TECHBOMB

TECHBOMB QUIZ:

SOFTWARE AND SYMBOLIC AI

TECHBOMB

True/False

Questions:

1. Software is a collection of instructions that tell a computer what to do.
2. Hardware and software perform the same function in a computer system.
3. System software includes operating systems like Windows and Linux.
4. Application software is designed for specific tasks such as editing videos or managing data.
5. The Software Development Life Cycle (SDLC) defines the process of designing, developing, and maintaining software.
6. The Waterfall model is more flexible and iterative than Agile.
7. Agile focuses on continuous feedback and small, rapid iterations.
8. DevOps integrates software development with IT operations for faster deployment.
9. Software architecture defines how components of a system are organized and interact.
10. A monolithic architecture is highly modular and easy to scale.

TECHBOMB

True/False

Questions:

11.Microservices architecture allows different components to run independently.

12.Software scalability means a system can handle increased load without performance loss.

13.Debugging is the process of creating new software from scratch.

14.esting ensures the reliability and correctness of a software system.

15.Expert systems are based on Symbolic AI principles.

16.Symbolic AI uses logic and rules to represent knowledge.

17.Neural networks rely on explicit rules and symbolic representations.

18.The “Knowledge Principle” states that intelligent behavior requires domain-specific knowledge.

19.ELIZA is an early example of a Symbolic AI chatbot.

20.Semantic networks represent knowledge using nodes and relationships.

21.Predicate logic allows AI systems to express statements formally and reason about them.

22.Rule-based systems use IF–THEN statements to draw conclusions.

23.The Cyc project aimed to encode common-sense knowledge into computers.

24.Symbolic reasoning is transparent and explainable compared to neural networks.

25.Neuro-symbolic AI combines deep learning with logic-based reasoning.

Multiple Choice Questions:

Which of the following is system software?

A) Microsoft Word

B) Windows 11

C) Canva

D) Telegram

Which software model is known for sequential development stages?

A) Agile

B) DevOps

C) Waterfall

D) Prototype

Which phase of SDLC involves testing and bug fixing?

A) Planning

B) Design

C) Implementation

D) Testing

What is the main purpose of software maintenance?

A) Creating prototypes

B) Improving and updating existing software

C) Selling software licenses

D) Deleting outdated code

What is the difference between system and application software?

A) None

B) System software manages hardware; application software performs tasks.

C) Application software controls memory.

D) System software creates games.

Multiple Choice Questions:

What does DevOps focus on?

A) Hardware configuration

B) Merging development and operations

C) Decreasing software quality

D) Writing documentation

Which of these is NOT a programming paradigm?

A) Procedural

B) Object-Oriented

C) Functional

D) Randomized

In Object-Oriented Programming, which concept hides internal details?

A) Inheritance

B) Abstraction

C) Encapsulation

D) Overloading

Which programming language is most used in AI development?

A) C++

B) Java

C) Python

D) PHP

5. What is the main goal of software testing?

A) To fix all bugs manually

B) To ensure software meets requirements

C) To design user interfaces

D) To create backups

Multiple Choice Questions:

What is the main goal of software testing?

A) To fix all bugs manually

B) To ensure software meets requirements

C) To design user interfaces

D) To create backups

What is Symbolic AI?

A) AI that learns purely from data

B) AI that uses symbols and logic to represent knowledge

C) AI that evolves like genetic algorithms

D) AI that mimics human neurons

Which of these is an example of Symbolic AI?

A) ChatGPT

B) DENDRAL

C) AlphaGo

D) Stable Diffusion

What does knowledge representation involve?

A) Storing user passwords

B) Encoding world knowledge into symbols and structures

C) Rendering graphics

D) Data compression

which of the following is a reasoning ethod in Symbolic AI?

A) Regression

B) Forward chaining

C) Backpropagation

D) Gradient descent

What was the goal of the Cyc project?

A) Create neural networks

B) Build robots

C) Encode common-sense reasoning into computers

D) Translate languages

Multiple Choice Questions:

Which of these defines Expert Systems?

A) Data-driven AI

B) Rule-based problem solvers using human expertise

C) Visual AI models

D) Automated voice recorders

MYCIN was used for:

A) Chemistry analysis

B) Diagnosing bacterial infections

C) Configuring computers

D) Language translation

What do semantic networks represent?

A) Relationships between words or concepts

B) Neural connections in the brain

C) Internet topology

D) Mathematical equations

Which type of logic is the foundation of Symbolic AI reasoning?

