



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER II SESSION 2021/2022

COURSE NAME : ARTIFICIAL INTELLIGENCE

COURSE CODE : DAT 21003

PROGRAMME CODE : DAT

EXAMINATION DATE : JULY 2022

DURATION : 2 HOURS 30 MINUTES

INSTRUCTION

1. ANSWER **ALL** QUESTIONS
2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSIST OF **SIX (6)** PAGES

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- Q1** (a) List **FIVE (5)** knowledge representation in Artificial Intelligence (AI).
(5 marks)
- (b) Knowledge plays very important role in AI to demonstrate the intelligent behavior in AI agents or systems. Based on Figure **Q1(b)**, describe relationships between sensing, knowledge and action in order to make a decision.
(6 marks)
- (c) K-Means clustering is one of the popular methods in data mining. Explain the steps in K-Means.
(4 marks)
- (d) Explain, with examples, **FIVE (5)** algorithms that have been used in expert systems.
(10 marks)
- Q2** (a) Evaluate the following logical statements either **TRUE** or **FALSE**.
- (i) All humans are immortal.
 - (ii) No man can climb the Everest mountain.
 - (iii) Everybody can pass a programming subject.
 - (iv) All humans need oxygen.
 - (v) The earth is sphere shaped.
- (5 marks)
- (b) Provide predicate calculus representation for all statements given below.
- (i) Ahmad likes AI.
 - (ii) Those who like AI know Python.
 - (iii) Python is related to logic.
 - (iv) Logic has been taught in DAT 21003 course.
- (5 marks)

(c) Consider the following variable quantifier either **TRUE** or **FALSE**.

	Symbols	Statements
(i)	$\forall X$	Color (car, X)
(ii)	$\exists Y$	Friend (gabriel, Y)
(iii)	$\forall X$	Wild (whale, X)
(iv)	$\forall V$	Bird (fly, V)
(v)	$\exists Z$	Human (kind, Z)

(5 marks)

(d) Semantic predicate calculus is used to determine the truth values. Complete every equation below by determining **TRUE** or **FALSE**.

	P	Q	$P \wedge Q$	$\neg P$	$P \vee Q$	$P \Rightarrow Q$	$P = Q$
(i)	True	True					
(ii)	True	False					
(iii)	False	True					
(iv)	False	False					

(10 marks)

Q3 (a) Describe Natural Language Processing (NLP) basic knowledge regarding syntactic and semantic with examples.

(4 marks)

(b) List **FIVE (5)** steps in text data gathering using *Selenium* web scraper tool.

(5 marks)

- (c) Explain functionality of every single line in Python web crawler (*Beautiful Soup*) based on the code segmentation below.

```
import requests
import bs4
sumber = requests.get('http://cpipass.com')
type(sumber)
sumber.text
DetailSum = bs4.BeautifulSoup(sumber.text, 'lxml')
type(DetailSum)
crawlObj = DetailSum.select('body')
crawlObj
```

(6 marks)

- (d) Assume you are a data engineer who is given text data sets. By using preprocessing steps in NLP, show how it can be implemented using Python.

(10 marks)

- Q4** (a) Differentiate between supervised and unsupervised learning.

(2 marks)

- (b) List **FOUR (4)** components in Neural Network algorithm.

(4 marks)

- (c) Differentiate between Neural Network and Fuzzy logic.

(4 marks)

- (d) Vector Space Model (VSM) is one of the compulsory methods for text conversion. Based on the dataset in **Table Q4(d)** calculate Term Frequencies and Inverse Document Frequencies (TF-IDF) values.

(15 marks)

- END OF QUESTIONS -

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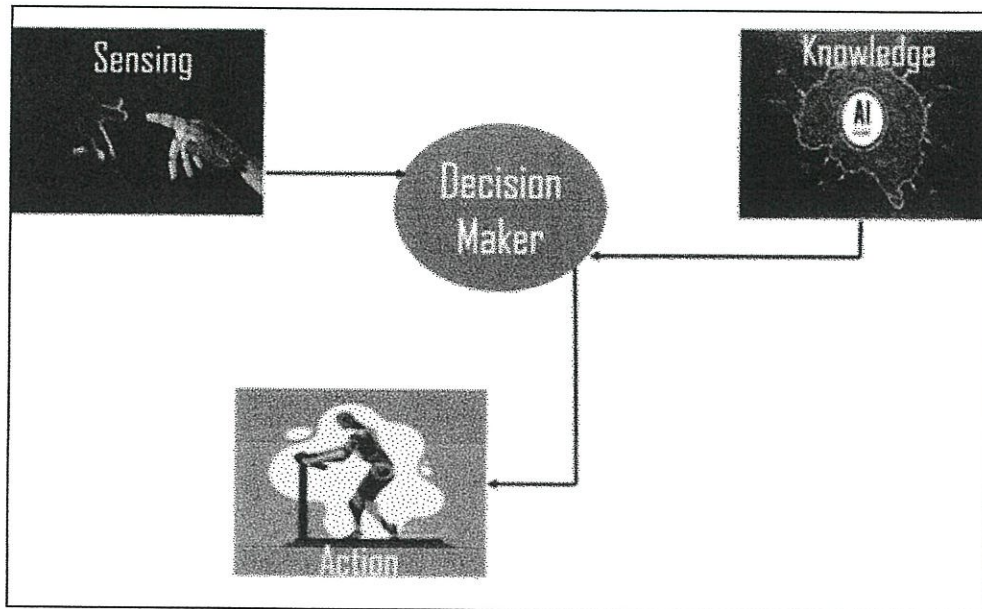


Figure Q1(b)

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D_i = Denotes as document

Q_1 = Query

D_1 : "shipment of gold damaged in a fire"

D_2 : "Delivery of silver arrived in a silver truck"

D_3 : "Shipment of gold arrived in a truck"

Q_1 : "Gold silver truck"

$D=3, IDF=\log(D/df_i)$

Bag of Words	Count tf_i							$w_i = tf_i * idf_i$			
	Q	D_1	D_2	D_3	df_i	D/df_i		Q	D_1	D_2	D_3
A	0	1	1	1	3						
Arrived	0	0	1	1	2						
Damage	0	1	0	0	1						
Delivery	0	0	1	0	1						
Fire	0	1	0	0	1						
Gold	1	1	0	1	2						
In	0	1	1	1	3						
Of	0	1	1	1	3						
Silver	1	0	2	0	1						
Shipment	0	1	0	1	2						
Truck	1	0	1	1	2						

Table Q4(d)