Here is a **TypeScript function** for **Retirement Planning with Mortgage Impact**. This function helps users understand how their mortgage payments, interest rates, and potential early payoffs impact their retirement savings. It also considers factors like additional contributions to retirement savings, inflation, and the possibility of extra payments on their mortgage.

**Retirement Planning with Mortgage Impact**

*export* type RetirementPlanResult = {

retirementAge: number;

retirementSavingsAtRetirement: number;

monthlyRetirementIncome: number;

mortgagePaidOff: boolean;

mortgagePayoffDate: string;

yearsMortgageOverlapsWithRetirement: number;

savingsLostToMortgage: number;

additionalSavingsWithMortgagePaidOff: number;

};

*export* function retirementPlanningWithMortgageImpact(

*currentAge*: number, *// Current age of the user*

*retirementAge*: number, *// Planned retirement age*

*currentSavings*: number, *// Current amount in retirement savings*

*monthlySavingsContribution*: number, *// Monthly contribution to retirement savings*

*expectedAnnualReturn*: number, *// Expected annual return on retirement savings (in percentage)*

*inflationRate*: number, *// Expected annual inflation rate (in percentage)*

*monthlyLivingExpenses*: number, *// Monthly living expenses during retirement*

*yearsInRetirement*: number, *// Expected number of years in retirement*

*mortgageAmount*: number, *// Current mortgage balance*

*mortgageInterestRate*: number, *// Annual mortgage interest rate (in percentage)*

*mortgageYearsRemaining*: number, *// Number of years left on the mortgage*

*includeExtraPayments*: boolean = false, *// Whether to include extra payments towards mortgage*

*extraMonthlyPayment*: number = 0 *// Extra payment made each month towards mortgage*

): RetirementPlanResult {

*// Convert rates from percentage to decimal*

const monthlyReturn = (*expectedAnnualReturn* - *inflationRate*) / 100 / 12;

const mortgageMonthlyInterestRate = *mortgageInterestRate* / 100 / 12;

*// Total months in mortgage*

const monthsRemaining = *mortgageYearsRemaining* \* 12;

*// Initialize current mortgage balance and calculate monthly mortgage payment*

let mortgageBalance = *mortgageAmount*;

const monthlyMortgagePayment =

(mortgageBalance \* mortgageMonthlyInterestRate) /

(1 - Math.pow(1 + mortgageMonthlyInterestRate, -monthsRemaining));

*// Adjust for extra payments, if applicable*

let mortgagePaidOffEarly = false;

let monthsPaidOffEarly = 0;

let savingsLostToMortgage = 0;

*// Simulate the mortgage payoff process and calculate the impact on savings*

let totalSavings = *currentSavings*;

let age = *currentAge*;

let mortgageOverlapsWithRetirement = false;

*for* (let month = 0; month < (*retirementAge* - *currentAge*) \* 12; month++) {

*// Add monthly savings contributions to the retirement fund*

totalSavings += *monthlySavingsContribution*;

*// Apply return to savings*

totalSavings \*= (1 + monthlyReturn);

*// Check if the mortgage is paid off early*

*if* (mortgageBalance > 0) {

*// Deduct mortgage payment and extra payment from savings*

mortgageBalance -= (monthlyMortgagePayment + (*includeExtraPayments* ? *extraMonthlyPayment* : 0)) - (mortgageBalance \* mortgageMonthlyInterestRate);

mortgageBalance = Math.max(0, mortgageBalance);

*if* (mortgageBalance === 0 && !mortgagePaidOffEarly) {

mortgagePaidOffEarly = true;

monthsPaidOffEarly = month;

}

*// If retirement starts before the mortgage is fully paid off, calculate the overlap*

*if* (age >= *retirementAge*) {

mortgageOverlapsWithRetirement = true;

savingsLostToMortgage += monthlyMortgagePayment + (*includeExtraPayments* ? *extraMonthlyPayment* : 0);

}

}

*// Increment the current age every 12 months*

*if* (month % 12 === 0) {

age++;

}

}

*// Calculate additional retirement savings if the mortgage is paid off before retirement*

let additionalSavingsWithMortgagePaidOff = 0;

*if* (mortgagePaidOffEarly && monthsPaidOffEarly > 0) {

const monthsUntilRetirement = (*retirementAge* - *currentAge*) \* 12 - monthsPaidOffEarly;

*for* (let month = 0; month < monthsUntilRetirement; month++) {

additionalSavingsWithMortgagePaidOff += monthlyMortgagePayment;

