CS 360 Online Quiz 3

CS 360 Online Quiz Honesty Statement
I am fully aware that once I access quiz problems I am allowed to work with my group partners only 90 minutes on them, that I may use the textbooks, lecture materials, and all other resources available via course website, but neither of the following is permitted: other books or materials, personal notes, web search tools, calculators, contacting other individuals outside my assigned group. By making a submission of my answers to the instructor I acknowledge that I followed the statement of online honesty.

You have 90 minutes for working out quiz problems, and still 15 more minutes for packaging your answers into pdf format and submitting them to the instructor via e-mail.

Solve all three problems. Each problem counts for 3 points. Extra credit problem also counts for three points.

1. In the figure below (of slides 10-15 of Week 3 Part 4 file) we evaluated our expression in normal order. What would happen if we tried to use applicative order? Justify your answer.

$$
\begin{array}{lll}
 & (\underline{\lambda f}.\lambda g.\lambda h.fg(h\,h))\underline{(\lambda x.\lambda y.x)}h(\lambda x.x\,x) & \\
\rightarrow_\beta & (\lambda g.\underline{\lambda h}.(\lambda x.\lambda y.x)g(\underline{h\,h}))h(\lambda x.x\,x) & (1)\\
\rightarrow_\alpha & (\underline{\lambda g}.\lambda k.(\lambda x.\lambda y.x)g(k\,k))\underline{h}(\lambda x.x\,x) & (2)\\
\rightarrow_\beta & (\underline{\lambda k}.(\lambda x.\lambda y.x)h(k\,k))\underline{(\lambda x.x\,x)} & (3)\\
\rightarrow_\beta & (\underline{\lambda x}.\lambda y.x)\underline{h}((\lambda x.x\,x)\ (\lambda x.x\,x)) & (4)\\
\rightarrow_\beta & (\underline{\lambda y}.h)\underline{((\lambda x.x\,x)\ (\lambda x.x\,x))} & (5)\\
\rightarrow_\beta & h & (6)
\end{array}
$$

2. Explain the roles of sets FIRST, FOLLOW and PREDICT of PLP Figure 2.23 in the construction of the parse table of PLP Figure 2.20.

3. Construct sets FIRST, FOLLOW and PREDICT of PLP Figure 2.24 for the grammar G of balanced parentheses $G: S \rightarrow (S)S \mid \epsilon$. Explain in terms of constructed PREDICT sets why the grammar is LL(1).

4. (Extra credit) Construct sets FIRST, FOLLOW and PREDICT of PLP Figure 2.24 for the grammar (iii) of figure 23 of weeks 1-2 file. Explain in terms of constructed PREDICT sets why the grammar is LL(1).