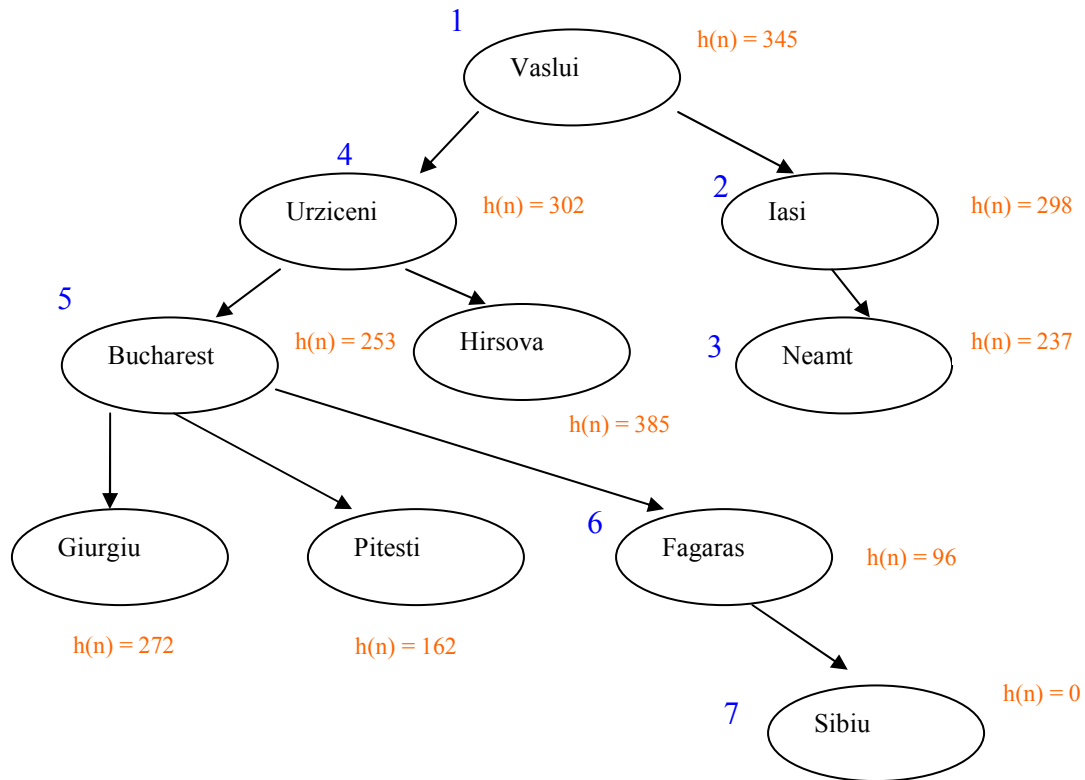
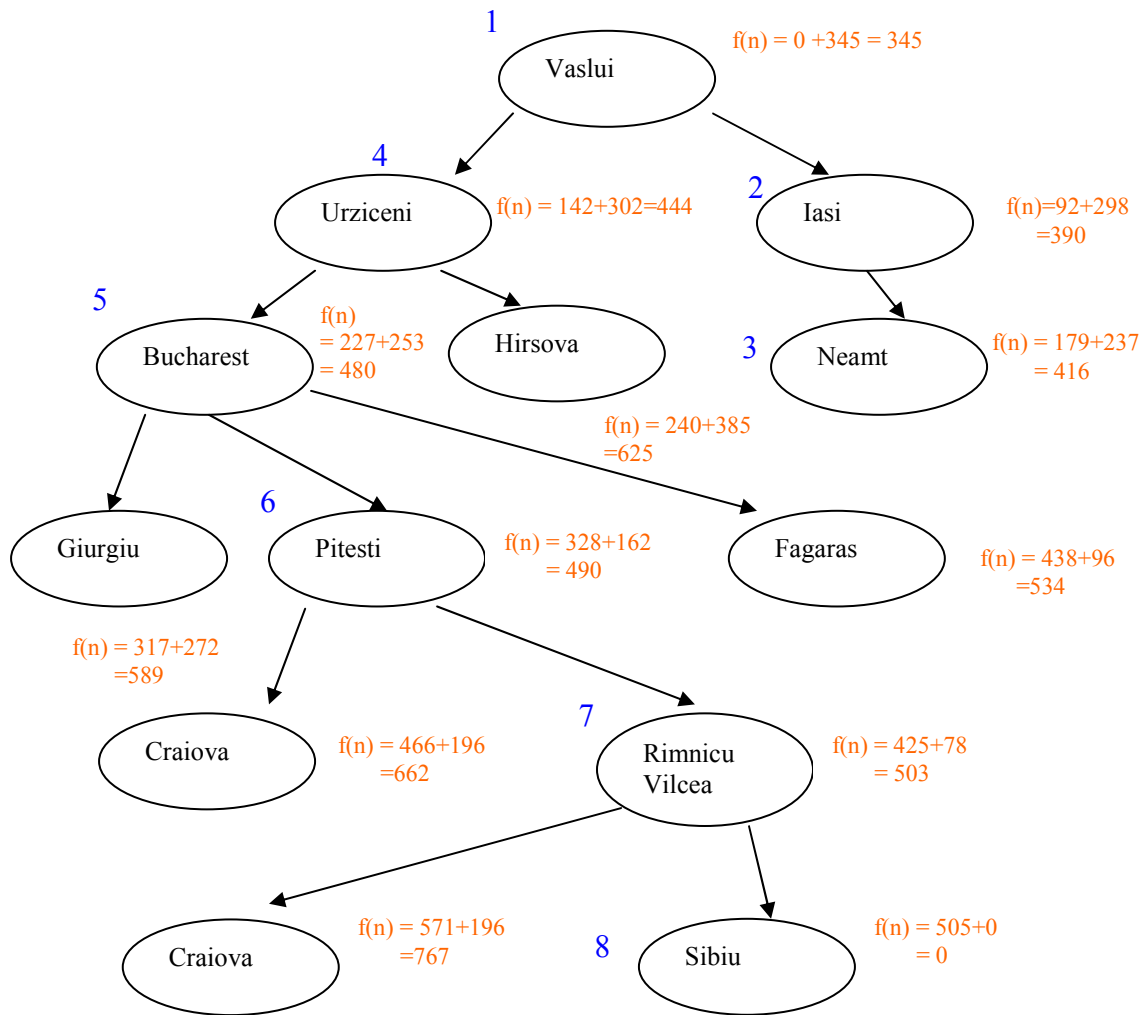


