



UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF THE
DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY/BACHELOR OF
SCIENCE (APPLIED COMPUTER SCIENCE)
FIRST SEMESTER, 2023/2024
(AUGUST-DECEMBER, 2023)

BIT 308/ ACMP 308: ARTIFICIAL INTELLIGENCE

STREAM: Y3 S1

TIME: 2 HOURS

DAY: MONDAY, 03:00–05:00 PM

DATE: 20/11/2023

INSTRUCTIONS

- 1. Do not write anything on this question paper.***
- 2. Answer Question ONE [Compulsory] and any other TWO Questions.***

QUESTION ONE

- Define the following terms as they are used in Artificial Intelligence.
 - Artificial Intelligence [6mks]
 - Toy problem [2mks]
 - Turing problem [4mks]
 - List the drawbacks of a table-drive agent. [4mks]
 - Who is responsible for AI mistakes? [6mks]
 - What the different between goal formulation and problem formulation. [4mks]
 - Explain the importance of accountability and responsibility in AI. [4mks]
 - Using a relevant diagram, write brief notes on Active Reinforcement Learning. [6mks]
 - Discuss the ethical considerations surrounding the development and deployment of AI systems. [4mks]
- Provide a brief response to each of the following sub-questions: [4mks]

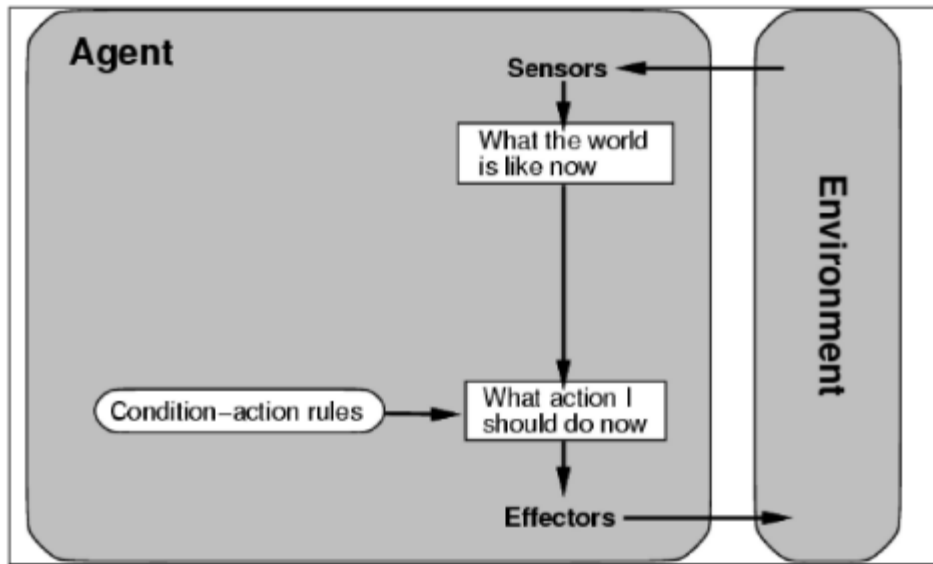
QUESTION TWO

- Write short notes on Constraint Satisfaction problems. [5mks]
- Write short notes on Hill-Climbing Search and Genetic Algorithm Search [5mks]

- c) In detail describe the various machine learning phases/ steps citing possible ethical concerns at each phase. [10mks]

QUESTION THREE

- a) Using the diagram below, answer the question that follow.
- What type of agent is represented by the diagram below? [2mks]
 - Discuss the various distinguishing features for this type of agent. [4mks]
 - In detail discuss how this agent can be implemented to address day to day challenges in Africa. [4mks]
 - Given an opportunity to enhance the capability of this agent, what features would you add and give your justifications. [2mks]



- b) Using a relevant example, explain how Greedy Best-first Search can be used in the Route-finding problems. [4mks]
- c) Discuss in detail why the A* Search is the most widely used from of best-first search in AI agents. [4mks]

QUESTION FOUR

- a) A number of tools have been developed to implement Artificial Intelligence Systems, differentiate between PROLOG and LISP giving the practical usages, advantages and challenges of each [10mks]
- b) Discuss the pitfalls that businesses should be aware of to reduce the risks during the deployment of AI systems. [10mks]

QUESTION FIVE

In an attempt to decongest the prisons in Kenya, the Judiciary Service Commission (JSC) has come up with an ambitious plan of leveraging AI to decide on which prisoners can be released, how long given offenders are to be jailed, and which offenders are to give parole, and which ones are to be given community service as punishment. They intend to use personal and public data including posts on social media profiles – texts, images, videos etc, ID, residence address, job and profession details, annual salary, KRA profile, and financial information such as MPESA and Bank transaction statements. The JSC intends to have this solution operational in under 6 months.

In reference to the case study presented, answer the following questions:

- a) Should the system be developed? Why? Support your answer appropriately. [8mks]
- b) Do you think there are ethical concerns in this system being proposed? Explain? [6mks]
- c) How else can AI be used to solve the problem presented without ethical concerns?[6mks]