A) Predicate logic

B) Boolean logic

C) Fuzzy logic

D) Quantum logic

Rule-based systems are also called:

A) Expert Systems

B) Neural Systems

C) Probabilistic Models

D) Game Engines

Multiple Choice Questions:

What was a limitation of Symbolic AI?

A) Lack of interpretability

B) Struggled with learning from raw data

C) Overfitting

D) Poor explainability

What is Neuro-Symbolic AI trying to achieve?

A) Combine reasoning and learning

B) Replace data with logic

C) Eliminate neural networks

D) Focus only on vision tasks

Which is a benefit of Symbolic AI?

A) Explainable reasoning

B) High data efficiency

C) Better pattern recognition

D) Fast parallel learning

Which is an example of system testing?

A) Checking the syntax of code

B) Testing the entire integrated system

C) Testing one function

D) Writing pseudocode

Why is software reliability important?

A) It ensures programs fail safely and predictably

B) It improves advertising

C) It shortens development time

D) It allows faster typing

Open-Ended Questions:

1.Explain the main phases of the Software Development Life Cycle (SDLC).

2.Compare Waterfall, Agile, and DevOps in terms of flexibility and feedback.

3.Describe how software testing ensures system reliability.

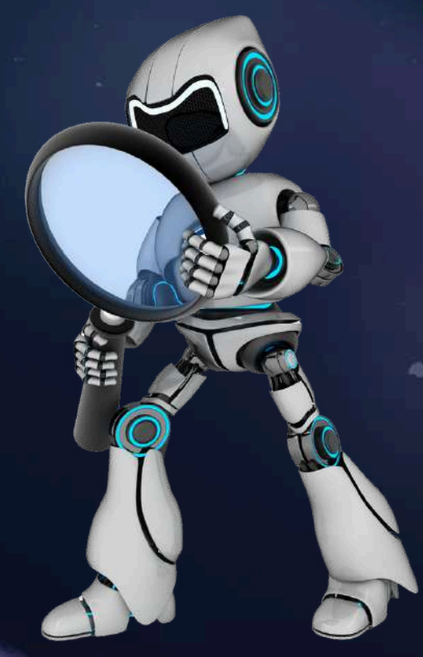
4.What is knowledge representation, and why is it essential for Symbolic AI?

5.How do Expert Systems use rules to solve problems?

6.Explain the main differences between Symbolic AI and Neural AI.

7.What are the benefits of combining symbolic reasoning with deep learning?

8.In your opinion, how might future software integrate Symbolic AI to create smarter, explainable systems?



ANSWER KEY – Software and Symbolic AI Quiz

True / False

#	Statement	Answer
1	Software is a collection of instructions that tell a computer what to do.	✅ True
2	Hardware and software perform the same function in a computer system.	❌ False
3	System software includes operating systems like Windows and Linux.	✅ True
4	Application software is designed for specific tasks such as editing videos or managing data.	✅ True
5	The Software Development Life Cycle defines the process of designing, developing, and maintaining software.	✅ True
6	The Waterfall model is more flexible and iterative than Agile.	❌ False
7	Agile focuses on continuous feedback and small, rapid iterations.	✅ True
8	DevOps integrates software development with IT operations for faster deployment.	✅ True
9	Software architecture defines how components of a system are organized and interact.	✅ True
10	A monolithic architecture is highly modular and easy to scale.	❌ False
11	Microservices architecture allows different components to run independently.	✅ True
12	Software scalability means a system can handle increased load without performance loss.	✅ True
13	Debugging is the process of creating new software from scratch.	❌ False
14	Testing ensures the reliability and correctness of a software system.	✅ True
15	Expert systems are based on Symbolic AI principles.	✅ True
16	Symbolic AI uses logic and rules to represent knowledge.	✅ True
17	Neural networks rely on explicit rules and symbolic representations.	❌ False
18	The “Knowledge Principle” states that intelligent behavior requires domain-specific knowledge.	✅ True
19	ELIZA is an early example of a Symbolic AI chatbot.	✅ True
20	Semantic networks represent knowledge using nodes and relationships.	✅ True
21	Predicate logic allows AI systems to express statements formally and reason about them.	✅ True
22	Rule-based systems use IF–THEN statements to draw conclusions.	✅ True
23	The Cyc project aimed to encode common-sense knowledge into computers.	✅ True
24	Symbolic reasoning is transparent and explainable compared to neural networks.	✅ True
25	Neuro-symbolic AI combines deep learning with logic-based reasoning.	✅ True

