First question to ask yourself:
what is my ranking of the basic outcomes?

state →	s_1	s_2	s_3
act ↓			
a_1	z_1	z_2	z_3
a_2	z_4	z_5	z_6
a_3	z_7	z_8	z_9

state →	s_1	s_2	s_3		
act ↓				best	z_8
					z_3
a_1	z_1	z_2	z_3		z_1, z_9
a_2	z_4	z_5	z_6		z_2, z_6
a_3	z_7	z_8	z_9		z_4, z_5
				worst	z_7

Note:

- a_1

Thus …

state $\rightarrow$	s_1	s_2	s_3			Utility
act $\downarrow$				best	z_8	1
					z_3	
a_1	z_1	z_2	z_3		z_1, z_9	
a_3	z_7	z_8	z_9		z_2	
				worst	z_7	0

Three questions to ask yourself:

Note that p is the probability of the worst outcome, not the best

(1) What p is such that $\begin{pmatrix} z_3 \\ 1 \end{pmatrix} \sim \begin{pmatrix} z_7 & z_8 \\ p & 1-p \end{pmatrix}$? Suppose the answer is

(2) What p is such that $\begin{pmatrix} z_1 \\ 1 \end{pmatrix} \sim \begin{pmatrix} z_7 & z_8 \\ p & 1-p \end{pmatrix}$? Suppose the answer is

(3) What p is such that $\begin{pmatrix} z_2 \\ 1 \end{pmatrix} \sim \begin{pmatrix} z_7 & z_8 \\ p & 1-p \end{pmatrix}$? Suppose the answer is

		Utility
best	z_8	1
	z_3	$\frac{3}{4}$
	z_1, z_9	$\frac{2}{3}$
	z_2	$\frac{2}{5}$
worst	z_7	0

In order not to deal with fractions, rescale the utility function by multiplying each number by 60:

		Utility
best	z_8	60
	z_3	45
	z_1, z_9	40
	z_2	24
worst	z_7	0

state $\rightarrow$	s_1	s_2	s_3
act $\downarrow$			
a_1	40	24	45
a_3	0	60	40

Next step: try to assign probabilities to the states (from objective data or some subjective assessment). Suppose you assess the following:

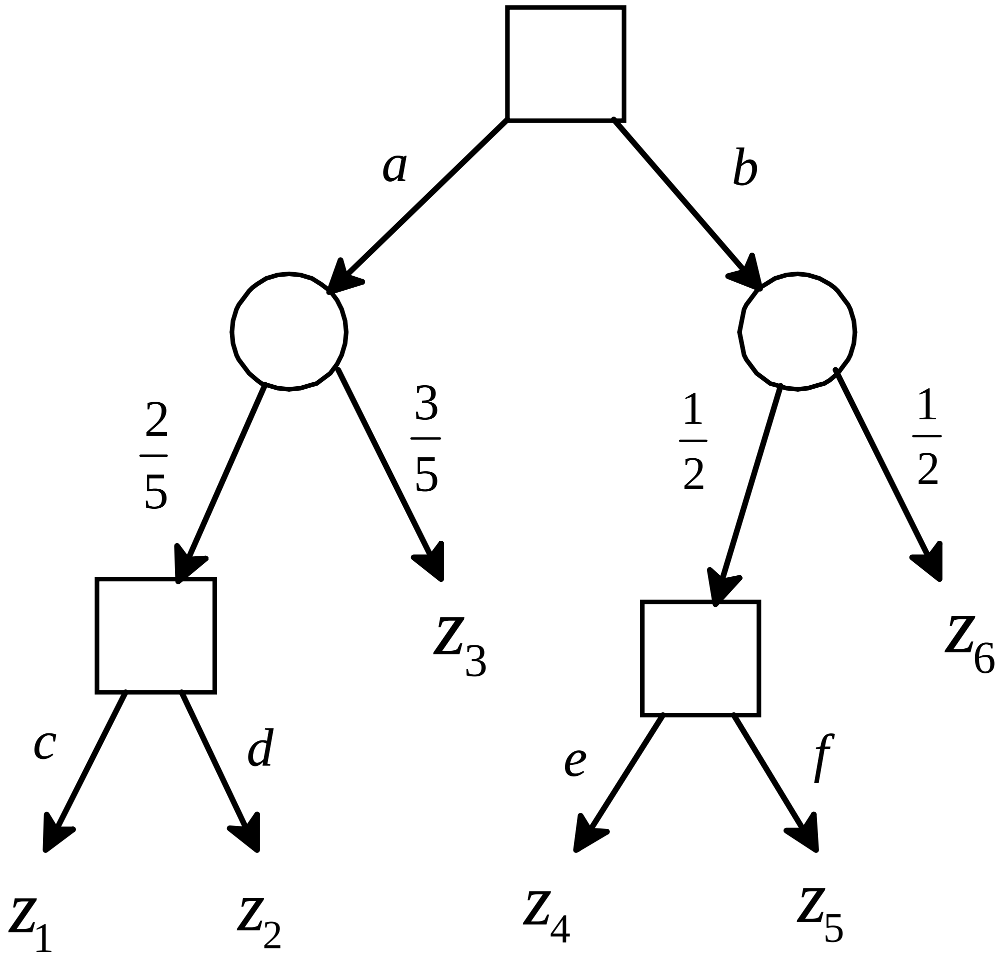
state:	s_1	s_2	s_3
probability:	$\frac{1}{5}$	$\frac{3}{5}$	$\frac{1}{5}$

