Here's a complete TypeScript function for the **Car Financing vs. Leasing Comparison**. This function will allow users to input the relevant parameters and return a JSON object comparing the total cost of financing a car vs. leasing it over a specified period. The function considers factors like the car price, down payment, interest rate, loan duration, maintenance costs, leasing terms, and residual value.

*export* type CarComparisonResult = {

financing: {

totalLoanPayments: number;

totalMaintenanceCost: number;

totalCost: number;

carValueAtEnd: number;

};

leasing: {

totalLeasePayments: number;

totalMaintenanceCost: number;

totalCost: number;

};

comparison: {

savingsByLeasing: number;

isLeasingCheaper: boolean;

};

};

*export* function carFinancingVsLeasingComparison(

*carPrice*: number, *// Total price of the car*

*downPayment*: number, *// Initial down payment for the financing option*

*loanInterestRate*: number, *// Interest rate for the car loan*

*loanTermYears*: number, *// Duration of the loan in years*

*monthlyLeasePayment*: number, *// Monthly payment for the lease*

*leaseTermYears*: number, *// Lease duration in years*

*maintenanceCostFinancing*: number, *// Annual maintenance cost for financing*

*maintenanceCostLeasing*: number, *// Annual maintenance cost for leasing*

*carDepreciationRate*: number, *// Car depreciation rate per year for resale value*

*residualValueAfterLease*: number *// Residual value at the end of the lease*

): CarComparisonResult {

const monthsInYear = 12;

*// Financing calculations*

const loanTermMonths = *loanTermYears* \* monthsInYear;

const monthlyInterestRate = *loanInterestRate* / 100 / monthsInYear;

*// Calculate monthly loan payments for financing using the amortization formula*

const monthlyLoanPayment = (*carPrice* - *downPayment*) \*

(monthlyInterestRate \* Math.pow(1 + monthlyInterestRate, loanTermMonths)) /

(Math.pow(1 + monthlyInterestRate, loanTermMonths) - 1);

const totalLoanPayments = monthlyLoanPayment \* loanTermMonths;

const totalMaintenanceFinancing = *maintenanceCostFinancing* \* *loanTermYears*;

const carValueAtEnd = *carPrice* \* Math.pow(1 - *carDepreciationRate* / 100, *loanTermYears*);

const totalCostFinancing = totalLoanPayments + totalMaintenanceFinancing - carValueAtEnd;

*// Leasing calculations*

const totalLeasePayments = *monthlyLeasePayment* \* *leaseTermYears* \* monthsInYear;

const totalMaintenanceLeasing = *maintenanceCostLeasing* \* *leaseTermYears*;

const totalCostLeasing = totalLeasePayments + totalMaintenanceLeasing - *residualValueAfterLease*;

*// Comparison*

const savingsByLeasing = totalCostFinancing - totalCostLeasing;

const isLeasingCheaper = totalCostLeasing < totalCostFinancing;

*// Return results in JSON format*

*return* {

financing: {

totalLoanPayments: +totalLoanPayments.toFixed(2),

totalMaintenanceCost: +totalMaintenanceFinancing.toFixed(2),

totalCost: +totalCostFinancing.toFixed(2),

carValueAtEnd: +carValueAtEnd.toFixed(2),

},

leasing: {

totalLeasePayments: +totalLeasePayments.toFixed(2),

totalMaintenanceCost: +totalMaintenanceLeasing.toFixed(2),

totalCost: +totalCostLeasing.toFixed(2),

},

comparison: {

savingsByLeasing: +savingsByLeasing.toFixed(2),

isLeasingCheaper,

},

};

}

**Parameters:**

* **carPrice**: Total price of the car if purchased.
* **downPayment**: Initial down payment for the financing option.
* **loanInterestRate**: Interest rate for the car loan.
* **loanTermYears**: Duration of the car loan in years.
* **monthlyLeasePayment**: Monthly payment for the car lease.
* **leaseTermYears**: Duration of the lease agreement in years.
* **maintenanceCostFinancing**: Annual maintenance cost for the car under financing.
* **maintenanceCostLeasing**: Annual maintenance cost for the car under leasing.
* **carDepreciationRate**: Depreciation rate of the car per year (as a percentage).
* **residualValueAfterLease**: Residual value of the car after the lease period ends.

**Expected JSON Output:**

The function returns a CarComparisonResult object containing:

* **financing**: Breakdown of total loan payments, maintenance costs, and overall costs of owning the car.
* **leasing**: Breakdown of total lease payments, maintenance costs, and overall costs of leasing the car.
* **comparison**: The savings between leasing vs. financing and a boolean flag indicating whether leasing is cheaper.

**Example Call:**

const comparison = carFinancingVsLeasingComparison(

30000, *// Car price*

5000, *// Down payment*

3.5, *// Loan interest rate*

5, *// Loan term in years*

350, *// Monthly lease payment*

3, *// Lease term in years*

500, *// Annual maintenance cost for financing*

100, *// Annual maintenance cost for leasing*

15, *// Car depreciation rate per year (%)*

18000 *// Residual value after lease*

);

console.log(JSON.stringify(comparison, null, 2));

This will output a JSON object comparing the costs of financing vs. leasing. You can adjust the parameters to fit different scenarios and show users how they can save money with each option.