Homework #2: Chapters 4 and 6

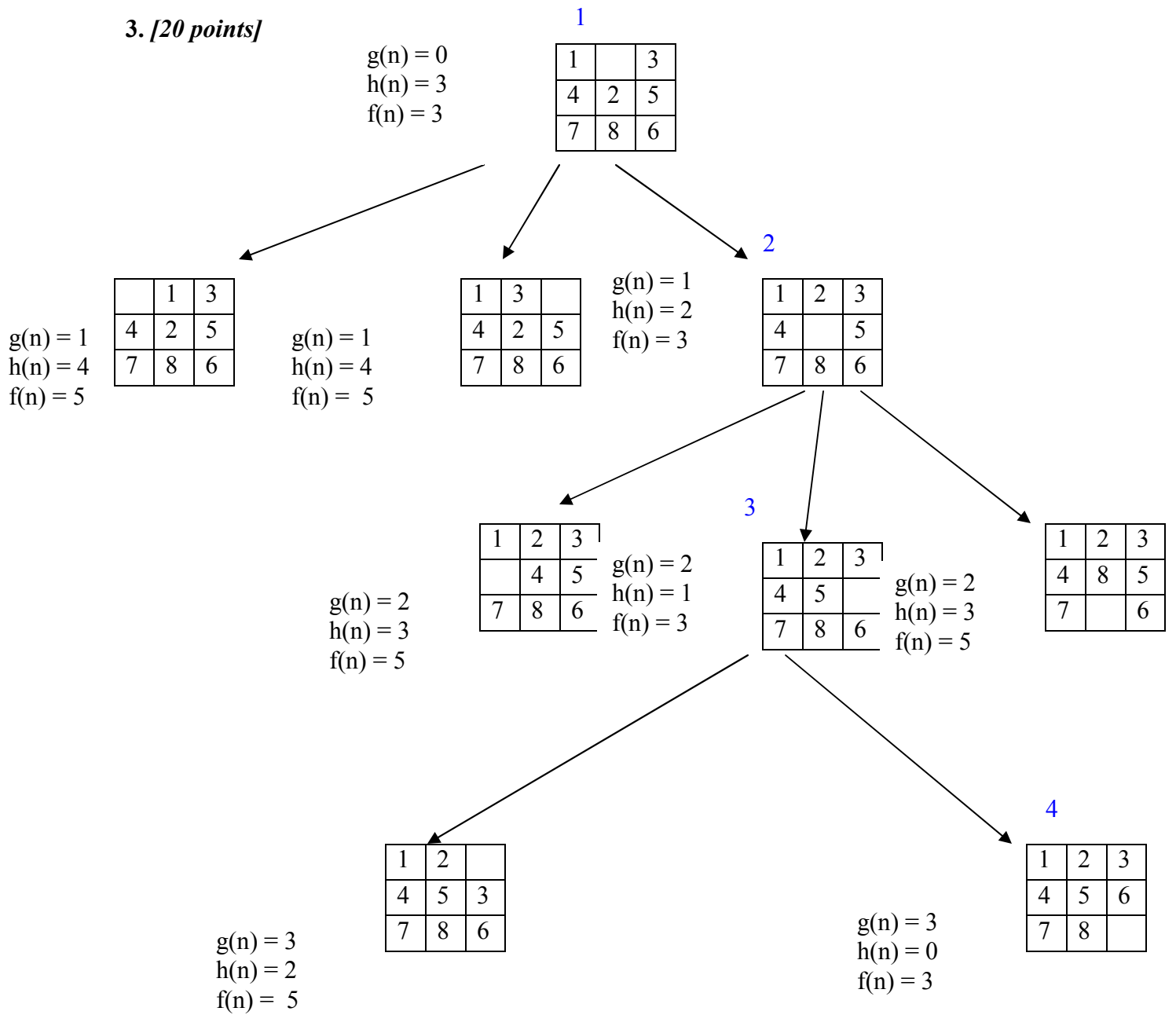
1. [15 points]



