Your last submission is used for your score.

The due date for this assignment has passed.

Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may not grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension | View Key

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1. **[12.5/12.5 Points]** DETAILS | PREVIOUS ANSWERS **ASWSBE14 19.E.002.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

A decision maker faced with four decision alternatives and four states of nature develops the following profit payoff table.

Decision Alternative	States of Nature			
	s_1	s_2	s_3	s_4
d_1	16	11	12	7
d_2	13	12	10	9
d_3	11	12	12	13
d_4	10	12	13	15

The decision maker obtains information that enables the following probabilities assessments:
$P(s_1) = 0.5$, $P(s_2) = 0.2$, $P(s_3) = 0.2$, and $P(s_4) = 0.1$.

(a) Use the expected value approach to determine the optimal decision.

EV(d_1) 13.3 ✓
EV(d_2) 11.8 ✓
EV(d_3) 11.6 ✓
EV(d_4) 11.5 ✓
The optimal decision is d_1 ✓ .

(b) Now assume that the entries in the payoff table are costs. Use the expected value approach to determine the optimal decision.

The optimal decision is d_4 ✓ .

Need Help? Read It

2. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.005.MI.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

The computer-gaming market in the United States is estimated at $18.5 billion as of 2017.† Consider the case of a certain computer-gaming company located in California. It is considering the production of one of two new video games for the coming holiday season: Battle Pacific or Space Pirates. Battle Pacific is a unique game and appears to have no competition. Estimated profits (in thousands of dollars) under high, medium, and low demand are as follows.

	Demand		
Battle Pacific	**High**	**Medium**	**Low**
Profit	$1,100	$700	$300
Probability	0.2	0.5	0.3

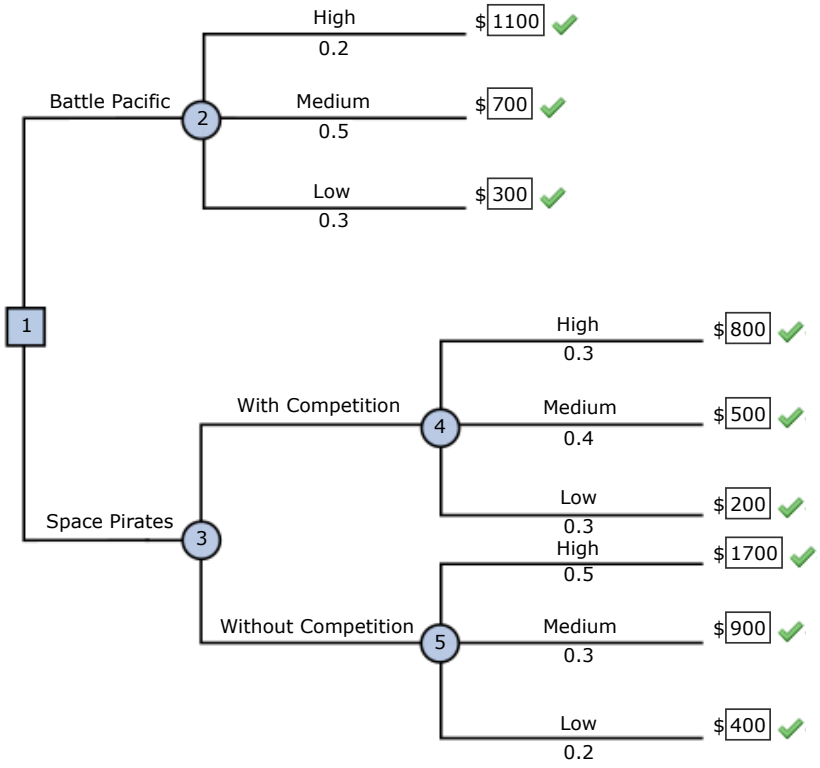
The company is optimistic about its Space Pirates game. However, the concern is that profitability will be affected by a competitor's introduction of a video game viewed as similar to Space Pirates. Estimated profits (in thousands of dollars) with and without competition are as follows.

Space Pirates	**Demand**		
With Competition	**High**	**Medium**	**Low**
Profit	$800	$500	$200
Probability	0.3	0.4	0.3

Space Pirates	**Demand**		
Without Competition	**High**	**Medium**	**Low**
Profit	$1,700	$900	$400
Probability	0.5	0.3	0.2

(a) Develop a decision tree for the company's problem.

Decision Tree Description



(b) For planning purposes, the company believes there is a 0.6 probability that its competitor will produce a new game similar to Space Pirates. Given this probability of competition, the director of planning recommends marketing the Battle Pacific video game. Using expected value, what is your recommended decision?

- ○ Battle Pacific
- ◉ Space Pirates ✓

Need Help? Read It Master It

3. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.007.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A Town Council has decided to build a new community center to be used for conventions, concerts, and other public events, but considerable controversy surrounds the appropriate size. Many influential citizens want a large center that would be a showcase for the area, but the mayor feels that if demand does not support such a center, the community will lose a large amount of money. To provide structure for the decision process, the council narrowed the building alternatives to three sizes: small, medium, and large. Everybody agreed that the critical factor in choosing the best size is the number of people who will want to use the new facility. A regional planning consultant provided demand estimates under three scenarios: worst case, base case, and best case. The worst-case scenario corresponds to a situation in which tourism drops significantly; the base-case scenario corresponds to a situation in which the town continues to attract visitors at current levels; and the best-case scenario corresponds to a significant increase in tourism. The consultant has provided probability assessments of 0.10, 0.60, and 0.30 for the worst-case, base-case, and best-case scenarios, respectively.

