9.10 Week 9 Homework Quiz

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Kevin Offemaria (username: offemakp)

Attempt 1

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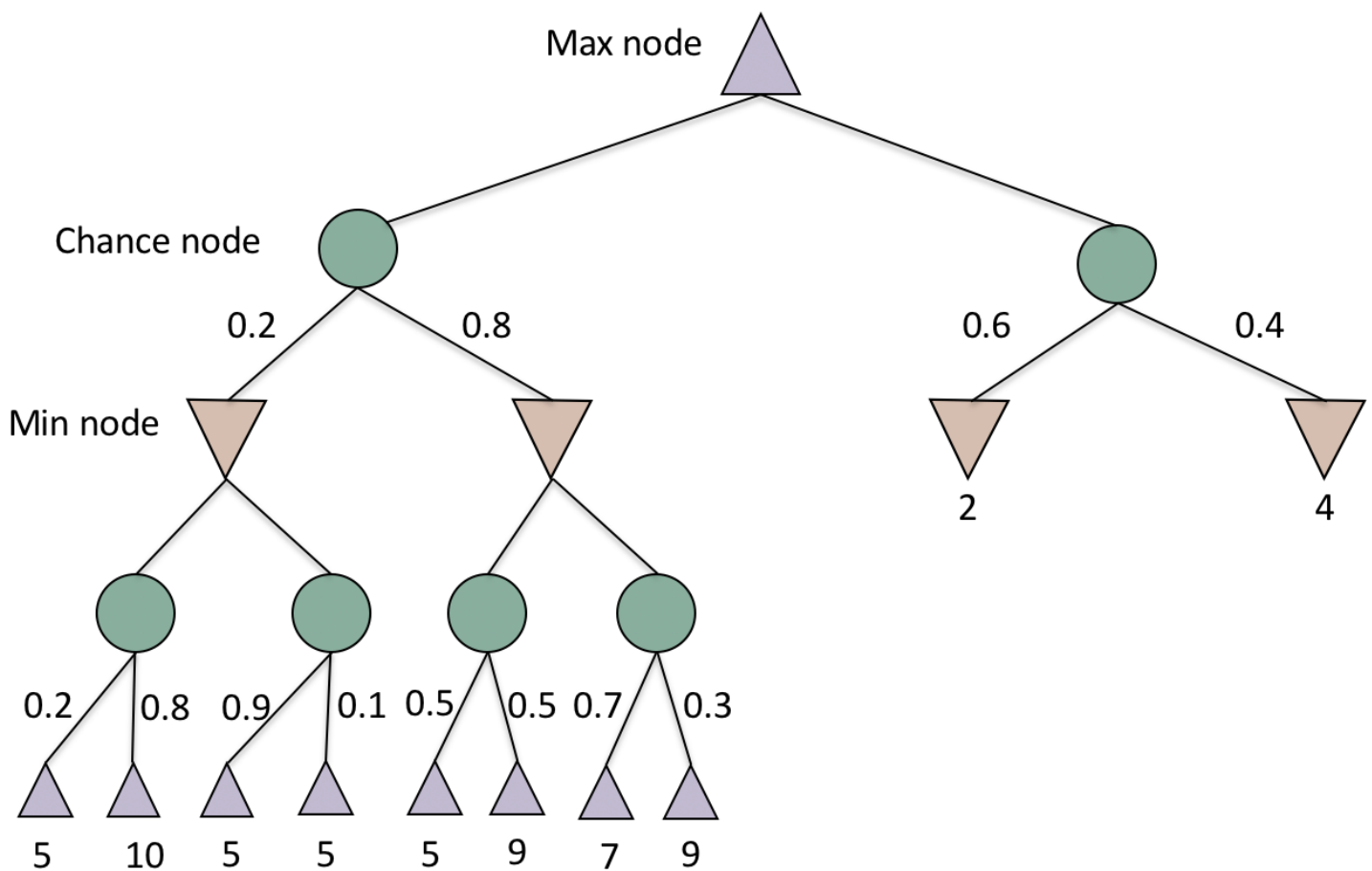**Submission View**

Your quiz has been submitted successfully.