2. [15 points]



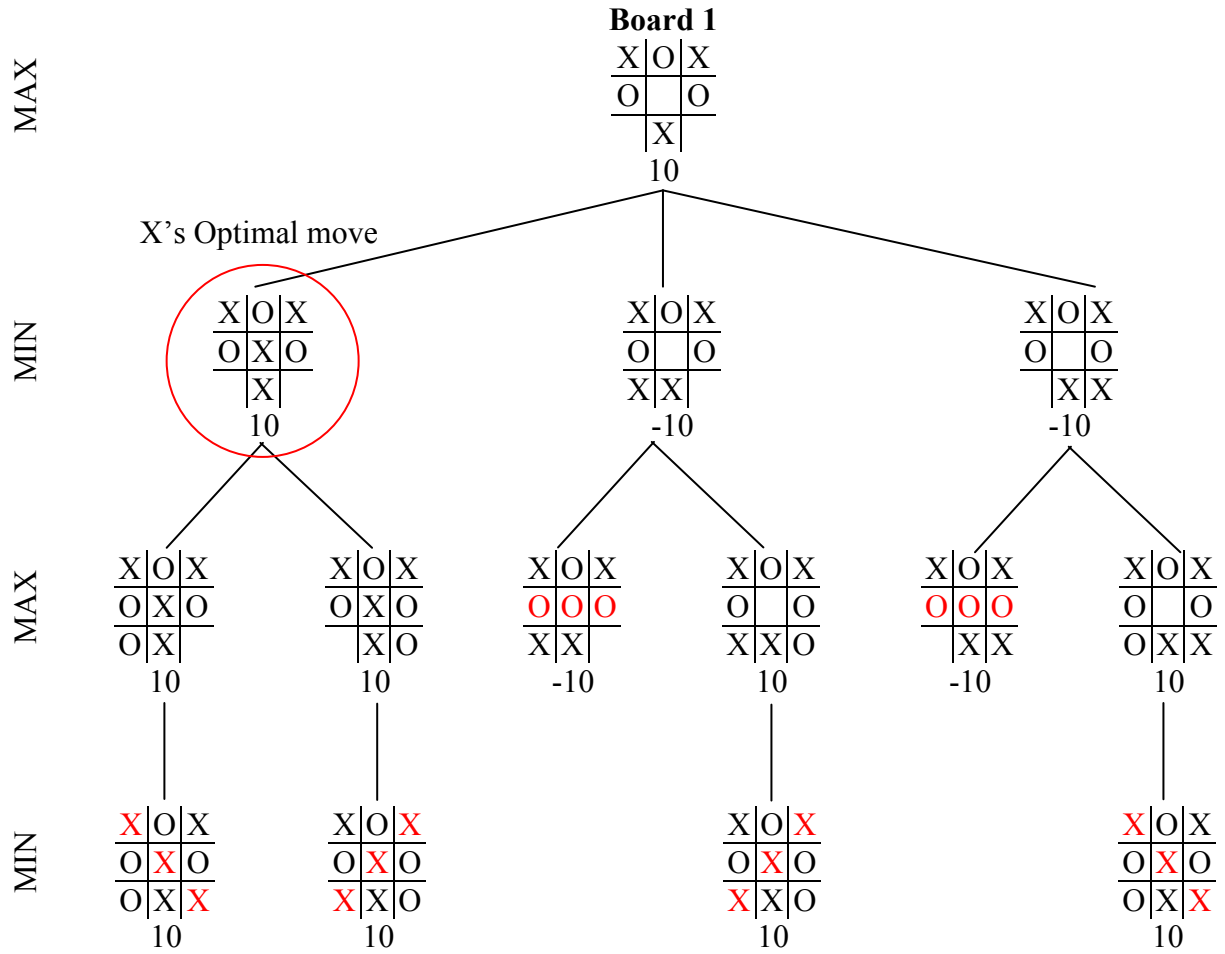
3. [20 points]