The town council suggested using net cash flow over a five-year planning horizon as the criterion for deciding on the best size. A consultant developed the following projections of net cash flow (in thousands of dollars) for a five-year planning horizon. All costs, including the consultant's fee, are included.

Center Size	Demand Scenario		
	Worst Case	Base Case	Best Case
Small	390	490	650
Medium	−260	640	790
Large	−410	570	980

(a) What decision should the town make using the expected value approach?

EV(Small) 528 ✓
EV(Medium) 595 ✓
EV(Large) 595 ✓
The best decision is to build a medium or large-sized ✓ community center.

(b) Compute the expected value of perfect information.

EVPI = 122 ✓

Do you think it would be worth trying to obtain additional information concerning which scenario is likely to occur?

- (●) The town should consider additional information about the likelihood of the three scenarios.
- ( ) The town should not consider additional information about the likelihood of the three scenarios.

✓

(c) Suppose the probability of the worst-case scenario increases to 0.2, the probability of the base-case scenario decreases to 0.5, and the probability of the best-case scenario remains at 0.3.

EV(Small) 518 ✓
EV(Medium) 505 ✓
EV(Large) 497 ✓

What effect, if any, would these changes have on the decision recommendation?

The best decision is to build a small ✓ community center.

(d) The consultant suggested that an expenditure of $150,000 on a promotional campaign over the planning horizon will effectively reduce the probability of the worst-case scenario to zero. The campaign can be expected to also increase the probability of the best-case scenario to 0.4. (Remember to subtract the cost of the promotional campaign from the expected value.)

EV(Small) 404 ✓
EV(Medium) 550 ✓
EV(Large) 584 ✓

The best decision is to build a large ✓ community center.

Compared to the analysis in part (c), is this a good investment?

- ○ It is not a good investment as the risk of loss is not eliminated.
- ◉ It is a good investment as the risk of loss is eliminated.
- ○ It is a good investment as the risk of loss is not eliminated.
- ○ It is not a good investment as the risk of loss is eliminated.

✓

Need Help? Read It

4. [11.6/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.009.MI.SA.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

To prepare for disasters such as hurricanes, organizations such as the Red Cross must make decisions about when and where to preposition relief supplies such as water, food, and medical supplies. Suppose that the Red Cross can choose to stock supplies for a possible hurricane that hits Florida either in a central distribution center that is protected from possible hurricane disaster or in regional distribution centers that are closer to where damage is expected but run the risk of being destroyed by severe hurricanes. The following table displays the costs (in $ millions) of the different decision alternatives under three possible states of nature: no hurricane landfall, moderate hurricane landfall, and severe hurricane landfall. Note that because these values represent costs, they are all displayed as negative values.

	State of Nature		
Decision Alternatives	**No Landfall, s_1**	**Moderate Landfall, s_2**	**Severe Landfall, s_3**
Stock Centralized Distribution Center, d_1	−45	−33	−80
Stock Regional Distribution Centers, d_2	−30	−60	−70

The probabilities for the states of nature are $P(s_1) = 0.23$, $P(s_2) = 0.48$, $P(s_3) = 0.29$. The Red Cross can also wait an additional 48 hours during which time an additional "hurricane hunter" flight will collect additional data on the hurricane. By waiting, the Red Cross gathers additional sample data on whether the hurricane will make a turn toward or away from Florida. The probabilities associated with these are:

P(Toward Florida) = 0.8
P(Away From Florida) = 0.2
$P(s_1|$Toward Florida$) = 0.1$
$P(s_2|$Toward Florida$) = 0.55$
$P(s_3|$Toward Florida$) = 0.35$
$P(s_1|$Away From Florida$) = 0.75$
$P(s_2|$Away From Florida$) = 0.2$
$P(s_3|$Away From Florida$) = 0.05$

(a) Construct a decision tree for this problem.

(b) What is the recommended decision if the Red Cross does not wait to make a decision?

What is the expected value of this decision?

(c) What is the optimal decision strategy if the Red Cross waits an additional 48 hours?

What is the expected value of this decision?

(d) What is the expected value of the sample data?

Step 1

(a) Construct a decision tree for this problem.

A decision tree graphically shows the sequential nature of the decision-making process. Squares are used to depict decision nodes and circles are used to depict chance nodes. The branches leaving the decision node correspond to the decision alternatives. The branches leaving each chance node correspond to the states of nature. The payoffs are shown at the end of the states-of-nature branches.

The decision alternatives and states-of-nature are summarized below.

	State of Nature		
Decision Alternatives	**No Landfall, s_1**	**Moderate Landfall, s_2**	**Severe Landfall, s_3**
Stock Centralized Distribution Center, d_1	−45	−33	−80
Stock Regional Distribution Centers, d_2	−30	−60	−70

The first node will represent whether or not the Red Cross sends supplies to distribution centers immediately or if they wait 48 hours. Therefore, node 1 is a decision ✔ node.

