 ANSWER ALL QUESTIONS. IF YOU DON’T EXPLAIN (= SHOW YOUR WORK FOR) YOUR ANSWERS YOU WILL GET NO CREDIT.

NAME: ___________________________ University ID: ___________________________

IRCLE THE NAME OF YOUR TA: Kalyani Chauduri or Hyunseo Park

If you don’t know the name of your TA, then write your Section Number: ________________

• By writing your name on this exam you certify that you have not violated the University’s Code of Academic Contact (for example, you have not copied from the work of another student and you have not knowingly facilitated cheating by another student).

• If you submit the exam without writing your name and ID, you will get a score of 0 for this exam.

• If you do not stop writing when told so (at the end), a penalty of 10 points will be deducted from your score.
1. [50 points] Consider the following game, where the payoffs are von Neumann-Morgenstern payoffs (note that Player 3 makes the first move and note the order in which payoffs are written):

(a) [4 points] Write all the strategies of Player 2.

(b) [4 points] How many strategies does Player 1 have?

(c) [6 points] How many proper subgames does the game have?
(d) [36 points] Find three subgame-perfect equilibria and specify the payoffs at those equilibria.
   [This question is reproduced in the next 3 pages, so you have 3 pages to answer it.]
Continue part (d) here if you need more space (find three subgame-perfect equilibria and specify the payoffs at those equilibria).
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Consider the following game with von Neumann-Morgenstern payoffs.

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<td>B</td>
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<td>C</td>
<td>3, 6</td>
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(a) [4 points] List all the pure-strategy Nash equilibria.

(b) (b.1) [10 points] Find the mixed-strategy Nash equilibrium.

(b.2) [6 points] Calculate the payoffs of the two players at the Nash equilibrium.
3. [30 points] Consider the following two-player game-frame. Rudy is a fugitive and it is common knowledge between him and the Chief of Police that (1) there are only two locations, A and B, where he could be hiding and (2) the police will be able to pinpoint the exact location of Rudy’s cellphone, but only if it is on, that is, if it communicates with the cell towers. Rudy makes three consecutive decisions: first whether to hide at location A or at location B, second whether to turn off his cellphone or leave it on and third - in case he leaves his cellphone on - whether to keep it with himself or give it to an accomplice to take it to the other location and leave it there (turned on). The next day, the police chief, not knowing any of the above decisions by Rudy, after consulting the tracking device and checking whether or not there is a signal from the cellphone and, if there is, where it is coming from, decides whether to storm location A or location B.

(a) [14 points] Draw an extensive-form game-frame to represent this situation.
(b) [3 points] How many information sets does the police chief have?

(c) [5 points] How many strategies does the police chief have?

(d) [3 points] How many information sets does the Rudy have?

(e) [5 points] How many strategies does Rudy have?