Compilers and Languages class test 1

Write your name and secondary ID (of the form abc123) on the top right corner of all your answer sheets.

Question 1 Consider the following grammar:

$$
\begin{aligned}
S &\rightarrow A\,E \\
E &\rightarrow e \\
E &\rightarrow f \\
A &\rightarrow a\,A \\
A &\rightarrow B\,a\,A \\
A &\rightarrow \varepsilon \\
B &\rightarrow b \\
B &\rightarrow g
\end{aligned}
$$

Which symbols are in:

- FIRST(B)

- FIRST(A)

- FOLLOW(A)

For full marks, argue formally from the definitions of FIRST and FOLLOW using derivations. [30%]

Question 2 For the same grammar as in the previous question, show how the LL(1) machine can accept the input

$$a\,b\,a\,f$$

For each predict step, give the condition on FIRST or FOLLOW that enables the step. [40%]

Question 3 Consider the following grammar:

$$
\begin{aligned}
S &\rightarrow A\,d \\
S &\rightarrow B\,d \\
A &\rightarrow a\,b \\
B &\rightarrow a\,b
\end{aligned}
$$

Explain in detail whether this grammar is suitable for LL(1) or LR(0) parsing.

[30%]