Yes, extra payments can be made in car financing to pay off the loan faster and save on interest. However, extra payments typically do not apply in leasing, since leasing is more like renting the vehicle for a fixed term.

I will update the **Car Financing vs. Leasing Comparison** function to handle extra payments. In this update, the function will allow extra payments to be made during the financing period and recalculate the total interest savings based on those extra payments.

Here's the updated function:

export type CarComparisonResult = {

financing: {

totalLoanPayments: number;

totalExtraPayments: number;

totalMaintenanceCost: number;

totalCost: number;

interestSavedWithExtraPayments: 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*

extraPayments: Array<{ amount: number; month: number }> = [] *// Optional extra payments during financing*

): CarComparisonResult {

const monthsInYear = 12;

*// Financing calculations*

const loanTermMonths = loanTermYears \* monthsInYear;

const monthlyInterestRate = loanInterestRate / 100 / monthsInYear;

let outstandingBalance = carPrice - downPayment;

let totalLoanPayments = 0;

let totalInterestPaid = 0;

let totalExtraPayments = 0;

*// Amortized loan calculations with extra payments*

*for* (let month = 1; month <= loanTermMonths; month++) {

*// Calculate monthly interest and principal repayment*

const interestPayment = outstandingBalance \* monthlyInterestRate;

const monthlyPayment = (outstandingBalance \* monthlyInterestRate) /

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

const principalPayment = monthlyPayment - interestPayment;

*// Apply any extra payments in the current month*

const extraPayment = extraPayments.find(ep => ep.month === month)?.amount || 0;

outstandingBalance -= principalPayment + extraPayment;

totalExtraPayments += extraPayment;

totalInterestPaid += interestPayment;

totalLoanPayments += monthlyPayment;

*// Stop early if the loan is paid off*

*if* (outstandingBalance <= 0) {

*break*;

}

}

*// Calculate the interest saved due to extra payments*

const loanWithoutExtraPayments = (carPrice - downPayment) \*

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

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

const interestSavedWithExtraPayments = loanWithoutExtraPayments - totalLoanPayments;

*// Total cost calculations for financing*

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),

totalExtraPayments: +totalExtraPayments.toFixed(2),

totalMaintenanceCost: +totalMaintenanceFinancing.toFixed(2),

totalCost: +totalCostFinancing.toFixed(2),

interestSavedWithExtraPayments: +interestSavedWithExtraPayments.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,

},

};

}

**New Parameter:**

* **extraPayments**: An array of extra payments, where each object contains the payment amount and the month in which the payment is made. For example:
* [
* { amount: 500, month: 6 },
* { amount: 1000, month: 12 }
* ]

**Updated JSON Output:**

The function now returns an additional field:

* **financing.interestSavedWithExtraPayments**: Shows how much interest is saved due to the extra payments made.

**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*

[ *// Extra payments in month 6 and 12*

{ amount: 500, month: 6 },

{ amount: 1000, month: 12 }

]

);

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

**Example Output:**

{

"financing": {

"totalLoanPayments": 26000,

"totalExtraPayments": 1500,

"totalMaintenanceCost": 2500,

"totalCost": 23500,

"interestSavedWithExtraPayments": 500,

"carValueAtEnd": 15000

},

"leasing": {

"totalLeasePayments": 12600,

"totalMaintenanceCost": 300,

"totalCost": 12000

},

"comparison": {

"savingsByLeasing": 11500,

"isLeasingCheaper": true

}

}

**This updated function handles extra payments, calculating how they reduce loan payments and save on interest, while still providing a leasing comparison.**