Then: $\mathbb{E}[U(a_1)] =$

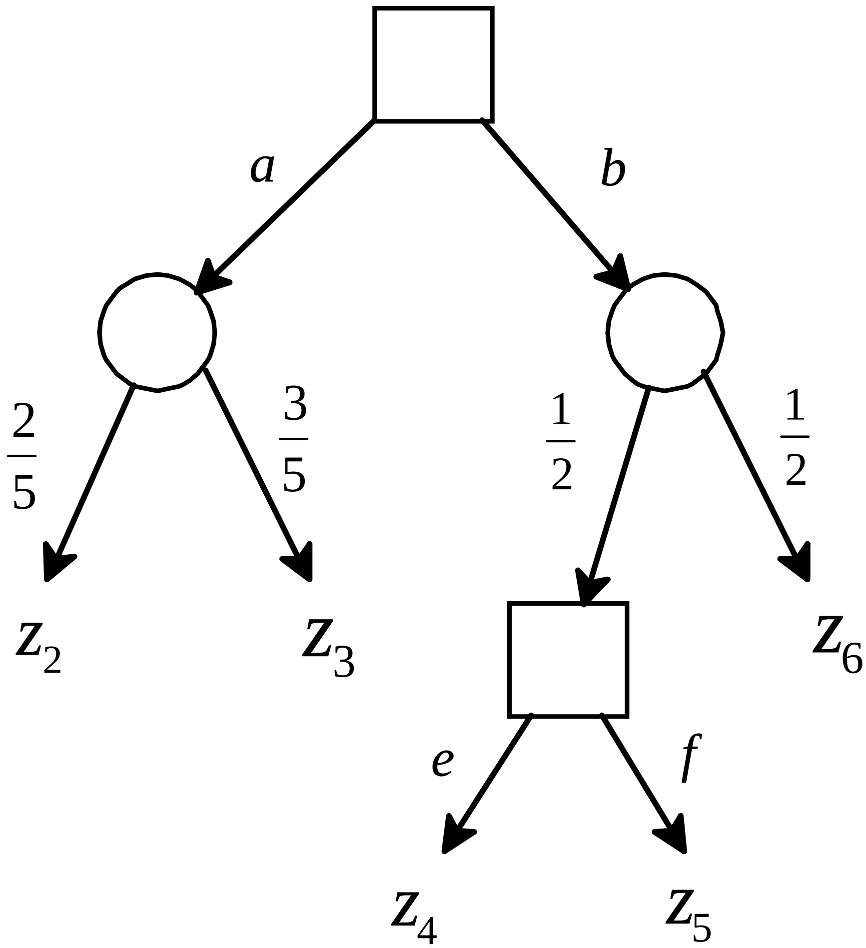
$\mathbb{E}[U(a_3)] =$

Hence you should take action

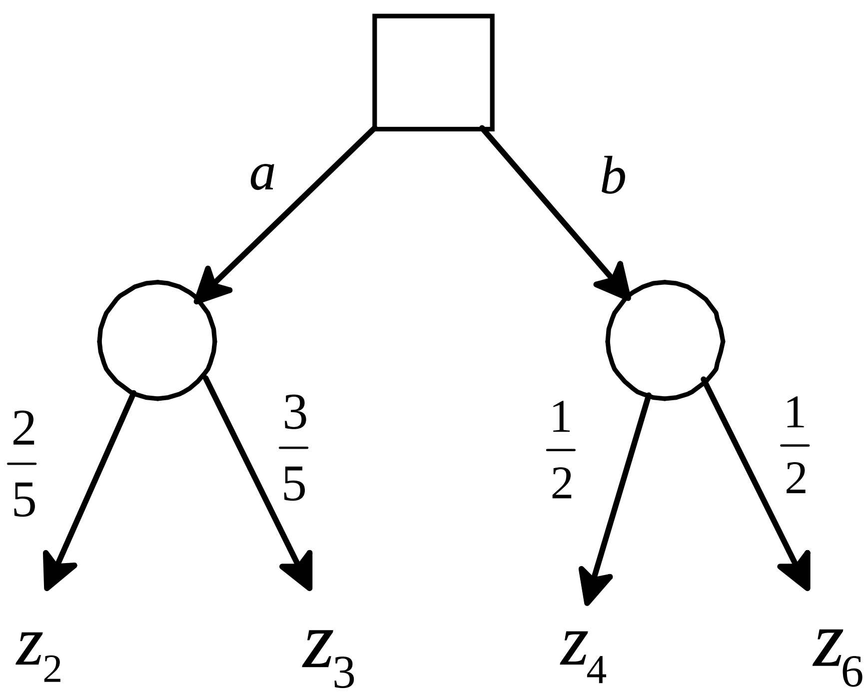
Decision tree

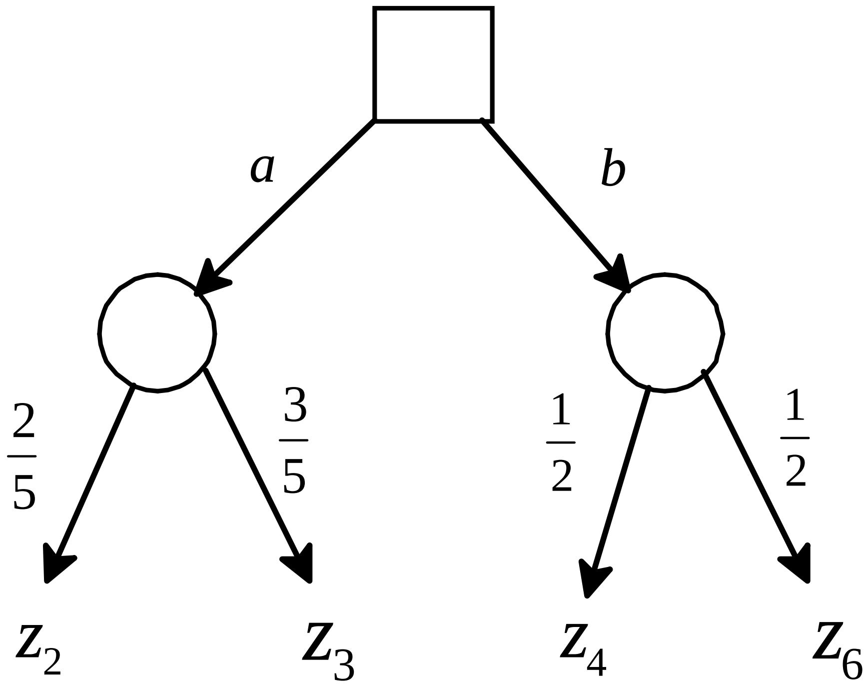


First question to ask yourself: how do I rank z_1 and z_2? Suppose that the answer is $z_2 \succ z_1$.



Second question to ask yourself: how do I rank z_4 and z_5? Suppose that the answer is $z_4 \succ z_5$.