Question 1   **3 / 3 points**

Consider the following expectiminimax tree. Utilities are given at the leaves. Probabilities are given along arcs from chance nodes. What is the value of the root node (rounded to one decimal point).
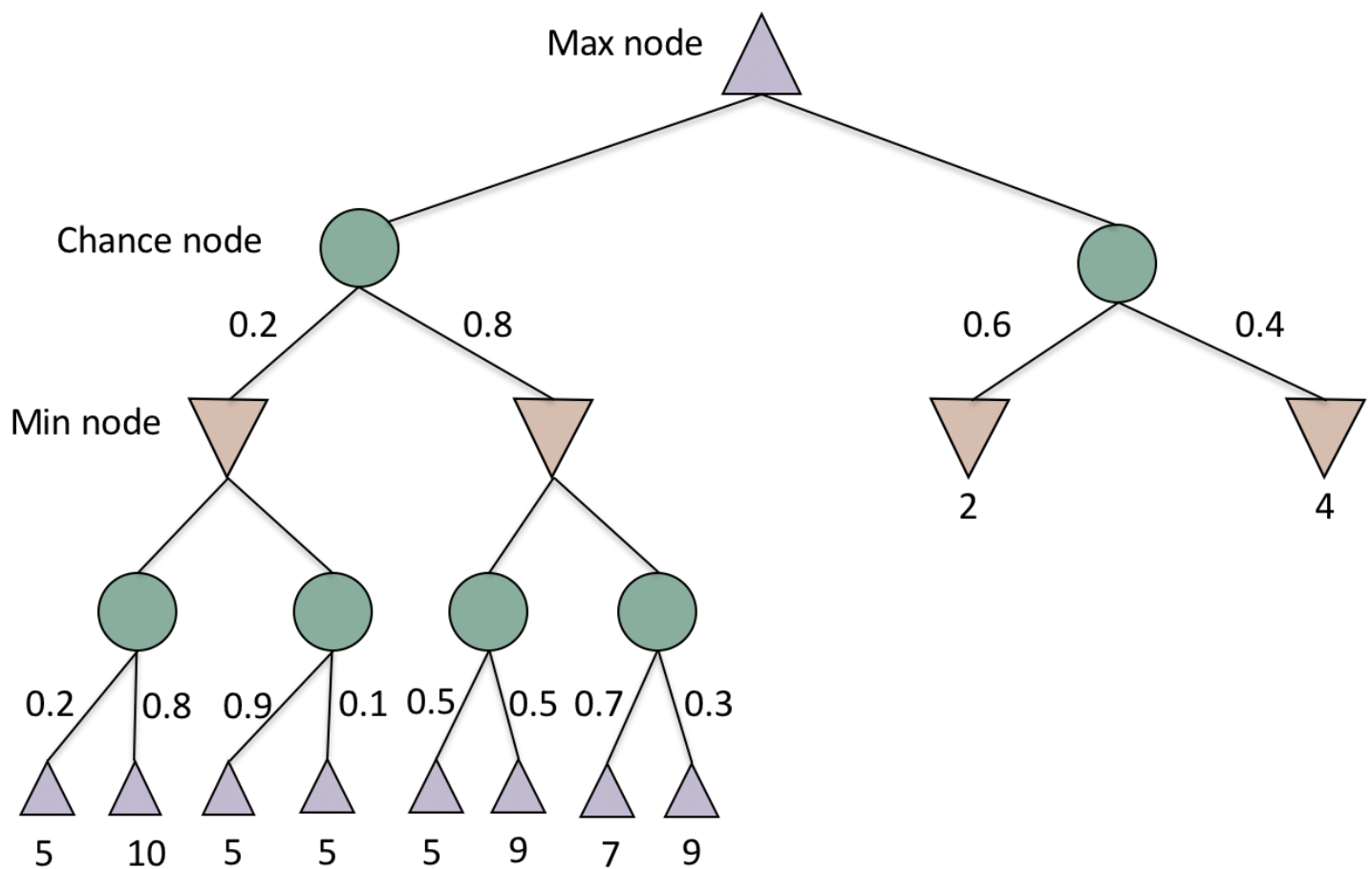
○ 2.0

