



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : ARTIFICIAL INTELLIGENCE
COURSE CODE : BNF 43603
PROGRAMME CODE : BNF
EXAMINATION DATE : JULY 2022
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWERS **ALL** QUESTIONS
2. THIS FINAL EXAMINATION IS AN **ONLINE ASSESSMENT** AND CONDUCTED VIA **CLOSED BOOK**
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTING VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

- Q1** (a) The Turing Test is a deceptively simple method of determining whether a machine can demonstrate human intelligence. Describe how the Turing test approach is used to measure the performance of an artificially intelligent machine. (5 marks)
- (b) In artificial intelligence, an intelligent agent is anything which perceives its environment, takes actions autonomously in order to achieve goals, and may improve its performance with learning or may use knowledge. Describe each of artificial intelligent agents based on their degree of perceived intelligence and give an example for each agent. (5 marks)
- (c) Differentiate and provide an example of the following task environment properties:
- (i) Fully observable vs. partially observable (2 marks)
 - (ii) Deterministic vs. stochastic (2 marks)
 - (iii) Episodic vs. sequential (2 marks)
 - (iv) Static vs. dynamic (2 marks)
 - (v) Known vs. unknown (2 marks)
- (d) Discuss the difference between an agent with rational behavior versus agent without rational behavior. (5 marks)
- Q2** (a) Describe the differences between Uninformed Search and Informed Search. Give an example for both (4 marks)

(16 marks)

- (c) Reinforcement learning (RL) enables an agent to become proficient in an unknown environment, given only its percepts and occasional rewards. Draw, label and explain the basic block diagram of a RL agent interacting with its environment.

(5 marks)

- Q4** (a) Differentiate between Artificial Intelligence, Machine Learning and Deep learning. Also give **TWO (2)** applications of from our daily lives

(5 marks)

- (b) Illustrate a neural network that has 16 input, 3 hidden layers of 8 neurons in each layer, and an output layer with 4 neurons.

(5 marks)

- (c) Differentiate between linear regression and logistic regression, support your answer by equations and examples.

(5 marks)

- (d) Explain the principle of the gradient descent algorithm. Accompany your explanation with a diagram. Explain the use of all the terms and constants that you introduce and comment on the range of values that they can take.

(5 marks)

- (e) **Figure 4(e)** has **Two (2)** curves (a) and (b): Identify which of the curves is from a logistic regression classifier and the other one is from a neural network and justify your answer.

(5 marks)

-END OF QUESTIONS -

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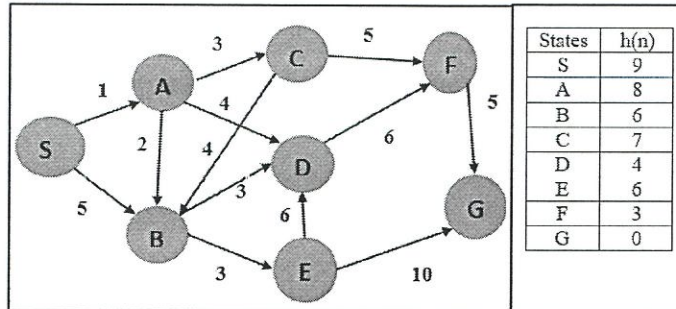


Figure Q2(c)

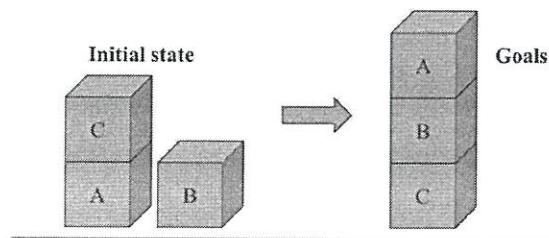


Figure Q3(b)

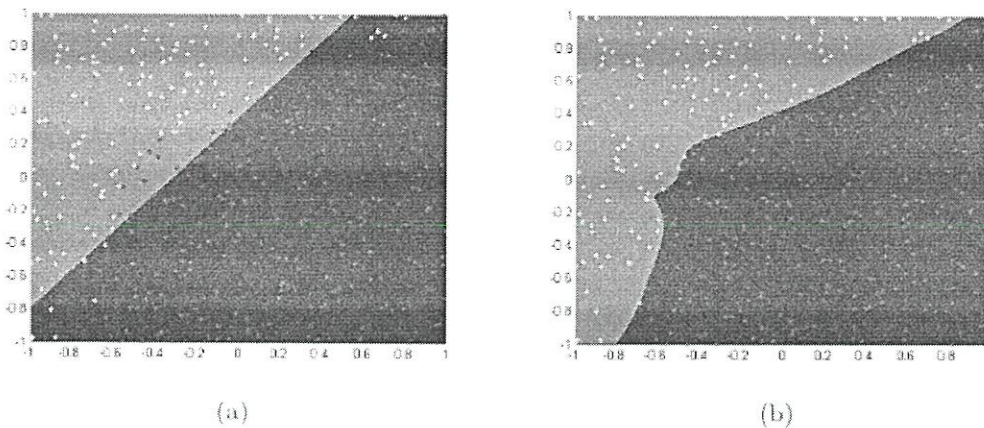


Figure Q4(e)