Problem 1

Focus on the bottom subgame first.
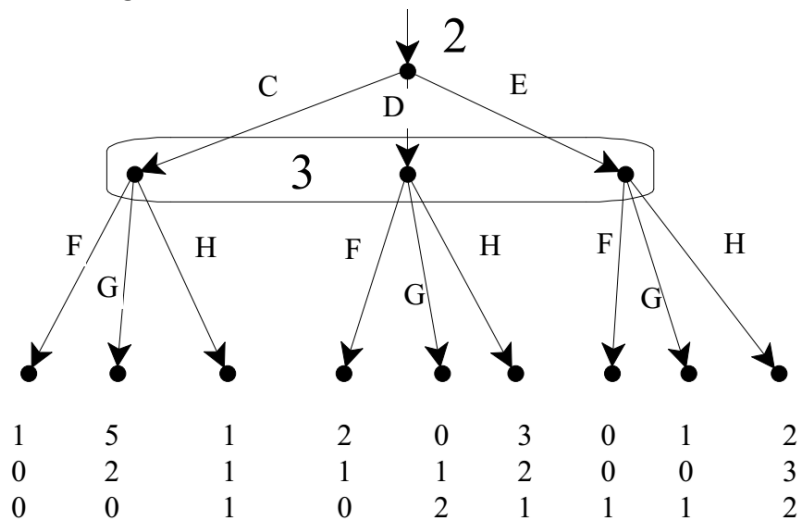
	F	**G**	**H**
C	$0,0$	$\mathbf{2},0$	$1,1$
D	$1,0$	$1,\mathbf{2}$	$\mathbf{2},1$
E	$0,\mathbf{1}$	$0,1$	$\mathbf{3},\mathbf{2}$

Unique Nash of the subgame is (E,H) with payoffs $2,3,2$.

The other subgame is
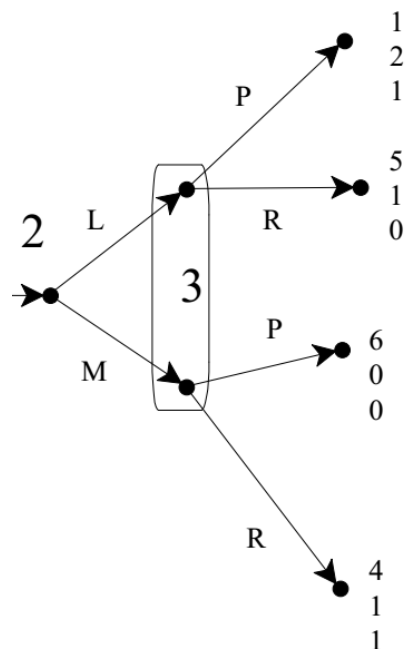
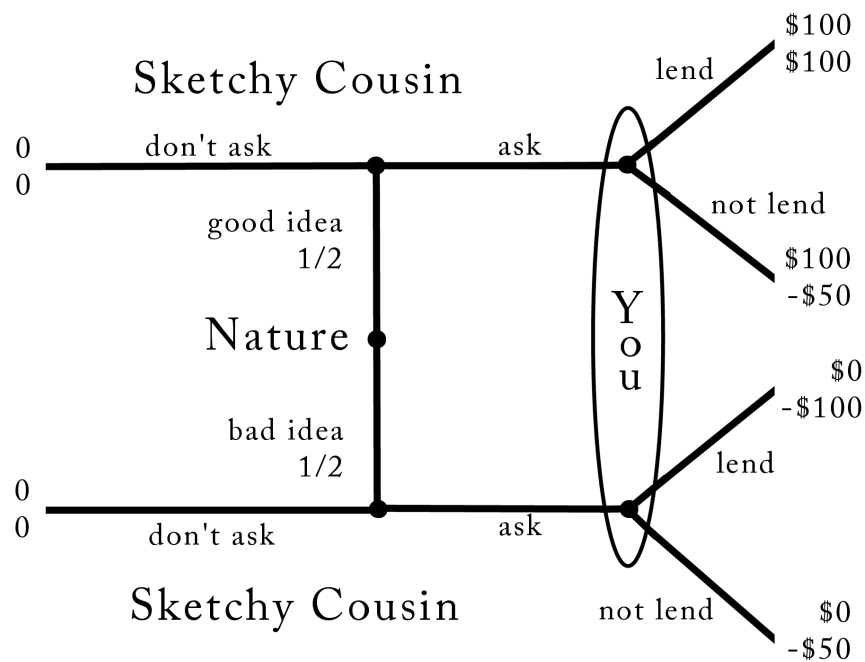|	**P**	**R**
L	$2,1$	$1,0$
M	$0,0$	$1,1$

