学号：_____ 线

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专业班级：_____ 密

河南理工大学_____2020-2021_____学年第__一__学期

《人工智能导论》试卷（A 卷）

考试方式	本试卷考试分数占 学生总评成绩比例	总得分
Open-book	60%	

分数	10
得分	

1. Single choice (2 marks per question)

1	2	3	4	5

1. Which of the following is false?
   a. The knowledge engineer and human expert discuss the knowledge required of the expert system.
   b. The knowledge engineer makes all of the key decisions on which knowledge to put into the expert system.
   c. The knowledge engineer encodes the knowledge in the Expert System
   d. The expert evaluates the expert system to ensure that it is correct
2. Which of the following is not a part of an Expert System ?
   a. SAP system
   b. Knowledge Base
   c. Inference Engine
   d. User Interface
3. Which of the following is false?
   a. An artificial neural network is modelled on human neural networks.
   b. There are approximately 100 billion neurons in the human brain.
   c. The dendrite is modelled by output in an artificial neuron network.
   d. The soma is modelled by a neuron in an artificial neuron network.
4. Which of the following is false?
   a. An artificial neuron network consists of a number of neurons.
   b. Artificial neuron networks are more powerful than biological neuron networks.
   c. The neurons are connected by weighted links that pass signals.
   d. The output signal is transmitted through the neuron’s outgoing connection.
5. Which of the following is false?
   a. The neuron computes the weighted sum of the input signals and compares the result to a threshold value.
   b. The neuron behaviour is determined by the result of the weighted sum and the activation function.
   c. There are various kinds of activation functions.
   d. Neuron networks are not used for learning.

分数	50
得分	

2. Short Answer Questions (10 marks per question)

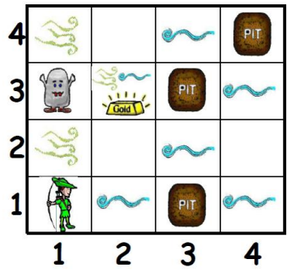
2.1 Please briefly explain what are Model-based reflex agents.

2.2 Provide a detailed description of the Simulated Annealing Search(SA) algorithm. Your answer should include a clear statement of the algorithm in pseudo-code, and a general description of how it works.

2.3 What is an expert system? What is the general structure of an expert system?

2.4 What are the main research and application areas of artificial intelligence?(List at least 5)

2.5 What is the PEAS of this Wumpus world?



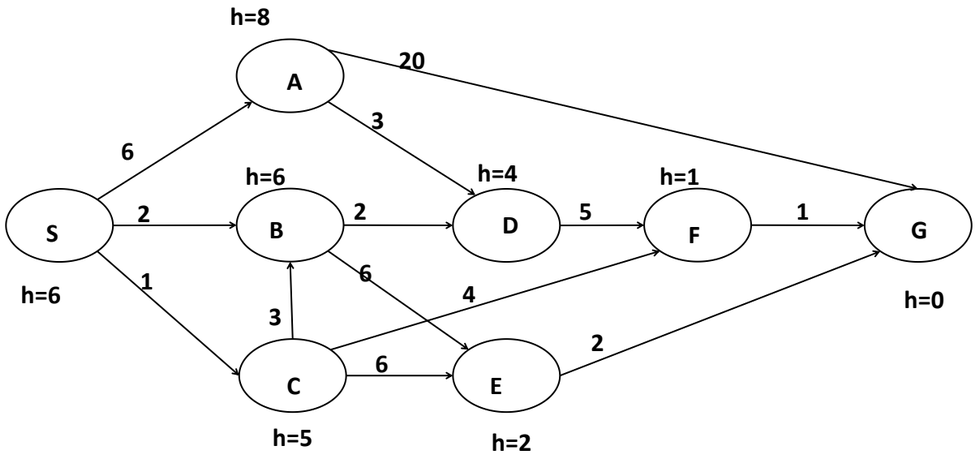
分数	40
得分	

3. Calculation questions (10 marks per question)

3.1 Consider the single-layer perceptron with threshold units,

(a) Draw a neural network which is used to separate the And operator. (5 marks)

(b) Deduce and verify your network in the form of truth table. (5 marks)



3.2 Consider the search problem below with start state S and goal state G. The transition costs are next to the edges, and the heuristic values are next to the states. Assume ties are always broken by choosing the state which comes first alphabetically.

(a) If we use Uniform-Cost Search, what is the final path for this search? (3 marks)

(b) If we use greedy search: What is the final path for this greedy search? (3 marks)

(c) If we use A* search: What is the final path for this A* search? (4 marks)

3.3 The data in the table below are risk assessment data with 5 attributes. Assume that the training set includes the first 14 data, please calculate the root node of the decision tree and draw the decision tree (note: only draw the first layer).(10 marks)

No	Credit history	Debt	Collateral	Income	Risk
1	bad	high	none	0-15 $	high
2	unknown	high	none	15-35$	high
3	unknown	low	none	15-35$	moderate
4	unknown	low	none	0-15 $	high
5	unknown	low	none	Over 35$	low
6	unknown	low	adequate	Over 35$	low
7	bad	low	none	0-15 $	high
8	bad	low	adequate	Over 35$	moderate
9	good	low	none	Over 35$	low
10	good	high	adequate	Over 35$	low
11	good	high	none	0-15 $	high
12	good	high	none	15-35$	moderate
13	good	high	none	Over 35$	low
14	bad	high	none	15-35$	high
15	bad	low	adequate	15-35$	low

3.4 The figure below is the game tree of a two-player game; the first player is the maximizer and the second player is the minimizer. Use the tree to answer the following questions:

(a) Briefly describe the algorithm for calculating minimax decisions. (3 marks)

(b) What is the final value of this game? (4 marks)

(c) Will any nodes be pruned? (3 marks)