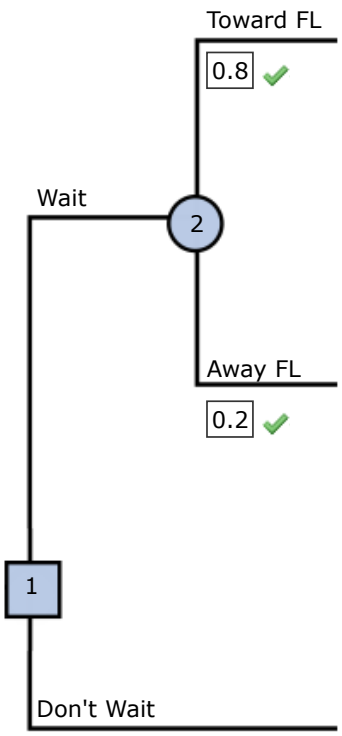
If the Red Cross waits to send supplies, there will be two possibilities for the path of the hurricane - it will either move toward or away from Florida. These possibilities will represent node 2 of the decision tree, which will be a chance ✔ node. After the path of the hurricane has been determined, supplies will be sent to either a centralized distribution center or a regional distribution center. This will represent a decision ✔ node. From each of these nodes, there are branches for no landfall, moderate landfall, and severe landfall. The type of landfall is a chance ✔ node.

If the Red Cross does not wait to send supplies, they will send supplies to either a centralized distribution center or a regional distribution center. The type of landfall will branch from each of these nodes.

Step 2

The decision tree will be partially formatted as below. The probabilities of the chance events will be placed on the branch under their respective labels. It was given that P(Toward FL) = 0.8 and P(Away from FL) = 0.2. Place these under their corresponding label in the following partial decision tree.

Decision Tree | Description



Step 3

The decision tree will be partially formatted as below. Recall that d_1 and d_2 represent the decisions to stock centralized distribution centers and a regional distribution center; s_1, s_2, and s_3 represent the states of nature for no landfall, moderate landfall, and severe landfall, respectively. The given probabilities are below.

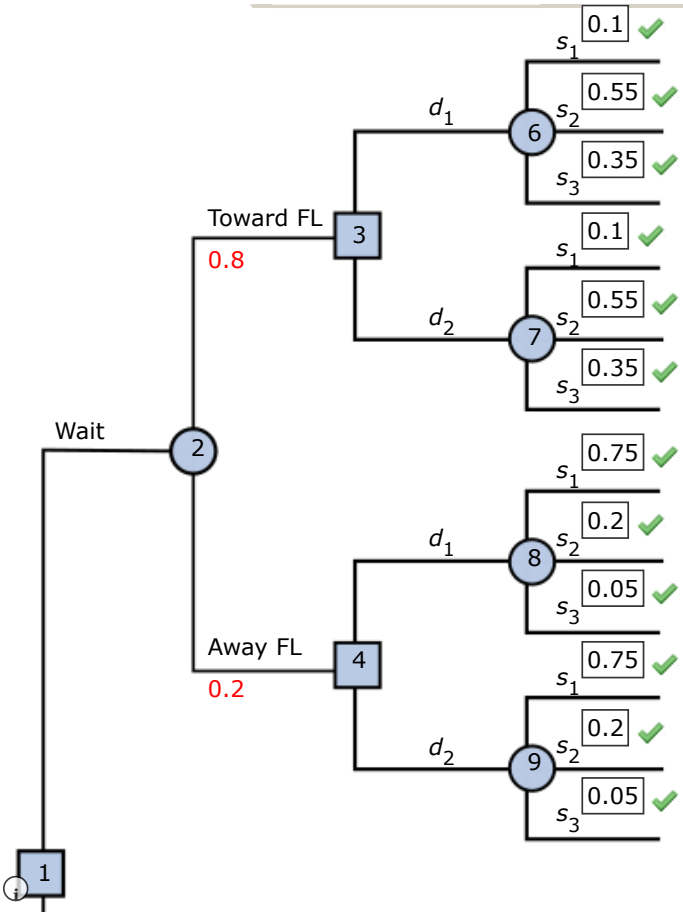
$P(s_1|\text{Toward Florida}) = 0.1$
$P(s_2|\text{Toward Florida}) = 0.55$
$P(s_3|\text{Toward Florida}) = 0.35$
$P(s_1|\text{Away From Florida}) = 0.75$
$P(s_2|\text{Away From Florida}) = 0.2$
$P(s_3|\text{Away From Florida}) = 0.05$

Note that the given probabilities only concern the path of the hurricane and the severity of the landfall. The probability statement $P(s_1|\text{Toward FL}) = 0.1$ is a conditional probability indicating that given that the hurricane is moving toward Florida, the probability of the event of no landfall is 0.1. Since this probability does not change based on decisions d_1 and d_2, the probability values for s_1 will be the same for nodes 6 and 7.

Similarly, $P(s_1|\text{Away from FL}) = 0.75$ indicates that given the hurricane moves away from Florida, the probability of the event of no landfall is 0.75. Since this probability does not change based on decisions d_1 and d_2, the probability values for s_1 will be the same for nodes 8 and 9.

Place the probabilities on the branch of their corresponding states of nature.