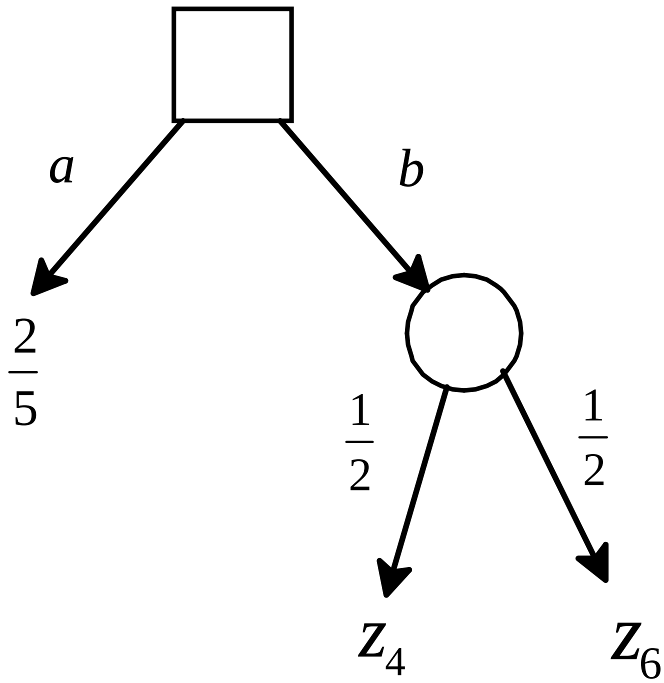




Next question: how do I rank the remaining four outcomes? Suppose:

		Utility
best	z_2	1
	z_6	
	z_4	
worst	z_3	0

This is sufficient to eliminate the random event on the left:

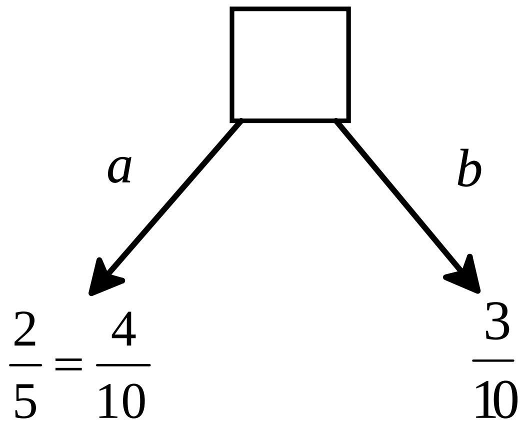


Two more questions and then you are done!

(4) What p is such that $\begin{pmatrix} z_6 \\ 1 \end{pmatrix} \sim \begin{pmatrix} z_2 & z_3 \\ p & 1-p \end{pmatrix}$? Suppose the answer is $p = \frac{1}{2}$.

(5) What p is such that $\begin{pmatrix} z_4 \\ 1 \end{pmatrix} \sim \begin{pmatrix} z_2 & z_3 \\ p & 1-p \end{pmatrix}$? Suppose the answer is $p = \frac{1}{10}$.

Then the lottery corresponding to the random event on the right has an expected utility of



Hence the optimal decision is to first take action *a* and then, if a second choice is required between *c* and *d*, choose *d*: