8.3 To calculate the conditional expectations, one needs to know the conditional probabilities of moving in the decision tree. These can be worked out backwards, from the unconditional probabilities of passing through a specific node, see Figure 1.

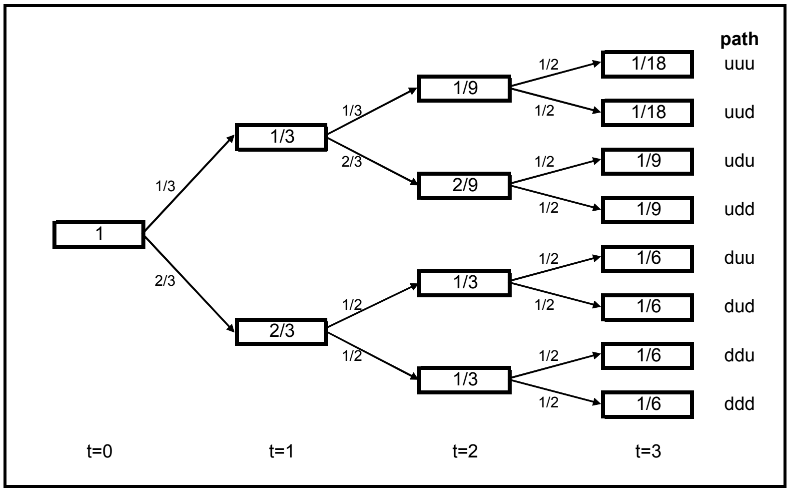

Figure 1: One-step conditional probabilities are at the branches; the number at each node signifies the unconditional probability of passing through that node.

With the one-step conditional probabilities in hand we can work backwards to obtain $\mathrm{E}_2[X]$, then $\mathrm{E}_1[X] = \mathrm{E}_1[\mathrm{E}_2[X]]$ and finally $\mathrm{E}_0[X] = \mathrm{E}_0[\mathrm{E}_1[X]]$. Since $\mathrm{E}_1[X]$ is known at $t = 1$ it is also known at $t = 2$, therefore $\mathrm{E}_2[\mathrm{E}_1[X]] = \mathrm{E}_1[X]$. For numerical values see Table 1.

outcome	$P(\{\omega\})$	X	$\mathrm{E}_2[X]$	$\mathrm{E}_1[X]$	$\mathrm{E}_2[\mathrm{E}_1[X]]$	$\mathrm{E}_1[\mathrm{E}_2[X]]$	$\mathrm{E}_0[X]$
uuu	$\frac{1}{18}$	8	7.5	$6\frac{1}{6}$	$6\frac{1}{6}$	$6\frac{1}{6}$	$3\frac{13}{18}$
uud	$\frac{1}{18}$	7	7.5	$6\frac{1}{6}$	$6\frac{1}{6}$	$6\frac{1}{6}$	$3\frac{13}{18}$
udu	$\frac{1}{9}$	6	5.5	$6\frac{1}{6}$	$6\frac{1}{6}$	$6\frac{1}{6}$	$3\frac{13}{18}$
udd	$\frac{1}{9}$	5	5.5	$6\frac{1}{6}$	$6\frac{1}{6}$	$6\frac{1}{6}$	$3\frac{13}{18}$
duu	$\frac{1}{6}$	4	3.5	2.5	2.5	2.5	$3\frac{13}{18}$
dud	$\frac{1}{6}$	3	3.5	2.5	2.5	2.5	$3\frac{13}{18}$
ddu	$\frac{1}{6}$	2	1.5	2.5	2.5	2.5	$3\frac{13}{18}$
ddd	$\frac{1}{6}$	1	1.5	2.5	2.5	2.5	$3\frac{13}{18}$

Table 1: Conditional expectations