Sinhgad Institutes

Sinhgad Technical Education Society's
SMT. KASHIBAI NAVALE COLLEGE OF ENGINEERING
VADGAON (BK), PUNE-411041

QUESTION BANK

Group A: Design and Analysis of Algorithms
Question Bank

1. What are the various steps to write an Algorithm?
2. Define the following terms-
    1. Time Complexity
    2. Space Complexity
    3. Algorithm
3. Mention an Algorithm that you will obtain when you add n natural numbers. Also, mention the space the Algorithm needs.
4. What steps do you need to take to design an Algorithm?
5. Design an Algorithm with illustration for the following purpose –
   (i) Element sorting.
   (ii) Searching for n number factorial.
6. Using Euclid's Algorithm, evaluate an algorithm for calculating gcd(m,n).
7. How will you convert a binary number to a decimal number?
8. Describe the various Algorithms you can use to find the prime numbers. Also, mention which is the most efficient and simplest Algorithm.
9. Which problems can you solve using Algorithms?
10. How can you measure the input size of an Algorithm?
11. Define basic operation in context to adding two n by n matrices with an example.

12.Estimate the recurrence relations of the followings-
(i) $x(n) = x(n/3) + 1$ for $n > 1$, $x(1) = 1$ (solve for $n = 3k$)
(ii) $x(n) = x(n-1) + 5$ for $n > 1$

13.What is the difference between Best, Average, and Worst-case efficiency?

14.Explain the concepts of asymptotic notations and its elements.

15.What is Big 'Oh' notation?

16.State the common technique that asserts algorithm correctness.

17.Map out the growth order and compare n! and 2n.

18. Discuss in detail about fundamentals of algorithmic problem solving?

19. Explain the important problem types in detail

20.. Explain the necessary steps for analyzing the efficiency of recursive algorithms

21.Explain the general framework for analyzing the efficiency of algorithm. CS8451 Question Bank Design and Analysis Of Algorithms

22.Write the asymptotic notations used for best case ,average case and worst case analysis of algorithms and Write an algorithm for finding maximum element of an array perform best , worst and average case complexity with appropriate order notations

23.Explain the method of solving recurrence equations with suitable example.

24.Explain the method of solving Non recursive equations with suitable examples CS8451 Question Bank Design and Analysis Of Algorithms
i)Describe the basic efficiency classes in detail.
ii) Write an algorithm for Fibonacci numbers generation and compute the following
a) How many times is the basic operation executed
b) What is the efficiency class of this algorithm
Solve the following recurrence relations CS8451 Question Bank Design and Analysis Of Algorithms

Group B: Machine Learning

1. Explain Machine Learning, Artificial Intelligence, and Deep Learning
2. What is Bias and Variance in Machine Learning?
3. What is Clustering in Machine Learning?
4. What is Linear Regression in Machine Learning?
5. What is a Decision Tree in Machine Learning?
6. What is Overfitting in Machine Learning and how can it be avoided?
7. What is Hypothesis in Machine Learning?
8. What are the differences between Deep Learning and Machine Learning?
9. What are the differences between Supervised and Unsupervised Machine Learning?
10. What is Bayes's Theorem in Machine Learning?
11. What is PCA in Machine Learning?
12. What is Support Vector Machine (SVM) in Machine Learning?
13. What is Cross-validation in Machine Learning?What is Entropy in Machine Learning?
14. What is Epoch in Machine Learning?
15. What is machine learning and how is it different from data mining?
16. Which two methods do you use for calibration in supervised learning?
17. Outline the difference between Type I and Type II errors.
18. What is the difference between a linked list and an array?
19. Explain the convex hull with an example.
20. Which ML algorithm do you use most frequently and why?
21. Explain the difference between L1 and L2 regularisation?
22. Explain dimension reduction in ML.
23. What is bagging and boosting in the ensemble method?
24. Explain three shortcomings of a linear model.
25. Elaborate on the advantages and disadvantages of using decision trees.
26. What ML certifications do you have?
27. The lazy learner is the other name for which ML algorithm?
28. What are Entropy and Epoch?

29. What is your experience working with a data visualisation tool? Name one tool you have used in your previous job.
30. What is ensemble learning and why do you use it?
31. Explain the concept of batch statistical learning.
32. What is a confusion matrix?
33. How are hyperparameters different from model parameters?
34. Is it possible for logistic regression to use more than two classes?

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1. What is Blockchain?
2. What is the difference between Bitcoin blockchain and Ethereum blockchain?
3. What are the different types of Blockchains?
4. Where is a blockchain stored?
5. What are the types of records that are present in the blockchain database?
6. List the key features of blockchain?
7. How does Blockchain differ from relational databases?
8. Name some popular platforms for developing blockchain applications.
9. What do you mean by blocks in the blockchain technology?
10. Every block of Blockchain consist of what elements?
11. How does a block is recognized in the Blockchain approach?
12. How can blocks be identified?
13. Can you modify the data in a block?
14. Can you remove a complete block from a network?
15. What type of records can be kept in the Blockchain? Is there any restriction on the same?
16. Which cryptographic algorithm is used in Blockchain?
17. In what order are the blocks linked in the blockchain?
18. What are the benefits of blockchain?
19. What are the Merkle trees? What is its importance in blockchain?
20. What is Double Spending? Is it possible to double spend in a Blockchain system?
21. What is a ledger? Name the common type of ledgers that can be considered by users in Blockchain?
22. Why is Blockchain a trusted approach?
23. What do you mean by Coinbase transaction?
24. What is the difference between blockchain and database?
25. What is Cryptocurrency?
26. What are the limitations of blockchain?
27. What is a 51% attack?
28. What is encryption? What is its role in Blockchain?
29. What is the difference between Proof-of-work and Proof-of-stake?
30. What is the difference between public and private key?
31. How does bitcoin use blockchain?
32. What is Consensus algorithm?
33. What are the types of consensus algorithms?
34. Why is Blockchain a trusted approach?
35. Is it possible to modify the data once it is written in a block?
36. Is it possible in Blockchain to remove one or more block from the networks?
37. What are Block Identifiers?