○ 5.0

○ 6.1

○ 6.6

○ 10.0

Question 2   1 / 1 point

Consider the following expectiminimax tree. Utilities are given at the leaves. Probabilities are given along arcs from chance nodes. Which branch would you expect Max to take?

Max node

Chance node

0.2   0.8   0.6   0.4

Min node

2   4

0.2   0.8   0.9   0.1   0.5   0.5   0.7   0.3

5   10   5   5   5   9   7   9

○ left

○ right

Question 3   3 / 3 points

Consider the following expectimax tree. Utilities are given at the leaves. Probabilities of action outcomes are given at arcs from chance nodes. Suppose this represents a tree for

deciding whether to answer a call when driving. Selected nodes are labeled A–E. What is the value of node A (to 2 decimals)?
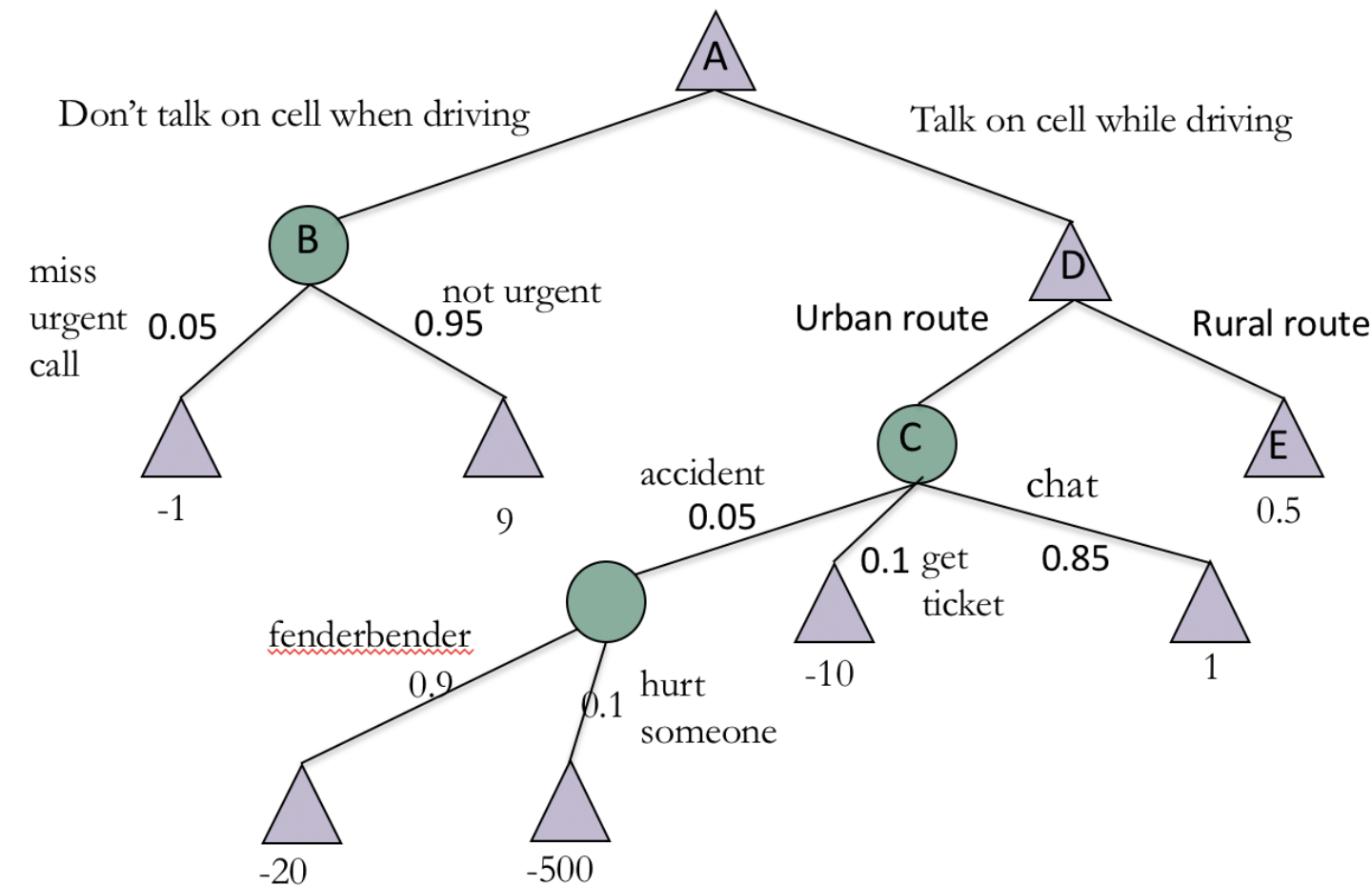
- ○ 9.00
- ○ −3.55
- ○ 8.50
- ○ 0.50

