AI PROJECT LIFE CYCLE

1. What is the AI project lifecycle and how is it structured? [ ]
   a. A linear process with only three stages
   b. A framework that includes stages to create an AI project
   c. An iterative process with no fixed stages
   d. A single stage process
2. What is the primary purpose of problem scoping in the AI project lifecycle? [ ]
   a. To collect data b. **to set goals and define the problem to be solved**
   c. To build the AI model d. to deploy the AI model
3. Which phase of the AI project lifecycle involves collecting data from various sources?[ ]
   a. Data exploration b. problem scoping **c. data acquisition** d. evaluation
4. In the context of AI, what are "features"? [ ]
   a. The characteristics or attributes of the data used in the model
   b. The names of AI models c. The stages in the AI project lifecycle
   d. The goals of problem scoping
5. What is the primary goal of data exploration in AI? [ ]
   a. To build AI models b. to navigate through data
   c. To examine, clean, summarize and visualize data to understand its underlying patterns
   d. To collect data
6. Which of the following is NOT a common source of data for AI projects? [ ]
   a. Sensors b. APIs c. **Human imagination** d. Databases
7. How can you determine if a data source is reliable for an AI project? [ ]
   a. By checking the data's color b. by asking for more data
   c. By using complex mathematical equations
   d. by checking the source's reputation and credibility
8. in AI, what is the primary purpose of data visualization? [ ]
   a. to make data look attractive b. to hide data patterns
   c. **to help understand data patterns** d. to add complexity to data
9. what is a "system map" in the context of AI? [ ]
   a. a map of the physical location of data sources.
   b. A map of AI algorithms
   c. A map of relationships between different elements of a problem
   d. A map of the internet
10. What is the primary purpose of the modelling phase in AI project lifecycle? [ ]
    a. To collect data b. to set goals and define the problems
    c. **To develop the AI model** d. to evaluate the AI model
11. When does evaluation commonly occur I AI project lifecycle? [ ]
    a. Before problem scoping b. after data acquisition
    c. During the modelling phase d. **towards the end of the project**
12. What is "decision tree" in AI commonly used for? [ ]
    a. Data exploration and visualization b. collecting data
    c. AI modelling **d. decision-making**
13. What does AGI stands for in AI terminology? [ ]
    a. Artificial Narrow Intelligence b. **Artificial General Intelligence**
    c. Artificial Superintelligence d. Advanced System intelligence
14. What is the main purpose of deploying an AI model in the AI project lifecycle?[ ]
    a. To make the AI model look attractive
    b. To demonstrate AI knowledge
    c. To make the AI model available for use in real-world applications

d. To evaluate the AI model.

Fill in the blanks:-

1. The AI project lifecycle consists of stages such as problem scoping, data acquisition, data exploration, _____ and evaluation and deployment.(Data Modeling)
2. In_____, the primary objective is to set clear goals and define the problem to be solved using AI. (Problem Scoping)
3. Data_____ involves collecting data from various reliable and authentic sources.(Acquisition)
4. Data_____ in AI refer to the characteristics or attributes of the data used in the model.(features)
5. _____ is the process of examining, cleaning , summarizing and visualizing data to understand its underlying structure and patterns.(Data exploration)
6. Decision trees are commonly used in AI for making _____ based decisions.(rule)
7. ANI stands for Artificial_____ intelligence, which is a type of AI with a narrow focus on specific tasks.(narrow)
8. Deep learning is a subset of _____ learning(machine)
9. Data visualization plays a pivotal role in data_____ for pattern recognition and data summarization.(exploration)

True or False

1. The AI project lifecycle includes stages such as problem scoping, data acquisition, data exploration, data modelling and evaluation and deployment. [T]
2. Problem scoping is the last phase in the AI project lifecycle where you evaluate the solution of the problem. [F]
3. Data acquisition involves collecting data from online sources, including sensors and APIs[T]
4. In the context of AI, "features" refer to the attributes or characteristics of the data used in the model. [T]
5. Data exploration is the process of examining, cleaning, summarizing and visualizing data to understand its underlying patterns [T]
6. Reliable data sources are essential for AI projects and their credibility can be assessed by checking their reputation. [T]
7. Continuous monitoring and evaluation of an AI model commonly occurs after the modelling phase of the AI project lifecycle. [T]
8. Decision trees are primarily used in AI for data exploration and visualization [F]
9. Artificial Narrow Intelligence aims to replicate human like intelligence across various tasks [T]
10. The main purpose of deployment in the AI project lifecycle is to make the AI model look attractive [F]

Assertion and Reasoning Based Questions

Read the following questions based on Assertion (A) and Reasoning (R). Mark the correct choice as