Two Nashies in the subgame: (L,P) with payoffs $1,2,1$; and (M,R) with payoffs $4,1,1$. Hence the bigger game reduces into two reduced games.
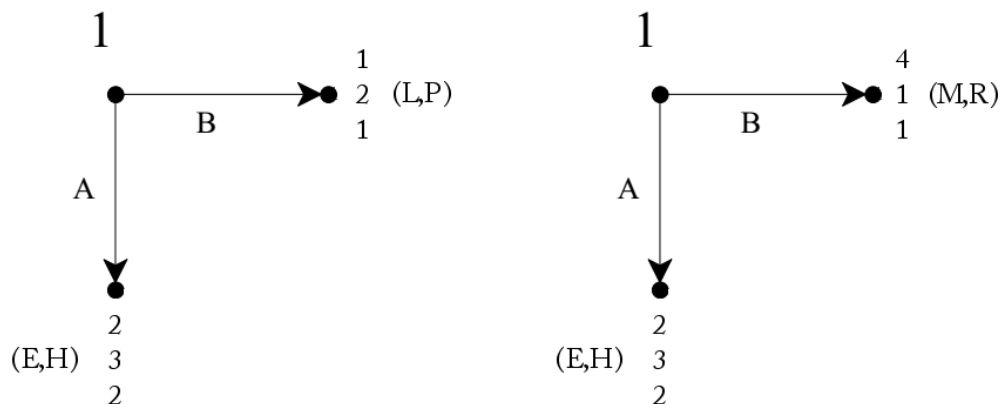
In the left game, Player 1 would choose A. Hence its subgame-perfect equilibrium is (A, EL, HP). In the right game, Player 1 would choose B. Hence its subgame perfect equilibrium is (B, EM, HR).

Problem 2

First note that there are no proper subgames. Hence any subgame-perfect equilibria must also be the Nash equilibria of the entire game.

You only have one information set, thus you only need specify L for lend or N for not-lend. Sketchy cousin has two information sets, however, so actions need be specified for both. An example of a strategy profile, then, is (AD, L), which means: if good idea, cousin asks (A); if bad idea, cousin doesn't ask (D); if asked, you lend money (L).

Now let's calculate payoffs for each strategy profile.

$$
\begin{aligned}
(AA, L): \quad & 0.50[100, 100] + 0.50[0, -100] = [50, 0], \\
(AD, L): \quad & 0.50[100, 100] + 0.50[0, 0] \quad\;\; = [50, 50], \\
(DA, L): \quad & 0.50[0, 0] \quad\;\;\;\; + 0.50[0, -100] = [0, -50], \\
(DD, L): \quad & 0.50[0, 0] \quad\;\;\;\; + 0.50[0, 0] \quad\;\; = [0, 0], \\
(AA, N): \quad & 0.50[100, -50] + 0.50[0, -50] \;\; = [50, -50], \\
(AD, N): \quad & 0.50[100, -50] + 0.50[0, 0] \quad\;\; = [50, -25], \\
(DA, N): \quad & 0.50[0, 0] \quad\;\;\;\; + 0.50[0, -50] \;\; = [0, -25], \\
(DD, N): \quad & 0.50[0, 0] \quad\;\;\;\; + 0.50[0, 0] \quad\;\; = [0, 0].
\end{aligned}
$$

Hence the strategic form of the game is

	L	N
AA	$50, 0$	$50, -50$
AD	$50, 50$	$50, -25$
DA	$0, -50$	$0, -25$
DD	$0, 0$	$0, 0$

Hence the Nash equilibria (and thus SPE) are (AA, L) and (AD, L). I guess the lesson is either: 1. The probability that your cousin has a good idea outweighs his sketchiness; or 2. Just lend to him anyway because you don't want your window smashed.