X, Y, and Z want to order a pizza but no one is willing to pay. So they decide to take turns flipping a coin. The first one to get a **head** pays for the pizza. The first flip is done by X, then Y, then Z, then X, and so on. The sample space of this experiment can be defined by

$$\Omega = \begin{cases} H, TH, TTH, TTTH, \ldots, \\ TTTT\cdots \quad \text{(this is the case that head never occurs till the end of time)} \end{cases}$$

Define the following events using set notations:

(i) X pays.

(ii) Y pays.

(iii) $(X \cup Y)^c$ pays.

Note that: X is on turn on $1, 4, 7, \ldots$ flip, Y is on turn on $2, 5, 8, \ldots$ flip and Z is on turn on $3, 6, 9, \ldots$ flip...