(i) both A and R are true and R is the correct explanation for A

(ii) both A and R are true but R is not the correct explanation for A

(iii) A is true but R is false

(iv) A is false but R is true,

1. **Assertion:-** Data collection is an essential part of the AI project cycle.
   Reasoning:- high-quality data is crucial for training and validating AI models.
   Ans:- (i)
2. **Assertion:-** the 4Ws problem canvas is primarily used to determine the technical specifications of AI models.
   Reasoning:- the canvas focuses on identifying the problem and its context, rather than technical details
   Ans:- (iv)
3. **Assertion:-** problem identification is the first step in the AI project lifecycle.
   Reasoning:- identifying and understanding the problem to be solved is a crucial initial step in the AI project.
   Ans:- (i)
4. **Assertion:-** in problem scoping, it is important to set clear and measurable project goals.
   Reasoning:-clear and measurable project goals provide a defined direction for the AI project and help in tracking progress.
   Ans:- (i)
5. **Assertion:-**model evaluation is an optional step in the AI project cycle
   Reasoning:- model evaluation is necessary even if the AI model appears to be working correctly.
   Ans :- (iv)
6. **Assertion:-**machine learning and deep learning are subsets of artificial intelligence
   Reasoning:- both machine learning and deep learning are techniques within the broader field of AI.
   Ans:- (i)
7. **Assertion:-**acquiring diverse and varied data is not necessary for AI projects.
   Reasoning:- data diversity significantly impacts the performance of AI models.
   Ans:- (iv)
8. **Assertion:-** ethical considerations in data acquisition are important in AI projects.
   Reasoning:- the primary focus in AI projects should be on technical aspects and ethical concerns do not impact data acquisition.
   Ans:- (iii)
9. **Assertion:-**APIs are essential for enabling communication between different software components.
   Reasoning:- APIs allow different software components to exchange data and interact with each other.
   Ans:- (i)

10. **Assertion:-** the "Who" aspects of the 4Ws problem canvas focuses on the stakeholders involved in the AI project.
    Reasoning:- identifying technical team members is the primary focus of the "Who" aspect.
    Ans:- (iii)

Subjective type Questions:-

1. **What is the AI Project Lifecycle and how is it structured?**
   Ans:- The AI lifecycle is the iterative process of moving from a business problem to an AI solution that solves that problem. Each of the steps in the life cycle is revisited many times throughout the design, development, and deployment phases

2. **Explain the importance of problem scoping in the AI project lifecycle.**
   Ans:- Problem scoping is the process of pinpointing a particular issue or opportunity that can be tackled using artificial intelligence (AI). During this phase, we not only identify

the problem but also set specific objectives, goals, and criteria for success. However, scoping a problem is no simple task. It requires a deep understanding of the issue so that we can work effectively and solve problem-solving.

To achieve this, we rely on an approach called the 4Ws problem canvas, which helps us gain a clearer and more defined understanding of the problem we're dealing with.
The 4Ws problem canvas helps in recognizing the key elements related to the problem.
The 4Ws are as follows:
Who
What
Where
Why

3. **What is data acquisition and why is it a crucial step in AI project development?**
   Ans:- Data Acquisition, also known as acquiring data, refers to the procedure of gathering data. This involves searching for datasets suitable for training AI models. The process typically comprises three key steps

4. **Describe the term "features" in the context of data in AI.**
   Ans:- In the context of AI and machine learning, "features" refer to the individual characteristics or attributes of the data that are used as input for a model to make predictions, classification or decision. Features are the specific piece of information that describe each data point and are critical for teaching a machine-learning model to recognize patterns and relationships within the data.
5. **What are some common sources of data for AI projects.**
   Ans:- data for AI projects can be obtained from various sources, both within india and internationally. These sources can be categorized into several broad categories.
   1. public databases and repositories
   2. Sensors
   3. API
   4.Surveys
   5. Web scraping
6. **How can you determine if a data source is reliable for an AI project?**
   Ans:- it is important to understand that during the AI project cycle, data acquisition in a critical phase, but merely collecting data is not enough, it is equally important to consider the reliability, authenticity and appropriateness of the data sources. Consider the following points:
   - Authenticity of data source
   - Data quality assurance
   - Appropriateness of data
   - Data availability
   - Ethical considerations
7. **What is data exploration and why is it essential in the AI project lifecyle?**
   Ans:- Data exploration means looking closely at data to understand it better. This is an important step in any project based on data, including AI projects.
   It involves cleaning up messy data, summarizing it in simple ways and representing it visually for better understanding.
8. **What is the purpose of data visualization in data exploration?**

Ans:- it is the process of converting data into pictures or graphs to make it easier to understand. Instead of looking at numbers, we observe visual representations like charts and graphs to see trends and patterns in the data. It helps you to perform following operations.

- It makes easier to see patterns and trends
- Complex data can be made simple with visuals
- Visuals can show strange things, known as outliers,
- It shows information in effective way even though people not familiar with technical details
- It gives ideas about what might be going on or why things are happening.