Question 4   **3 / 3 points**

Consider the following expectimax tree. Utilities are given at the leaves. Probabilities of action outcomes are given at arcs from chance nodes. Suppose this represents a tree for deciding whether to answer a call when driving. Selected nodes are labeled A–E. What is the value of node C (to 2 decimals)?
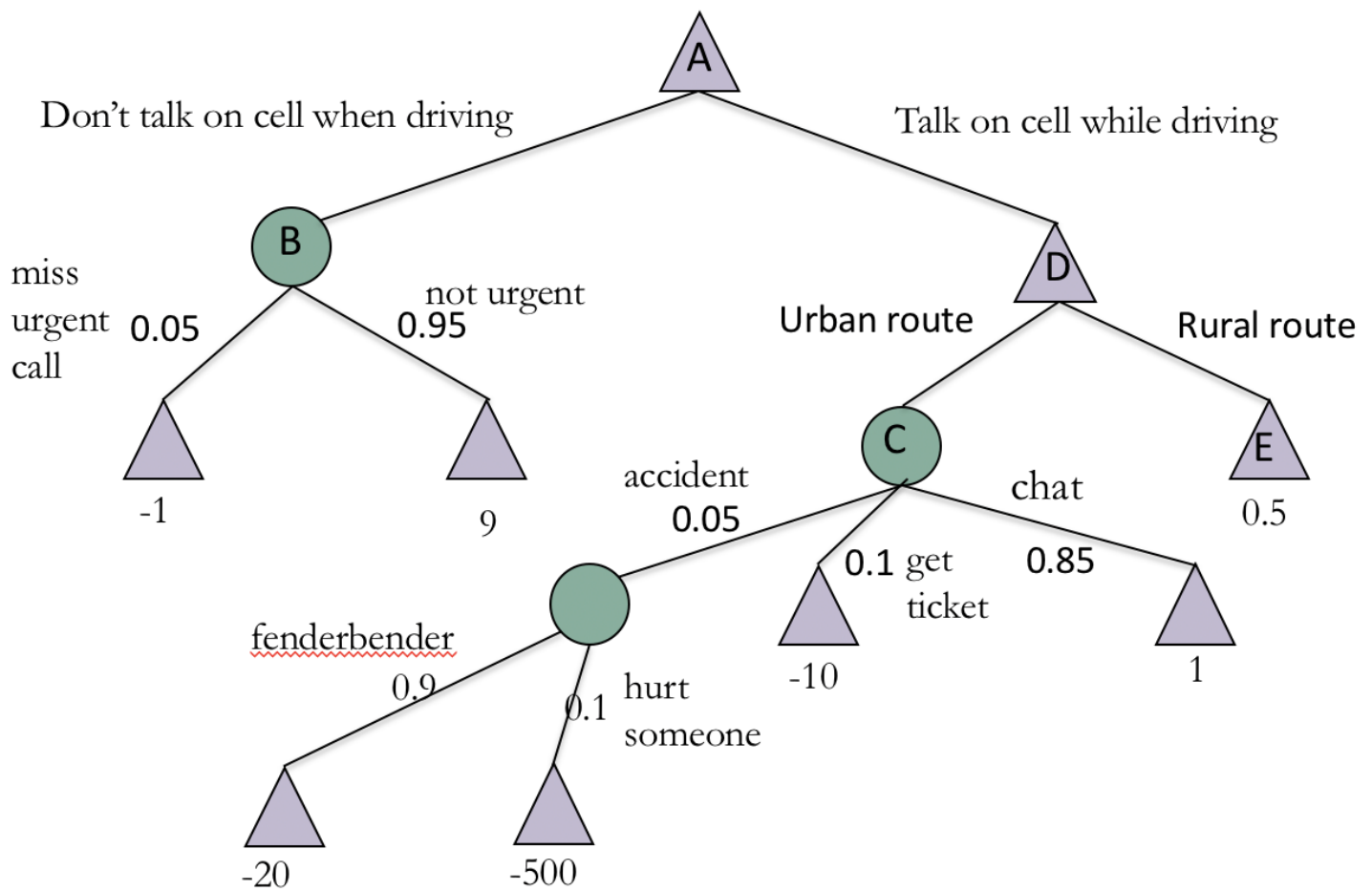
A