Decision Tree | Description

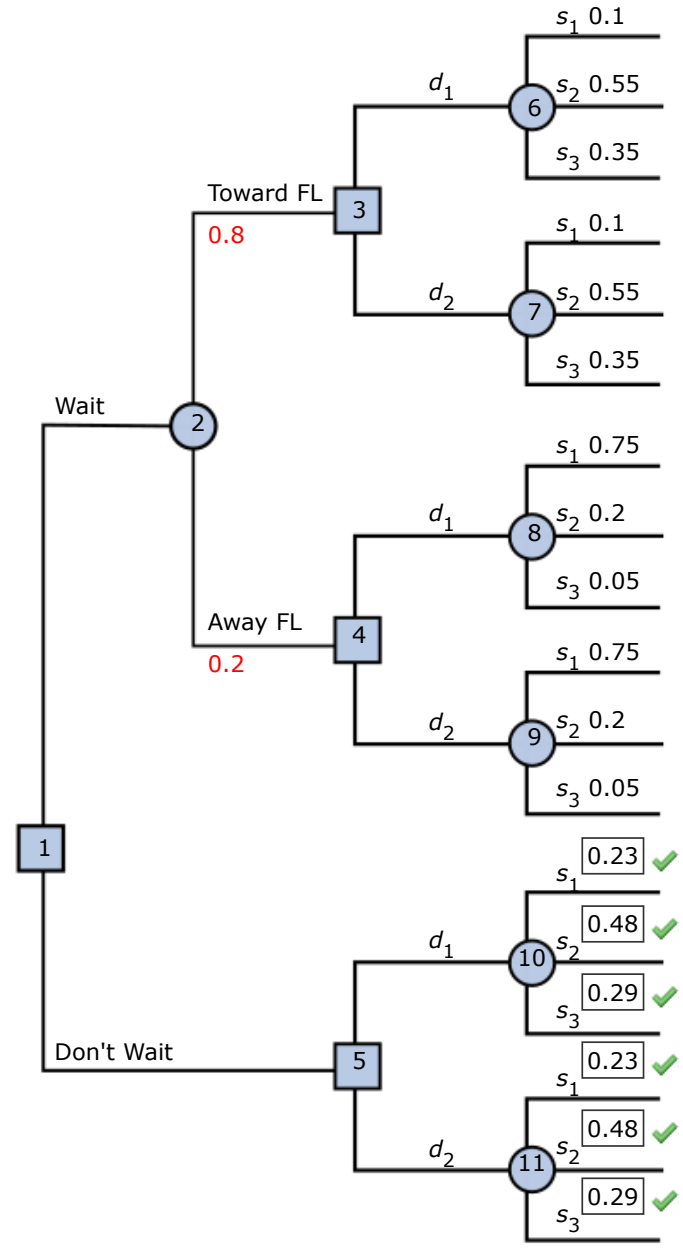


Step 4

The decision tree will be partially formatted as below. Recall that d_1 and d_2 represent the decisions to stock centralized distribution centers and a regional distribution center; s_1, s_2, and s_3 represent the states of nature for no landfall, moderate landfall, and severe landfall, respectively. It is given that $P(s_1) = 0.23$, $P(s_2) = 0.48$, and $P(s_3) = 0.29$. Since these probabilities do not change based on decisions d_1 and d_2, the probability values for s_1, s_2, and s_3 will be the same for nodes 10 and 11.

Place the probabilities on the branch of their corresponding states of nature.

Decision Tree | Description



Step 5

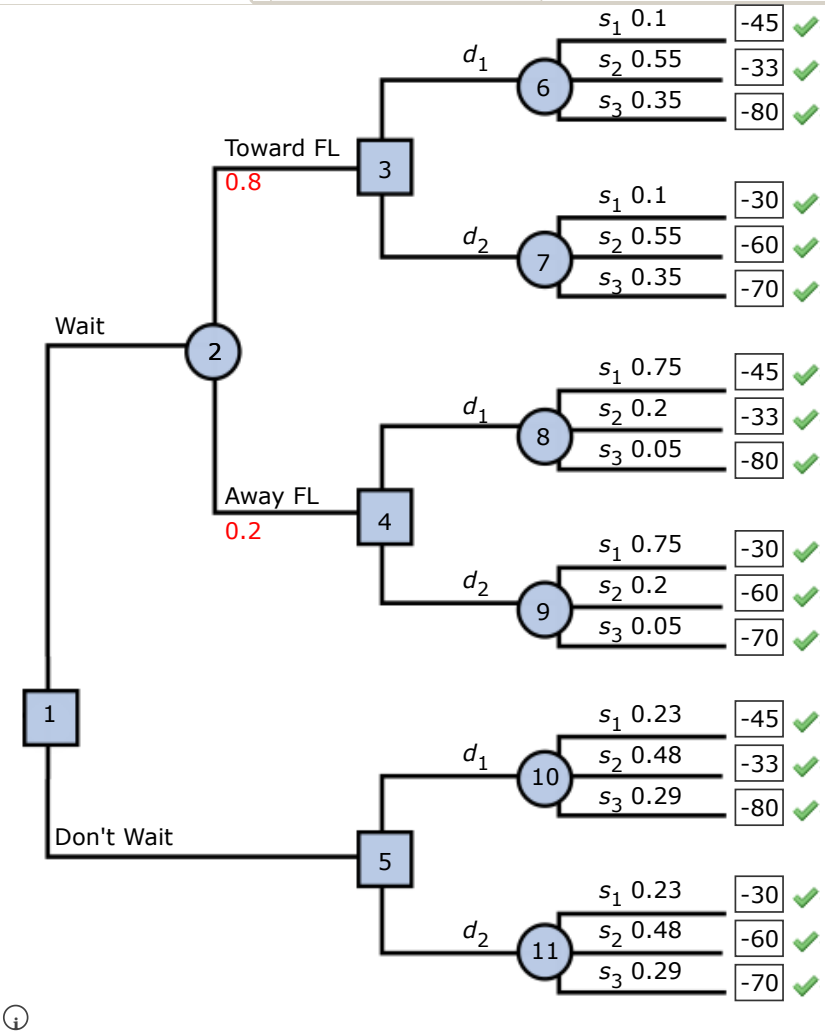
The consequence resulting from a specific combination of a decision alternative and state of nature is referred to as a payoff. These are placed at the end of the states-of-nature branches. The payoff here is the costs (in $ millions) of the different decision alternatives under the three possible states of nature. Recall the given information.

