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