ANSWER KEY – Software and Symbolic AI Quiz

Multiple Choice

#	Question Summary	Correct Answer
1	Example of system software	B) Windows 11
2	Sequential development model	Waterfall
3	SDLC phase for bug fixing	D) Testing
4	Main purpose of software maintenance	B) Improving and updating existing software
5	System vs application software	B) System manages hardware; application performs tasks
6	Focus of DevOps	B) Merging development and operations
7	NOT a programming paradigm	D) Randomized
8	Concept hiding internal details (OOP)	C) Encapsulation
9	Most used AI language	C) Python
10	Goal of testing	B) Ensure software meets requirements
11	Symbolic AI definition	B) Uses symbols and logic
12	Example of Symbolic AI	B) DENDRAL
13	Knowledge representation	B) Encoding world knowledge into symbols
14	Reasoning method in Symbolic AI	B) Forward chaining
15	Goal of Cyc project	C) Encode common-sense reasoning

ANSWER KEY – Software and Symbolic AI Quiz

16

Definition of Expert Systems

B) Rule-based problem solvers using human expertise

17

MYCIN’s purpose

B) Diagnosing bacterial infect

18

Semantic networks represent

A) Relationships between words or concepts

19

Logic foundation of Symbolic AI

A) Predicate logic

20

Rule-based systems also called

A) Expert Systems

21

Limitation of Symbolic AI

B) Struggled with learning from raw data

22

Neuro-Symbolic AI aims to

A) Combine reasoning and learning

23

Benefit of Symbolic AI

A) Explainable reasoning

24

Example of system testing

B) Testing the entire integrated system

25

Importance of software reliability

A) Ensures programs fail safely and predictably

ANSWER KEY – Software and Symbolic AI Quiz

Open-Ended Questions – Answer Key

1. Explain the main phases of the Software Development Life Cycle (SDLC).

→ The SDLC includes PLANNING, DESIGN, DEVELOPMENT, TESTING, DEPLOYMENT, and MAINTENANCE.

Each phase ensures STRUCTURE, QUALITY CONTROL, and RELIABILITY in software creation.

2. Compare Waterfall, Agile, and DevOps in terms of flexibility and feedback.

→ WATERFALL is LINEAR and rigid with SEQUENTIAL STAGES.

AGILE is ITERATIVE, encourages CONTINUOUS FEEDBACK, and quick adaptation.

DEVOPS integrates DEVELOPMENT and OPERATIONS, promotes CONTINUOUS DELIVERY and AUTOMATION.

3. Describe how software testing ensures system reliability.

→ TESTING detects BUGS, verifies FUNCTIONALITY, ensures STABILITY, and minimizes FAILURE RISK.

It helps confirm that software meets REQUIREMENTS and performs CONSISTENTLY under expected conditions.

4. What is knowledge representation, and why is it essential for Symbolic AI?

→ KNOWLEDGE REPRESENTATION (KR) organizes REAL-WORLD INFORMATION into LOGICAL STRUCTURES (like GRAPHS, LOGIC, or FRAMES) that machines can UNDERSTAND and REASON about.

It is crucial for SYMBOLIC AI to perform INFERENCE and PROBLEM-SOLVING.

5. How do Expert Systems use rules to solve problems?

→ EXPERT SYSTEMS rely on IF–THEN RULES stored in a KNOWLEDGE BASE.

An INFERENCE ENGINE applies these rules to FACTS, deriving CONCLUSIONS or DIAGNOSES through REASONING.

6. Explain the main differences between Symbolic AI and Neural AI.

→ SYMBOLIC AI is RULE-BASED, LOGICAL, and EXPLAINABLE; it manipulates SYMBOLS using REASONING.

NEURAL AI (or CONNECTIONIST AI) is DATA-DRIVEN, relies on PATTERN RECOGNITION, and is often LESS TRANSPARENT.

7. What are the benefits of combining symbolic reasoning with deep learning?

→ NEURO-SYMBOLIC AI merges LOGIC-BASED REASONING with DEEP LEARNING to achieve EXPLAINABILITY, GENERALIZATION, and HUMAN-LIKE UNDERSTANDING.

It improves TRANSPARENCY and PERFORMANCE in modern AI.

8. In your opinion, how might future software integrate Symbolic AI to create smarter systems?

→ Future software may combine RULE-BASED REASONING with MACHINE LEARNING, enabling TRANSPARENT, EXPLAINABLE, and ADAPTIVE SYSTEMS that can UNDERSTAND CONTEXT and JUSTIFY DECISIONS.