	State of Nature		
Decision Alternatives	**No Landfall, s_1**	**Moderate Landfall, s_2**	**Severe Landfall, s_3**
Stock Centralized Distribution Center, d_1	−45	−33	−80
Stock Regional Distribution Centers, d_2	−30	−60	−70

Since these costs do not change based on whether the hurricane moves toward or away from Florida, the cost associated with decision d_1 state of nature s_1 will be the same for nodes 6, 8, and 10. This will be the case for other combinations of decision alternatives and states of nature.

Enter the payoff values to the decision tree.

Decision Tree | Description



Step 6

(b) What is the recommended decision if the Red Cross does not wait to make a decision? What is the expected value of this decision?

The recommended decision will be the one that has the best expected value. The expected value for a chance node is found by multiplying the payoff at the end of each branch by the corresponding branch probability. The sum of these values results in the expected value for the corresponding decision node.

See the decision tree from part (a).

For this scenario, the expected values are the cost in millions of dollars for supplies. Thus, the best expected value will be the one which results in the lowest ✓ cost. Since the Red Cross will not wait to send supplies, the expected values for chance nodes 10 and 11 ✓ need to be found and compared.

Step 7

The recommended decision will result in the lowest expected cost of node 10 or 11. See the decision tree from part (a).

The expected value for a node is found by multiplying the cost at the end of branch by the corresponding probability. Find the expected value, in millions of dollars, for node 10.

EV(node 10) = 0.23(−45) + 0.48(−33) + 0.29(−80)
= $[-49.39] ✓ million

Find the expected value, in millions of dollars, for node 11.

EV(node 11) = 0.23(−30) + 0.48(−60) + 0.29(−70)
= $[-56] ✓ million

The best expected value results in a total cost of $[49.39] ✓ million. Therefore, if the Red Cross does not wait to send supplies, they should stock the [centralized distribution center] ✓ .

Step 8

(c) What is the optimal decision strategy if the Red Cross waits an additional 48 hours? What is the expected value of this decision?

If the Red Cross waits an additional 48 hours to send supplies, then there are two chance possibilities for the path of the hurricane and three possibilities for the severity of landfall. Recall the decision tree from part (a).

If the hurricane moves toward Florida, a decision needs to be made for which distribution centers to stock with supplies. Thus, the expected costs for nodes 6 and 7 will be determined. The lowest cost will result in the best decision.

Find the expected value of node 6, in millions of dollars.

EV(node 6) = 0.1(−45) + 0.55(−33) + 0.35(−80)
= $[-50.65] ✓ million

Find the expected value of node 7, in millions of dollars.

EV(node 7) = 0.1(−30) + 0.55(−60) + 0.35(−70)
= $[-60.5] ✓ million

The best expected value results in a total cost of $[50.65] ✓ million. Thus, if the hurricane moves toward Florida, the Red Cross should stock the [centralized distribution center] ✓ .

Step 9

Recall the decision tree from part (a).

If the hurricane moves away from Florida, a decision needs to be made for which distribution centers to stock with supplies. Thus, the expected costs for nodes 8 and 9 will be determined. The lowest cost will result in the best decision.

Find the expected value of node 8, in millions of dollars.

EV(node 8) = 0.75(−45) + 0.2(−33) + 0.05(−80)
= $[-44.35] ✓ million

Find the expected value of node 9, in millions of dollars.

EV(node 9) = 0.75(−30) + 0.2(−60) + 0.05(−70)
= $[-38] ✓ million

The best expected value results in a total cost of $[38] ✓ million. Thus, if the hurricane moves away from Florida, the Red Cross should stock the [regional distribution center] ✓ .

Step 10

If the hurricane moves toward Florida, the Red Cross should stock a centralized distribution center at a cost of $50.65 million. If the hurricane moves away from Florida, the Red Cross should stock regional distribution centers at a cost of $38 million.

The expected value of the Red Cross waiting to send supplies can be found as follows.

$$\text{expected value} = P(\text{Toward FL})EV(\text{node 3}) + P(\text{Away from FL})EV(\text{node 4})$$

It was given that P(Toward FL) = 0.8 and P(Away from FL) = 0.2, and we determined the expected values of nodes 3 and 4 to be −$50.65 million and −$38 million, respectively. Substitute these values to find the overall expected value of waiting 48

hours to send supplies in millions of dollars.

expected value = P(Toward FL)EV(node 3) + P(Away from FL)EV(node 4)
= 0.8(−50.65) + 0.2(-38 ✓)
= $-48.12 ✓ million

Step 11

(d) What is the expected value of the sample data?