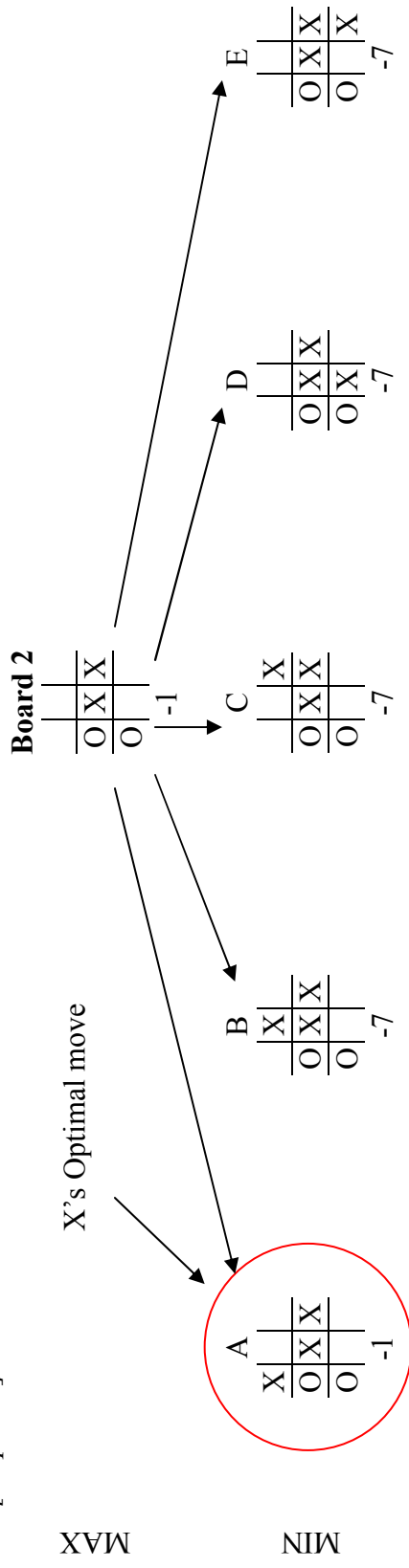
4. [10 points]

There are 9 places to put the first mark (an X), 8 places to put the next mark (an O), 7 to put the next mark (an X), etc. Therefore, there are up to $9!=362,880$ possible games. But, many of these games will never involve 9 moves because the game will terminate before the 9th move if either X or O get three in a row earlier. It is not possible to have a winner until one player has moved at least 3 times (5 total moves between the players). Therefore, there are at least $9*8*7*6*5=15,120$ possible games. For the purpose of approximation, it suffices to say that there are between 15,120 and 362,880 possible games. Significantly more complex calculations (or brute force) would be required to get an exact count.

5a. [15 points]



5b. [25 points]



$\begin{array}{ c c c } \hline X O \\ \hline O X \\ \hline O \\ \hline \end{array} \quad 3(1)+1-(1) = 3$	$\begin{array}{ c c c } \hline X \\ \hline O X \\ \hline O O \\ \hline \end{array} \quad 3(1)+2-3(1) = 2$	$\begin{array}{ c c c } \hline X O \\ \hline O X \\ \hline O \\ \hline \end{array} \quad 3+1-(10+1) = -7$	$\begin{array}{ c c c } \hline X \\ \hline O X \\ \hline O O \\ \hline \end{array} \quad 3+1-(3+1) = -3$	$\begin{array}{ c c c } \hline X \\ \hline O X \\ \hline O O \\ \hline \end{array} \quad 3+1-(3(2)) = -2$
A's children				

$\begin{array}{ c c c } \hline O X \\ \hline O X \\ \hline O \\ \hline \end{array} \quad 3+1-(10+1) = -7$	$\begin{array}{ c c c } \hline O X \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3+1-(10+1) = -7$	$\begin{array}{ c c c } \hline O \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 2-(3(1)+1) = -2$	$\begin{array}{ c c c } \hline O \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3+1-(3+1) = 0$	$\begin{array}{ c c c } \hline O X \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3(1)-(3(1)) = 0$
C's children				

$\begin{array}{ c c c } \hline O \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3+1-(10+1) = -7$	$\begin{array}{ c c c } \hline O X \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3(2)-(3(1)+1) = 2$	$\begin{array}{ c c c } \hline O \\ \hline O X \\ \hline O X \\ \hline \end{array} \quad 3+1-(3+1) = 0$	$\begin{array}{ c c c } \hline O X \\ \hline O O \\ \hline O X \\ \hline \end{array} \quad 3(2)-3(1) = 3$
E's children			