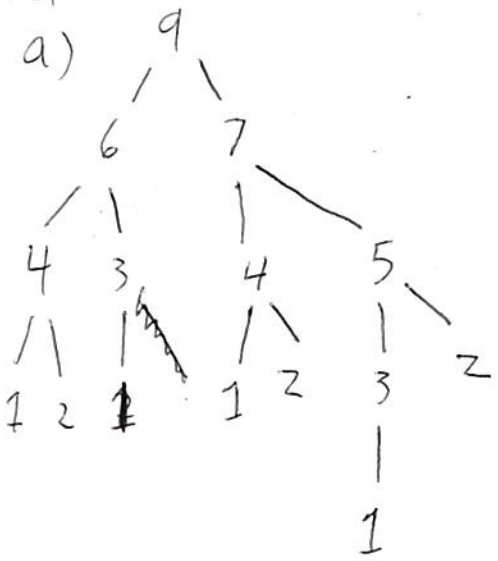


Q3

a)



player 1 wins

b) who win if n matches

- | | |
|----------------------------------|-----------------------------------|
| $n=1 \Rightarrow \text{draw}$ | $n=6 \Rightarrow \text{draw}$ |
| $n=2 \Rightarrow 2 \text{ wins}$ | $n=7 \Rightarrow 2 \text{ wins}$ |
| $n=3 \Rightarrow \text{draw}$ | $n=8 \Rightarrow \text{draw}$ |
| $n=4 \Rightarrow 1 \text{ wins}$ | $n=9 \Rightarrow 1 \text{ wins}$ |
| $n=5 \Rightarrow 1 \text{ wins}$ | $n=10 \Rightarrow 1 \text{ wins}$ |

it could be proven by induction (not asked) that:

$$\text{Winner} = \begin{cases} n \% 5 = 1 \Rightarrow \text{draw} \\ n \% 5 = 2 \Rightarrow 2 \text{nd player wins} \\ n \% 5 = 3 \Rightarrow \text{draw} \\ n \% 5 = 4 \Rightarrow 1 \text{st player wins} \\ n \% 5 = 0 \Rightarrow 1 \text{st player wins} \end{cases}$$