Homework II

1. [15 points]
Write ordinary (i.e., pure) BNF that is equivalent to the Extended BNF below; {...} denotes arbitrarily many, and [...] denotes optional. Justify your solution.

\[
\texttt{<float>} \texttt{[] <digit> {<digit>}} \{<digit>\} \{E [+ -] <digit> {<digit>}\}
\texttt{<digit> [] 0|1|2|3|4|5|6|7|8|9}
\]

2. [30 points]
Using the EBNF for Java (see class Web page), provide a derivation tree for each of the following, or identify the reason it is invalid. The derivation steps from \texttt{<identifier>} to a sequence of lower-case letters and digits that begins with a letter should be omitted.

(a) from \texttt{<decimal numeral>} derive: 2
(b) from \texttt{<array access>} derive: a[b=2]
(c) from \texttt{<statement>} derive: if (x) if (y) {} else break;

3. [30 points]
For each of the syntax diagrams below, provide an Extended BNF definition that describes exactly the same language (C= \{0,1\}) and informally justify your answers.

(A)

(B)

(C)