Programs to practice in the lab on 31.12.2024

Topics Covered: Variable Declaration (var, let, const), Classes, Prototypal Inheritance, Objects and Construction Functions

Question 1:

Program: Declare variables using var, let, and const. Log their values and observe differences (hoisting, scope, reassignment).

Task: Create a small program that assigns different types of data to variables (number, string, boolean) and logs them.

Question 2:

Program: Create a simple calculator using functions and variables. The user can input two numbers, and the calculator can add, subtract, multiply, or divide the numbers.

Task: Declare variables for the operands and the operation, and handle division by zero.

Question 3:

Program: Create a Person object with properties like name, age, and a method greet() that prints a greeting message.

Task: Add a new property isAdult() to check if the person is an adult (age 18+).

Question 4:

Program: Create a Student constructor function with properties like name, grade, and a method study(). Add a getGrade() method to get the student's grade.

Task: Create a few Student instances, call the study() method, and use getGrade().

Question 5:

Program: Create an object temperatureConverter with methods toCelsius() and toFahrenheit() to convert temperatures between Celsius and Fahrenheit.

Task: Add input for temperature values and convert them back and forth.

Question 6:

Create a Person constructor function that accepts name and age parameters and adds them as properties to the object. Then, create a Student constructor function that inherits from Person and adds a graded property.

Write a method describe in Person that returns a string like:

"Name: John, Age: 30"

And a method study in Student that returns:

"John is studying for grade A."

Question 7:

In JavaScript, every object has a prototype. Create an object car with properties like make, model, and year. Then, add a method getDetails() to the car object that returns the car's details as a string.

Using prototypal inheritance, create a new object electricCar that inherits from car, with an additional property batteryCapacity. Add a method getBatteryInfo() to electricCar that returns the battery capacity.

Question 8:

What is the difference between the prototype and __proto__ in JavaScript? Write an example to demonstrate their usage.

Question 9:

Write a class Rectangle with two properties width and height. Add a method area() that calculates the area of the rectangle. Then, create an instance of Rectangle with a width of 5 and height of 10 and log the area to the console.

Question 10:

Create a class BankAccount with properties accountHolder and balance. Add methods deposit(amount) and withdraw(amount) to handle the balance. Write a function transfer(account, amount) that transfers money between two accounts.

Question 11:

Create a class Animal with a method speak() that logs a generic message. Then, create a subclass Dog that extends Animal and overrides the speak() method to log "Woof!". Instantiate both classes and call their speak() method.

Question 12:

Program: Create a Book class with properties like title, author, and status (borrowed or available). Create a Library class with methods to add, remove, and borrow books.

Task: Implement searching by author or title and allow books to be marked as borrowed or available. Include a feature to track overdue books and calculate fines for late returns.

Question 13:

Program: Create a TaskManager class that manages tasks with properties like taskName, priority, and dueDate. Add methods to add, delete, and update tasks. Include sorting by priority and due date.

Task: Implement date comparison to check if a task is overdue. Create functionality for filtering tasks based on their status (in-progress, completed). Display overdue tasks in red and upcoming tasks in green.

Question 14:

Program: Create an Item class and a Cart class. The Cart class should have methods to add, remove, and view items. The Item class should include properties like name, price, and quantity.

Task: Implement features like updating the quantity of items, calculating the total price, and applying discount codes. Use localStorage to persist the cart items even after refreshing the page. Display the cart contents dynamically on the page.

Question 15:

Program: Create a number guessing game where the user has to guess a randomly generated number between 1 and 100. Provide hints like "higher" or "lower" until the user guesses the correct number.

Task: Implement a Game class with methods to start a new game, check guesses, and track the number of attempts. Display a success message when the user guesses correctly and reset the game.

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