Arrays and Strings

# String Compression (1)

Implement a method to perform basic string compression using the counts of repeated characters. For example, string

aabccccaaa would become a2b1c4a3

# Zero matrix (1)

Write an algorithm such that if an element in M x N matrix is 0, its entire row and column are set to 0.

Object-Oriented Design

# Design a musical jukebox using object-oriented principles (7)

# Design a parking lot using object-oriented principles (7)

# Design the data structures for an online book reader system (7)

Recursion

# Robot in a grid (8)

A robot is sitting on the upper left corner of grid with R rows and C columns. The robot can only move in two directions right and down, but certain cells are “off limits”, such that robot cannot step on them. Design the algorithm to find a path for the robot from the top left to the bottom right.

# Parentheses (8)

Implement an algorithm to print all valid (properly opened and closed) combinations of n pairs of parentheses.

## Example: input=3; output= ((())), (()()), ()(()), ()()()

Review the Code

# Find the mistakes in the following code: (11)

unsigned int i;

for (i = 100; i >= 0; --i)

printf(“%d\n”, i);

Databases

# Entity-Relationship Diagram (14)

Draw an entity-relationship diagram for a database with companies, people and professionals (people who work for companies).

# Denormalization

What is denormalization? Explain the pros and cons.

Moderate

# Number Swapper (16)

Write a function to swap a number in place (without temporary variables).

# Number Max (16)

Write a method that finds the maximum of two numbers. You should not use if-else or any other comparison operator.

Javascript

# **How are errors handled in JavaScript?**

Basically, you try to run code (in the try block between the braces), and execution is transferred to the catch block of code when/if runtime errors occur. This is the same way it works in other languages like C# and Java.

try {

// do something

} catch (e) {

// do something with the exception

} finally {

// This code block always executes whether there is an error or not.

}

# What is the difference between == and ===?

The == operator checks equality only whereas === checks equality and data type i.e. value must be of same type.

# Creating Objects in JavaScript

Create an object emp (employee) with 3 attributes: id, name and salary. Do it:

* By object literal
* By creating instance of Object directly
* By using an object constructor

# What is the output of 10+20+"30" in JavaScript?

3030 because 10+20 will be 30. If there is numeric value before and after +, it is treated is binary + (arithmetic operator).

# What will the browser's console show?

var text = 'outside';

function logIt(){

console.log(text);

var text = 'inside';

};

logIt();

**undefined**

# What will the browser's console show?

Consider the following code:

(function() {

var a = b = 5;

})();

console.log(b);

What will be printed on the console?

The code above prints 5.

The trick of this question is that in the IIFE there are two assignments but the variable a is declared using the keyword var. What this means is that a is a local variable of the function. On the contrary, b is assigned to the global scope.

# What is a constructor?

A constructor is a class member executed when an instance of the class is created. The constructor has the same name as the class, and it can be overloaded via different signatures. Constructors are used for initialization chores.

# **How are methods overloaded?**

Methods are overloaded via different signatures (number of parameters and types). Thus, you can overload a method by having different data types, different number of parameters, or a different order of parameters.

# What is method overloading?

Method overloading is creating multiple methods with the same name with unique signatures in the same class. When we compile, the compiler uses overload resolution to determine the specific method to be invoke.

# Can a private virtual method be overridden?

No, because they are not accessible outside the class.

# How do you inherit a class into other class in C#?

Colon is used as inheritance operator in C#. Just place a colon and then the class name.

public class DerivedClass : BaseClass

# What is the difference between method overriding and method overloading?

In method overriding, we change the method definition in the derived class that changes the method behavior. Method overloading is creating a method with the same name within the same class having different signatures.

# What are the different ways a method can be overloaded?

Methods can be overloaded using different data types for parameter, different order of parameters, and different number of parameters.

# What is code review?

The process of examining the source code generally through a peer, to verify it against best practices.

# What is logging?

Logging is the process of persisting information about the status of an application.

# What are mock-ups?

Mock-ups are a set of designs in the form of screens, diagrams, snapshots etc., that helps verify the design and acquire feedback about the application’s requirements and use cases, at an early stage of the design process.

What is the four-digit number in which the first digit is one-third the second, the third is the sum of the first and second, and the last is three times the second?

A = B / 3

C = 4 \* B / 3

D = 3 \* B

B 1 2 3

D 3 6 9

C - - 4

A - - 1

The following verse spells out a word, letter by letter. "My first" refers to the word's first letter, and so on. What's the word that this verse describes?

My first is in fish but not in snail

My second in rabbit but not in tail

My third in up but not down

My fourth in tiara not in crown

My fifth in tree you plainly see

My whole a food for you and me