Don't talk on cell when driving

Talk on cell while driving

B

D

miss
urgent
call

urgent 0.05

not urgent
0.95

Urban route

Rural route

C

E

accident
0.05

chat

0.5

-1

9

0.1 get
ticket

0.85

fenderbender

0.9

0.1

hurt
someone

-10

1

-20

-500

○ −0.15

○ 5.25

○ 0.70

○ −3.55

Question 5   **3 / 3 points**

Given the following initial state space, determine the utility value of the square labeled Q after *two* iterations of the value iteration algorithm. The values in the squares with +1 and −1 will not change. Assume a living reward of −0.04 and a discount factor (γ) of 1, and that your agent can move up, down, left, or right to any adjacent square during each state transition. The probability of successfully moving in the intended direction is 0.8, while the probability of moving 90 degrees offset from the intended direction is 0.1. Express your answer to four decimal places (X.XXXX).

0.0	0.0	Q 0.0	+1
0.0		0.0	-1
0.0	0.0	0.0	0.0

Answer: 0.8672

Question 6   0 / 3 points

Given the following initial state space, determine the utility value of the square labeled Q after *three* iterations of the value iteration algorithm. The values in the squares with +1 and –1 will not change. Assume a living reward of –0.04 and a discount factor (γ) of 1, and that your agent can move up, down, left, or right to any adjacent square during each state transition. The probability of successfully moving in the intended direction is 0.8, while the probability of moving 90 degrees offset from the intended direction is 0.1. Express your answer to five decimal places (X.XXXXX).

		Q	
0.0	0.0	0.0	+1
0.0		0.0	-1
0.0	0.0	0.0	0.0

Answer: 0.9281

Question 7

2 / 2 points

Given the following initial state space, determine the utility value of the square labeled S after *one* iteration of the value iteration algorithm. The values in the squares with +1 and −1 will not change. Assume a living reward of −0.04 and a discount factor (γ) of 1, and that your agent can move up, down, left, or right to any adjacent square during each state transition. The probability of successfully moving in the intended direction is 0.8, while the probability of moving 90 degrees offset from the intended direction is 0.1. Express your answer to two decimal places (X.XX).

0.0	0.0	0.0	+1
0.0		0.0	-1
S 0.0	0.0	0.0	0.0

Answer: −0.04

Done