The expected value of the sample data, EVSI, can be found using the following formula where EVwSI is the expected value with sample information about the states of nature and EVwoSI is the expected value without sample information about the states of nature.

$$EVSI = |EVwSI - EVwoSI|$$

In this scenario, the expected value with sample information is the expected value of the Red Cross waiting to send supplies which was found to be −$48.12 million. The expected value without sample information is the expected value of the Red Cross not waiting to send supplies, −$49.39 million. Use these values to calculate EVSI, in millions of dollars.

EVSI = |EVwSI − EVwoSI|
= |−48.12 − (-60.5 ✗)|
= $12.38 ✗ million

Thus, the expected value of the sample information is, in millions of dollars, $12.38 ✗ million.

You have now completed the Master It.

Need Help? Read It

5. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.011.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

More than 500 scripted television series were available for viewing in 2018.† New series typically start by producing a pilot episode that can be evaluated by a network before it agrees to pick up the series for production. Hale's TV Productions is considering producing a pilot for a comedy series in the hope of selling it to a major television network. The network may decide to reject the series, but it may also decide to purchase the rights to the series for either one or two years. At this point in time, Hale may either produce the pilot and wait for the network's decision or transfer the rights for the pilot and series to a competitor for $100,000. Hale's decision alternatives and profits (in thousands of dollars) are as follows:

Decision Alternative	State of Nature		
	Reject, s_1	1 Year, s_2	2 Years, s_3
Produce pilot, d_1	−100	50	150
Sell to competitor, d_2	100	100	100

The probabilities for the states of nature are $P(s_1)$ = 0.1878, $P(s_2)$ = 0.3210, and $P(s_3)$ = 0.4912. For a consulting fee of $5,000, an agency will review the plans for the comedy series and indicate the overall chances of a favorable network reaction to the series. Assume that the agency review will result in a favorable (F) or an unfavorable (U) review and that the following probabilities are relevant.

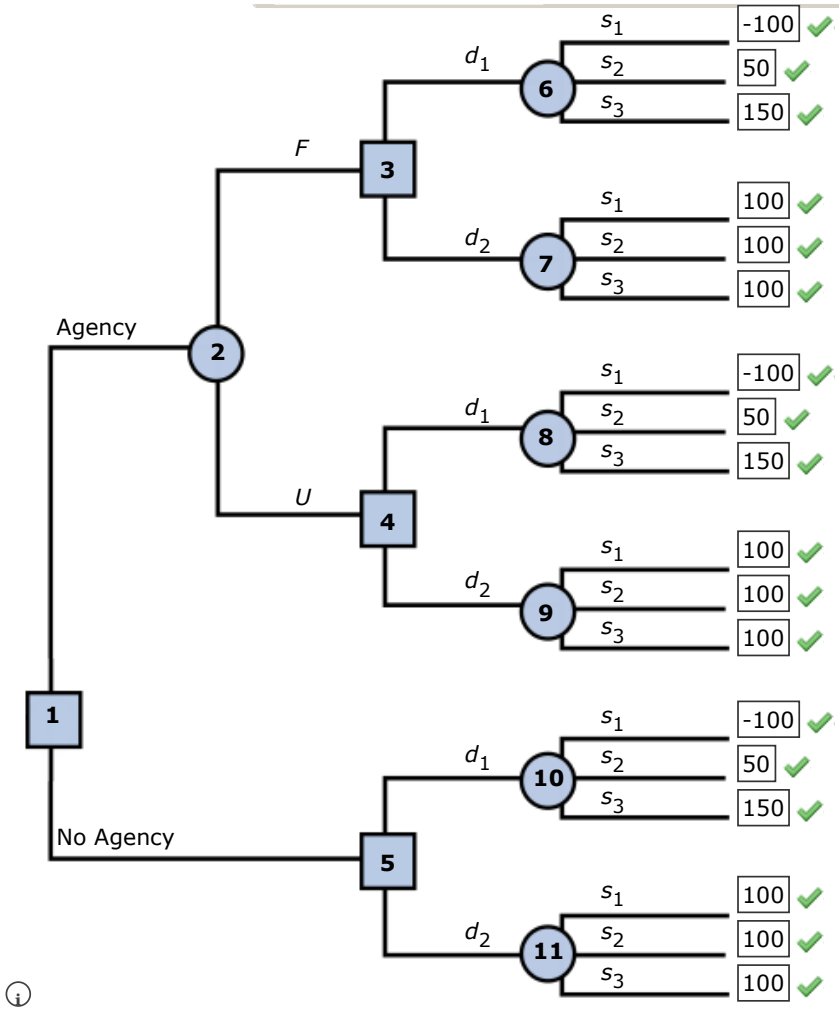
$P(F) = 0.69$
$P(U) = 0.31$

$P(s_1|F) = 0.07$
$P(s_2|F) = 0.29$
$P(s_3|F) = 0.64$

$P(s_1|U) = 0.45$
$P(s_2|U) = 0.39$
$P(s_3|U) = 0.16$

(a) Construct a decision tree for this problem. (Enter your answers in thousands of dollars.)