9. **Define what a system map is and its role in AI projects.**
   Ans:- A system map shows the components and boundaries of a system and the components of the environment at a specific point in time. With the help of System Maps, one can easily define a relationship amongst different elements which come under a system. Any change in these elements changes the system outcome too.
   Ex:- The concept of Water cycle is very simple to understand and is known to all. It explains how water completes its cycle transforming from one form to another. It also adds other elements which affect the water cycle in some way.
10. **Explain the differences between Artificial Narrow intelligence(ANI), Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI).**
    Ans:- ANI:-it referes to AI systems that are specialized in performing a specific task or a narrow range of tasks. These AI systems excel in their dedicated domain but lack the ability generalize their knowledge. Ex:- google spam email filter is an ANI
    AGI:- it aims to replicate human-like intelligence. AGI system possess the ability to understand, learn and apply knowledge across a wide variety of tasks and domains, ex:- while we do not yet have AGI
    ASI:- artificial super intelligence or ASI represents a hypothetical level of AI that surpasses human intelligence in every conceivable aspect. ASI would possess not only general intelligence but also an extraordinary capacity for problem-solving, creativity and the ability to improve and enhance its own capabilities without human intervention.
11. **What is the primary goal of the modelling phase in the AI project lifecyle? Explain the difference between rule-based AI and learning-based AI.**
    Ans:- primary goal of AI model is that it serves as a plan or design for a computer system's behavior. It can be treated as blue print which provides detailed instruction for developing AI Project.
    Rule-Based approach:- this approach relies on giving a machine a set of rules and data to work with. Consider a "RoboChef" AI assistant for making sandwiches.
    While teaching RoboChef to make a sandwich, you can instruct it to:-
    - First, take two slices of break.
    - Then, spread butter on one slice and jam on other
    - Finally, put the slices together.

    Learning-based approach:-in this approach we not only feed data but also with the desired outcomes. It has following features:-

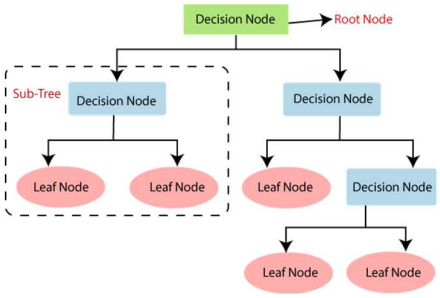
    Learns from Data:- it acquire knowledge and skills by processing and analyzing large amounts of data.

Improves over time:- it continuously improves its performance as it gains more experience and encounters new data.

adapts to new situations:- it can adapt to changing circumstances and respond effectively to novel situations.

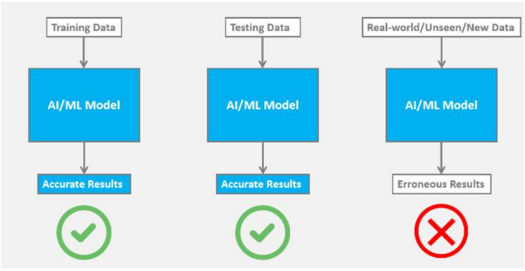
Decision tree:- it is a graphical representation of decision-making process or a classification algorithm.

12. **Why is evaluation important in AI projects and when does it typically occur?**
Ans:- evaluation is the final stage of the AI project lifecycle. In evaluation, we carefully check how well our AI model is working. The process of evaluation creates a report card for the AI algorithm to see if it is doing a good job. We use various tests and data to measure its performance. When performance is not up to our expectations, we might need to make changes and improvements in the previous stages like problem scoping, data acquisition or modelling. It helps ensure that the AI model is accurate, reliable and effective before it is deployed for real- world use.
13. **What are decision trees in AI and for what types of tasks are they commonly used?**
Ans:- Decision tree is graphical representation of a decision-making process or a classification algorithm.



It starts at root node and proceeds towards decision through the internal nodes. At each internal/ decision node, the tree evaluates a specific features value for the input data. Based on the feature's value, the tree follows the corresponding branch to the next decision note or leaf. This process continues until a leaf node is reached.

14. **Describe the concept of overfitting in AI models.**
Ans:- he purpose of an AI/ML model is to make predictions from real-life data after being trained by the training dataset (see Figure 1). Overfitting occurs when a model is too attuned or overly fitted to the training data and does not function accurately when it is fed with any other data.
In other words, The AI/ML model memorizes the training data rather than learning from it. An overfitted model will present accurate results while working with the training dataset and present erroneous results working with an unseen or new dataset.



15. **What is the main purpose of deploying an AI model? When does deployment typically happen in the AI project lifecycle?**
Ans:- Once a model has gone through the iterations of development, build, and test, the AI Operations (or Model Ops) team deploys the model into production. Deployment is

the process of configuring an analytic asset for integration with other applications or access by business users to serve production workload at scale