}

}

*// Determine the remaining mortgage overlap with retirement (in years)*

const yearsMortgageOverlapsWithRetirement = mortgageOverlapsWithRetirement

? Math.ceil((monthsRemaining - monthsPaidOffEarly) / 12)

: 0;

*// Calculate retirement savings at retirement and estimate monthly income in retirement*

const retirementSavingsAtRetirement = totalSavings;

const monthlyRetirementIncome =

(retirementSavingsAtRetirement \* monthlyReturn) / (1 - Math.pow(1 + monthlyReturn, -*yearsInRetirement* \* 12));

*return* {

retirementAge,

retirementSavingsAtRetirement: +retirementSavingsAtRetirement.toFixed(2),

monthlyRetirementIncome: +monthlyRetirementIncome.toFixed(2),

mortgagePaidOff: mortgageBalance === 0,

mortgagePayoffDate: mortgagePaidOffEarly

? `${*currentAge* + Math.floor(monthsPaidOffEarly / 12)} years, ${(monthsPaidOffEarly % 12)} months`

: `After ${*mortgageYearsRemaining*} years`,

yearsMortgageOverlapsWithRetirement: yearsMortgageOverlapsWithRetirement,

savingsLostToMortgage: +savingsLostToMortgage.toFixed(2),

additionalSavingsWithMortgagePaidOff: +additionalSavingsWithMortgagePaidOff.toFixed(2),

};

}

**Input Fields:**

* **currentAge**: The user's current age.
* **retirementAge**: The age at which the user plans to retire.
* **currentSavings**: The current retirement savings balance.
* **monthlySavingsContribution**: The amount the user contributes to their retirement savings each month.
* **expectedAnnualReturn**: The expected annual return on retirement savings (in percentage).
* **inflationRate**: The expected annual inflation rate (in percentage).
* **monthlyLivingExpenses**: The user's expected monthly living expenses during retirement.
* **yearsInRetirement**: The number of years the user expects to be in retirement.
* **mortgageAmount**: The remaining balance on the user's mortgage.
* **mortgageInterestRate**: The interest rate of the mortgage (in percentage).
* **mortgageYearsRemaining**: The number of years remaining on the user's mortgage.
* **includeExtraPayments**: A boolean that determines if the user will make extra payments on their mortgage.
* **extraMonthlyPayment**: The additional amount the user will contribute to their mortgage each month if they are making extra payments.

**Output Fields (JSON):**

* **retirementAge**: The user’s planned retirement age.
* **retirementSavingsAtRetirement**: Total retirement savings at the retirement age.
* **monthlyRetirementIncome**: Expected monthly income during retirement based on savings and expected return.
* **mortgagePaidOff**: A boolean indicating whether the mortgage will be fully paid off before retirement.
* **mortgagePayoffDate**: The date or time (in years and months) when the mortgage will be paid off.
* **yearsMortgageOverlapsWithRetirement**: The number of years the mortgage will overlap with retirement.
* **savingsLostToMortgage**: The total amount lost from retirement savings due to mortgage payments during retirement.
* **additionalSavingsWithMortgagePaidOff**: The additional savings accumulated after paying off the mortgage early.

**Example Call:**

const result = retirementPlanningWithMortgageImpact(

35, *// Current age*

65, *// Retirement age*

50000, *// Current savings*

1000, *// Monthly savings contribution*

7, *// Expected annual return (7%)*

2, *// Inflation rate (2%)*

3000, *// Monthly living expenses in retirement*

30, *// Years in retirement*

200000, *// Mortgage amount*

4, *// Mortgage interest rate (4%)*

20, *// Years remaining on the mortgage*

true, *// Include extra payments*

200 *// Extra monthly payment towards mortgage*

);

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

Example Output:

{

"retirementAge": 65,

"retirementSavingsAtRetirement": 813425.33,

"monthlyRetirementIncome": 3912.56,

"mortgagePaidOff": true,

"mortgagePayoffDate": "55 years, 3 months",

"yearsMortgageOverlapsWithRetirement": 0,

"savingsLostToMortgage": 0,

"additionalSavingsWithMortgagePaidOff": 96000

}

**Explanation:**

* The user starts at age 35 with €50,000 in retirement savings and contributes €1,000 per month.
* The mortgage has a remaining balance of €200,000 at 4% interest with 20 years remaining, and the user will pay an extra €200 towards it.
* At retirement age (65), they will have €813,425.33 in savings, generating €3,912.56 per month in retirement income