Decision Tree Description



(b) What is the recommended decision if the agency opinion is not used?

- produce pilot, d_1
- sell to competitor, d_2 ✓

What is the expected value (in thousands of dollars)?

100 ✓ thousand dollars

(c) What is the expected value of perfect information (in thousands of dollars)?

24.56 ✓ thousand dollars

(d) What is Hale's optimal decision strategy assuming the agency's information is used?

If favorable, produce ✓ . If unfavorable, sell ✓ .

(e) What is the expected value (in thousands of dollars) of the agency's information? (Round your answer to two decimal places.)

2.42 ✓ thousand dollars

(f) Is the agency's information worth the $5,000 fee?

- ○ Yes
- ◉ No ✓

What is the maximum that Hale should be willing to pay (in thousands of dollars) for the information? (Round your answer to two decimal places.)

2.42 ✓ thousand dollars

(g) What is the recommended decision?

- ○ Agency; if unfavorable, sell to competitor
- ○ Agency; if favorable, produce the pilot
- ○ No agency; produce the pilot
- ◉ No agency; sell to competitor ✓

Need Help? Read It

6. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.013.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Lawson's Department Store faces a buying decision for a seasonal product for which demand can be high, medium, or low. The purchaser for Lawson's can order 1, 2, or 3 lots of the product before the season begins but cannot reorder later. Profit projections (in thousands of dollars) are shown.

Decision Alternative	State of Nature		
	High Demand s_1	Medium Demand s_2	Low Demand s_3
Order 1 lot, d_1	60	60	50
Order 2 lots, d_2	80	80	30
Order 3 lots, d_3	100	70	10

(a) If the prior probabilities for the three states of nature are 0.284, 0.28, and 0.436, for high, medium, and low demands, respectively, what is the recommended order quantity?

- one lot
- two lots
- three lots

(b) At each preseason sales meeting, the vice president of sales provides a personal opinion regarding potential demand for this product. Because of the vice president's enthusiasm and optimistic nature, the predictions of market conditions have always been either "excellent" (E) or "very good" (V). Probabilities are as follows. What is the optimal decision strategy?

$P(E) = 0.6$
$P(V) = 0.4$

$P(s_1|E) = 0.34$
$P(s_2|E) = 0.32$
$P(s_3|E) = 0.34$

$P(s_1|V) = 0.2$
$P(s_2|V) = 0.22$
$P(s_3|V) = 0.58$

- If the vice president's prediction is excellent, one lot. If the prediction is very good, two lots.
- Do not use the vice president's prediction and order three lots.
- If the vice president's prediction is excellent, two lots. If the prediction is very good, one lot.
- Do not use the vice president's prediction and order two lots.
- If the vice president's prediction is excellent, three lots. If the prediction is very good, two lots.

(c) Compute EVPI and EVSI (in thousands of dollars). (Round your answers to one decimal place.)

EVPI $ 14.4 ✓ thousand

EVSI $ 1.28 ✓ thousand

Discuss whether the firm should consider a consulting expert who could provide independent forecasts of market conditions for the product.

Compared to the EVPI, the EVSI has a low ✓ value. This indicates additional information is probably worthwhile ✓ .

Need Help? Read It

7. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.016.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

To save on expenses, Rona and Jerry agreed to form a carpool for traveling to and from work. Rona preferred to use the somewhat longer but more consistent Queen City Avenue. Although Jerry preferred the quicker expressway, he agreed with Rona that they should take Queen City Avenue if the expressway had a traffic jam. The following payoff table provides the one-way time estimate in minutes for traveling to and from work.

Decision Alternative	State of Nature	
	Expressway Open s_1	Expressway Jammed s_2
Queen City Avenue, d_1	40	40
Expressway, d_2	35	55

Based on their experience with traffic problems, Rona and Jerry agreed on a 0.1 probability that the expressway would be jammed.

In addition, they agreed that weather seemed to affect the traffic conditions on the expressway. Let

C = clear

O = overcast

R = rain

The following conditional probabilities apply.

