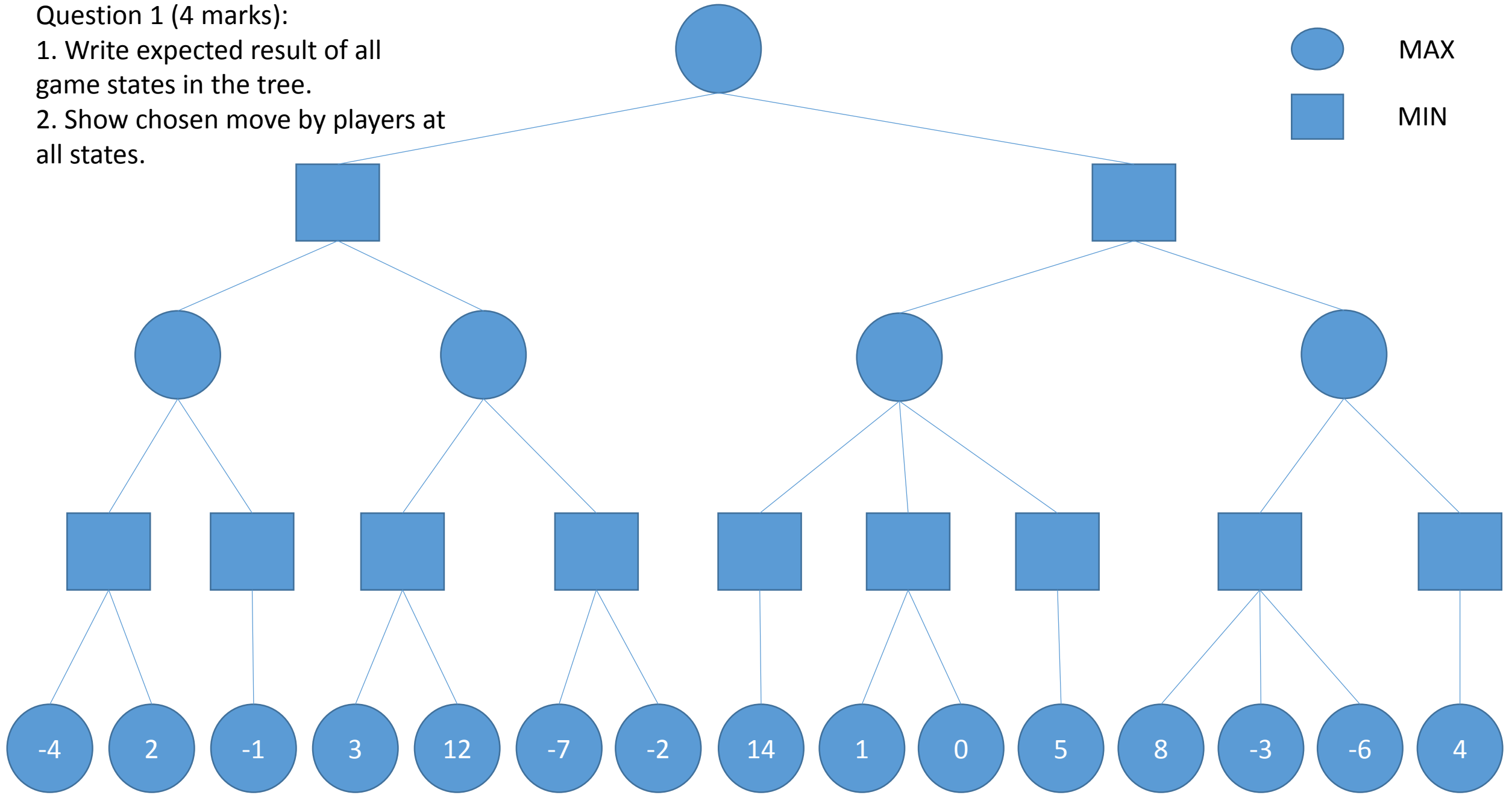
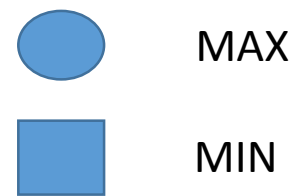


Question 1 (4 marks):

- 1. Write expected result of all game states in the tree.
- 2. Show chosen move by players at all states.



## Edge Costs

From	To					
	A	B	C	D	E	G
	S	2	1	-	-	-
	A	-	2	2	-	-
	B	-	-	4	4	-
	C	-	-	-	7	-
	D	-	-	-	3	-
	E	-	-	-	-	5

## Heuristic

S	3
A	2
B	2
C	1
D	2
E	1

Question 2 (4 marks): Perform A\* Search

1. Show the steps of the algorithm:

- At each step, show the node expanded.
- At each step, show the frontier.
- Show costs and path to node for all nodes in frontier:

$X(C,H,P)$ , where X is the node

C is the cost from S to X via P

H is the estimate cost from X to G

P is the path taken to X from S

2. Specify the cheapest path and its cost.

Question 3a (2 marks): Under what conditions could a depth-first search FAIL to find a solution?

