

43 Lecture - CS402

Important Mcqs

1. **Which of the following is an example of an undecidable problem?**

- a) Determining if a given number is prime
- b) Sorting a list of integers in ascending order
- c) Calculating the square root of a number
- d) Counting the number of vowels in a string

Answer: a) Determining if a given number is prime

Which of the following problems is decidable?

- a) The halting problem
- b) The subset sum problem
- c) The traveling salesman problem
- d) The knapsack problem

Answer: b) The subset sum problem

Which of the following is a necessary condition for a problem to be decidable?

- a) The problem must have a finite number of inputs
- b) The problem must have a finite number of outputs
- c) There must exist an algorithm that can solve the problem
- d) The problem must be solvable in polynomial time

Answer: c) There must exist an algorithm that can solve the problem

Which of the following is a sufficient condition for a problem to be undecidable?

- a) The problem can be solved by a non-deterministic algorithm
- b) The problem can be solved in exponential time
- c) The problem can be reduced to the halting problem
- d) The problem has an infinite number of inputs

Answer: c) The problem can be reduced to the halting problem

Which of the following problems is undecidable?

- a) Testing if a context-free grammar generates a given language
- b) Finding the shortest path in a graph
- c) Determining if a given number is even or odd
- d) Calculating the sum of two integers

Answer: a) Testing if a context-free grammar generates a given language

Which of the following problems is semi-decidable?

- a) The halting problem
- b) The subset sum problem
- c) The traveling salesman problem
- d) The knapsack problem

Answer: a) The halting problem

Which of the following is true about semi-decidable problems?

- a) They are always decidable

- b) They are always undecidable
- c) They can be partially solved by an algorithm
- d) They cannot be solved by any algorithm

Answer: c) They can be partially solved by an algorithm

Which of the following is an example of a semi-decidable problem?

- a) Testing if a given regular expression matches a given string
- b) Sorting a list of integers in descending order
- c) Finding the longest common subsequence between two strings
- d) Checking if a given context-free grammar is ambiguous

Answer: a) Testing if a given regular expression matches a given string

Which of the following problems is not decidable in general, but is decidable for certain special cases?

- a) The subset sum problem
- b) The traveling salesman problem
- c) The halting problem
- d) The knapsack problem

Answer: b) The traveling salesman problem

Which of the following statements is true about undecidable problems?

- a) They cannot be solved by any algorithm
- b) They can be solved in exponential time
- c) They have an infinite number of inputs
- d) They are always semi-decidable

Answer: a) They cannot be solved by any algorithm