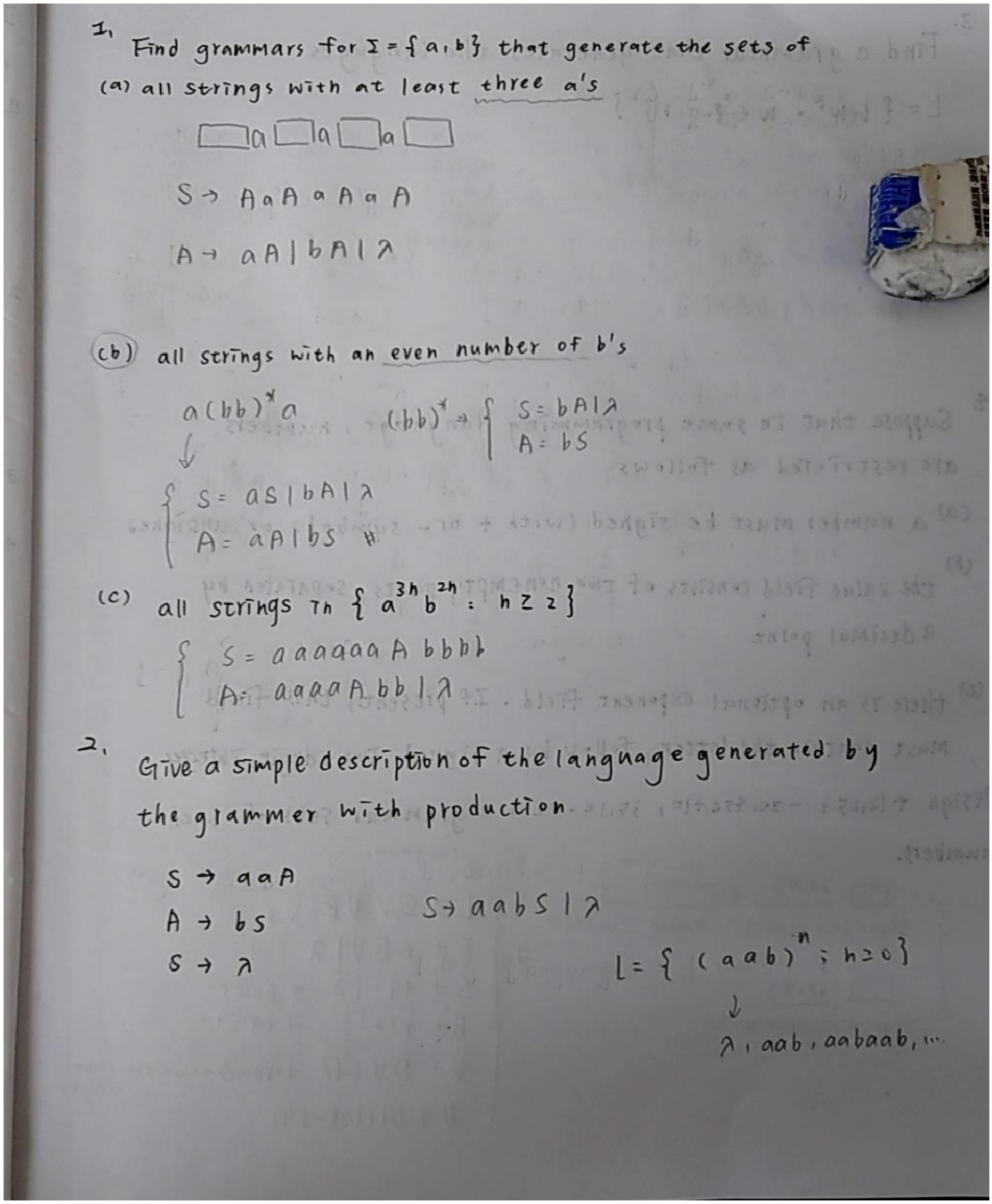
Chapter 1 Homework

1. Find grammars for $\Sigma = \{a, b\}$ that generate the sets of
(a) all strings with at least three a's.
(b) all strings with an even number of b's.
(c) all strings in $\{a^{3n}b^{2n}: n \geq 2\}$

2. Give a simple description of the language generated by the grammar with productions
$S \rightarrow aaA$
$A \rightarrow bS$
$S \rightarrow \lambda$



3. Find a grammar that generates the language $L = \{ww^R : w \in \{a, b\}^+\}$

4. Suppose that in some programming language, numbers are restricted as follows:
(a) a number may be signed (with + or – symbol) or unsigned.
(b) the value field consists of two nonempty parts, separated by a decimal point.
(c) there is an optional exponent field. If present, this field must contain the letter *e*, followed by a signed two-digit integer.

For example, +12.25, -20.45e+10, 35.1e-02. Design a grammar set of such numbers.