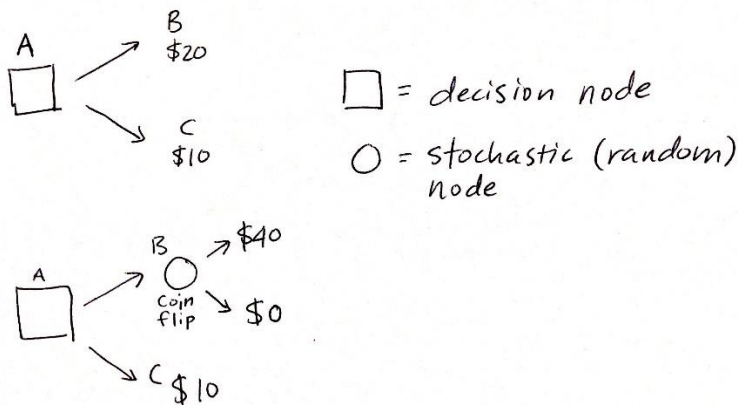
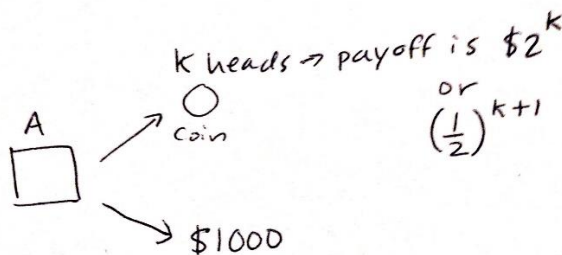


- Function  $f(x,y)$ 
  - Think of  $f$  as a policy or a decision/allocation
  - Ex:  $f(x,y)=ax+by$  (portfolio)
- Strategy:
  - Apply the policy or function to every possible outcome
  - Take the weighted sum of those function values
- Coin example
  - Dime is certain death, penny is money
  - Point is that we always have to make statistical decisions
  - We aren't always systematic about it but we should be
- Decision problems—reduce the “stochastic nodes” to expected values, and proceed as before
  - We started from the right and moved left when reducing the nodes
  - $B$  is a random variable.  $E(B)=0.5*0+0.5*40=\$20$

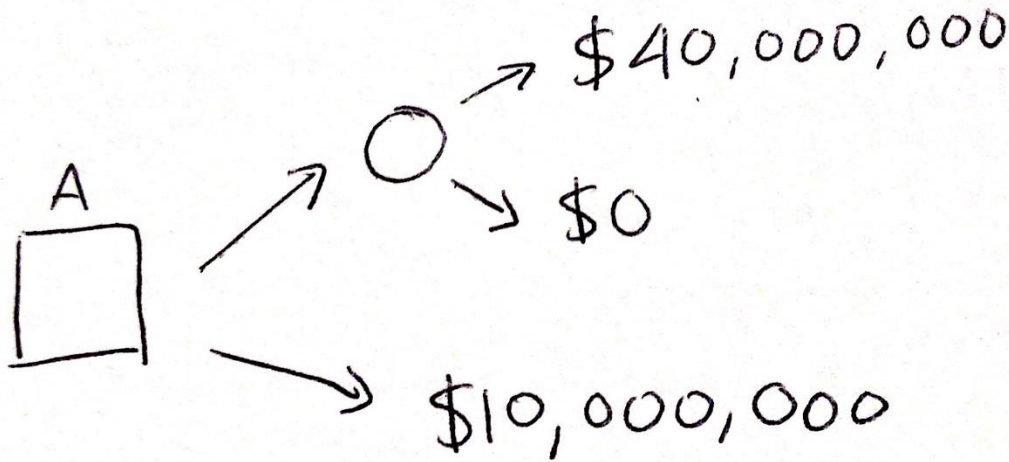


- When we do it again with values in the millions, we typically ignore the higher expected value of the coin flip and go with the sure \$10 million instead



- Flipping game:  $E(\text{coin}) = .5*1 + .25*2 + .125*4 + .0625*8 \dots$  and so on  $= 0.5*(\text{infinite})$ 
  - Even though the expected value of flipping is infinity, we still choose the \$1000

- How can we modify our decision-making principle so that our outcome doesn't seem so stupid?



- When we retry the first decision problem with values in the millions, we all choose to take the money rather than flip
- As the money increases, its utility levels out
- Measure things in utility rather than the dollar amounts (utility function)