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Question 3b (2 marks): Explain iterated deepening.

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Question 4 (4 marks): Provide a complete explanation of a planning graph.

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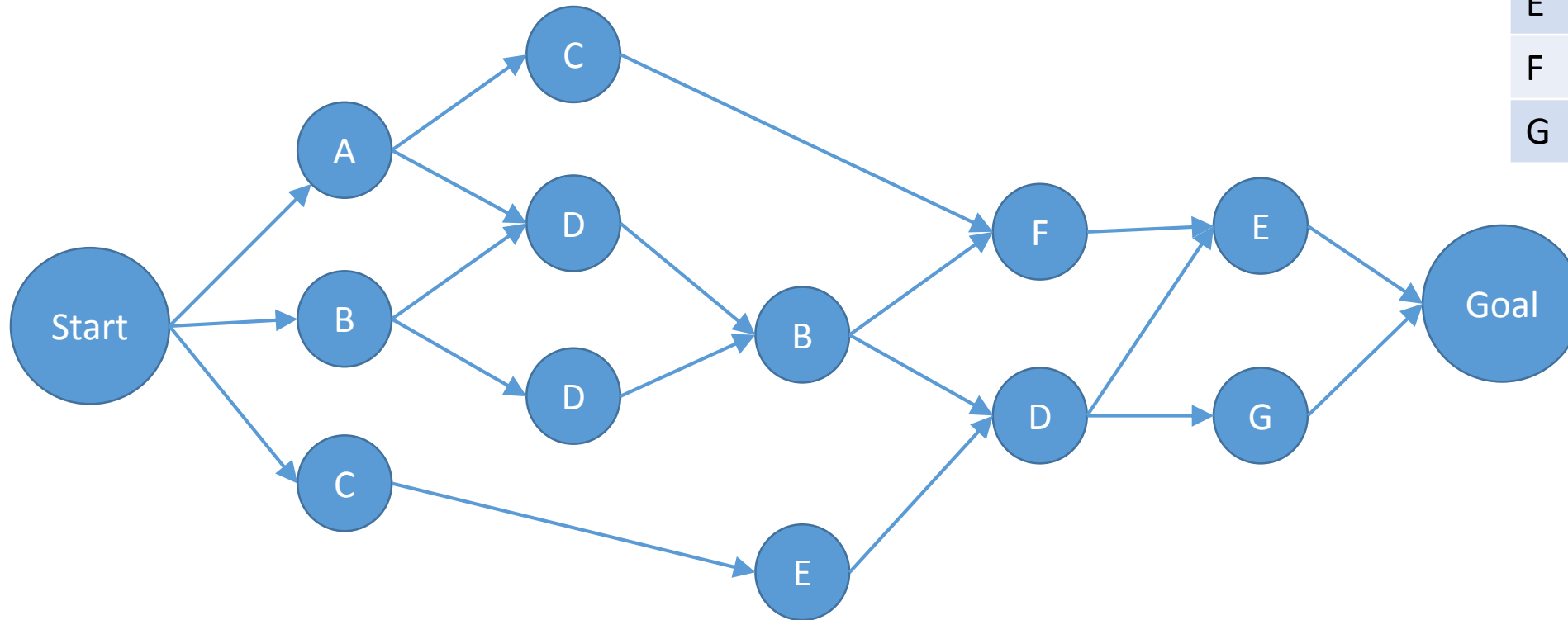
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Question 5 (4 marks):

1. Provide earliest start, latest start and slack times for all actions.
2. Show the 'Critical Path' (where slack=0).

Action	Time
A	10
B	15
C	40
D	20
E	2
F	5
G	25



Question 5 (6 marks): Ludwig has a beetle in a box. He never sees the beetle, and doesn't know whether the beetle is healthy or sick. But he knows whether the beetle eats the food he puts into the feeding hole each night. His experience with beetles is as if he had observed:

1. Sick beetles 100 times, and in only 10 of these cases did the beetles eat their food, and in 70 of those times the beetles were still sick the day after.
2. Healthy beetles 2000 times, and in 1500 of these cases did the beetles eat their food, and 100 of those times the beetles were sick the day after.

Model Ludwig's knowledge of the state of the beetle using a hidden Markov model with day time intervals. Draw the model and provide the transition and observation matrices. (4 Marks)

Update the transition and observation matrices in Ludwig's model to represent his knowledge after observing an additional case where a sick beetle at day  $d$  was well at day  $d+1$  and ate food at day  $d+1$  (2 Marks).

Question 6 (2 marks): Explain how the goals of AI are different in academia and in computer games.

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