$P(C|s_1) = 0.8$
$P(C|s_2) = 0.1$

$P(O|s_1) = 0.2$
$P(O|s_2) = 0.3$

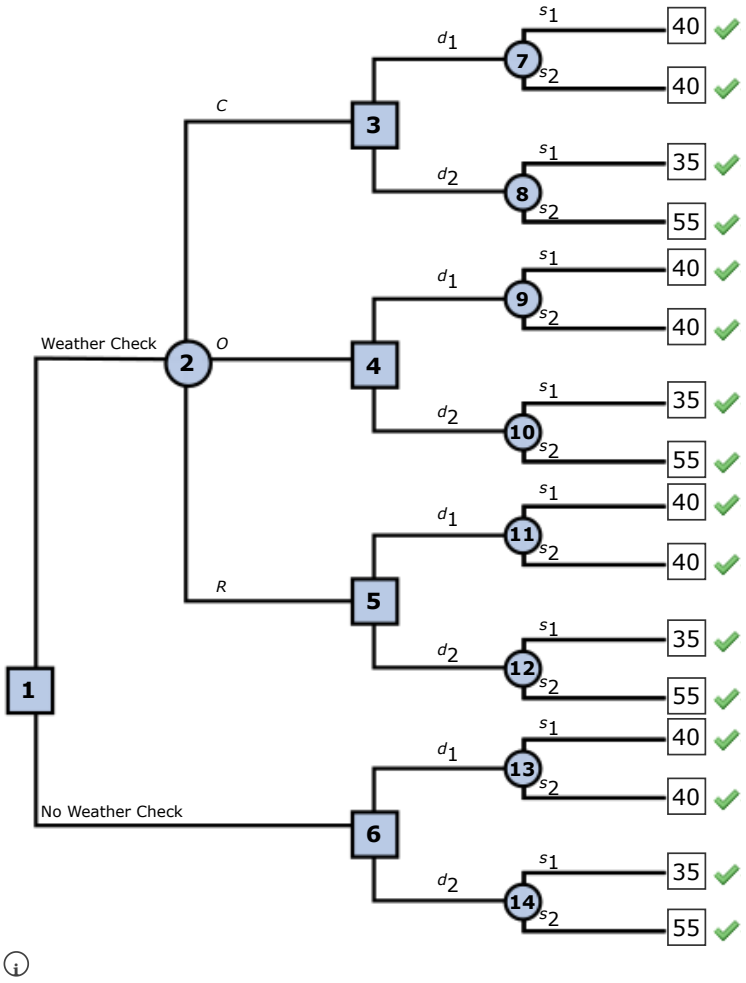
$P(R|s_1) = 0.0$
$P(R|s_2) = 0.6$

(a) Use Bayes' theorem for probability revision to compute the probability of each weather condition and the conditional probability of the expressway open, s_1, or jammed, s_2, given each weather condition. (Round the probability of each weather condition to three decimal places and the conditional probabilities to two decimal places.)

$P(C)$	0.73 ✓
$P(O)$	0.21 ✓
$P(R)$	0.06 ✓
$P(s_1\|C)$	0.99 ✓
$P(s_1\|O)$	0.86 ✓
$P(s_1\|R)$	0.00 ✓
$P(s_2\|C)$	0.01 ✓
$P(s_2\|O)$	0.14 ✓
$P(s_2\|R)$	1.00 ✓

(b) Show the decision tree for this problem.

Decision Tree Description



(c) What is the optimal decision strategy.

- (●) Check the weather and take the expressway unless there is rain. If it is raining, take the Queen City Avenue.
- ( ) Do not check the weather and take the Queen City Avenue.
- ( ) Check the weather and take the Queen City Avenue unless there is rain. If it is raining, take the expressway.
- ( ) Do not check the weather and take the expressway.

What is the expected travel time (in min)? (Round your answer to one decimal place.)

36.034 min

Need Help? Read It

8. [12.5/12.5 Points] DETAILS PREVIOUS ANSWERS ASWSBE14 19.E.019.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Warren Lloyd is interested in leasing a new car and has contacted three automobile dealers for pricing information. Each dealer offered Warren a closed-end 36 month lease with no down payment due at the time of signing. Each lease includes a monthly charge and a mileage allowance. Additional miles receive a surcharge on a per-mile basis. The monthly lease cost, the mileage allowance, and the cost for additional miles follow:

Dealer	Monthly Cost	Mileage Allowance	Cost per Additional Mile
Dealer A	$284	36,000	$0.15
Dealer B	$295	45,000	$0.20
Dealer C	$310	54,000	$0.15

Warren decided to choose the lease option that will minimize his total 36 month cost. The difficulty is that Warren is not sure how many miles he will drive over the next three years. For purposes of this decision he believes it is reasonable to assume that he will drive 12,000 miles per year, 15,000 miles per year, or 18,000 miles per year. With this assumption Warren estimated his total costs for the three lease options. For example, he figures that the Dealer A lease will cost him $10,224 if he drives 12,000 miles per year, $11,574 if he drives 15,000 miles per year, or $12,924 if he drives 18,000 miles per year.

(a) What is the decision, and what is the chance event?

The decision is to choose the best lease option ✓ . There are 3 ✓ alternatives. The chance event is the number of miles driven ✓ . There are 3 ✓ possible outcomes.

(b) Construct a payoff table. (Enter your answers in $).

Dealer	Annual Miles Driven		
	12,000	15,000	18,000
Dealer A	$ 10224 ✓	$ 11574 ✓	$ 12924 ✓
Dealer B	$ 10620 ✓	$ 10620 ✓	$ 12420 ✓
Dealer C	$ 11160 ✓	$ 11160 ✓	$ 11160 ✓

(c) Suppose that the probabilities that Warren drives 12,000, 15,000, and 18,000 miles per year are 0.5, 0.4, and 0.1, respectively. What dealer should Warren choose? (Enter your expected values in $).

EV(Dealer A) = $ 11034 ✓
EV(Dealer B) = $ 10800 ✓
EV(Dealer C) = $ 11160 ✓
The best decision is Dealer B ✓ .

(d) Suppose that after further consideration, Warren concludes that the probabilities that he will drive 12,000, 15,000 and 18,000 miles per year are 0.3, 0.4, and 0.3, respectively. What dealer should Warren select?

EV(Dealer A) = $ 11574 ✓
EV(Dealer B) = $ 11160 ✓
EV(Dealer C) = $ 11160 ✓
The best decision is Dealer B or C ✓ .