Analysis Class

Creates and validates Analysis objects

# Libraries/Classes calling on ValidateAndRead Library

Validate/Read

Flows Library

TotalRequiredFlows Class

TotalOptionalFlows Class

# Internal Library/Class dependencies

Discounting Library

# External Library Dependencies

None

# Functions

init

validateAnalysisObject()

validateDiscountRate()

# Pseudo Code

Optional inputs are in italics

Begin Pseudocode

init()

Standard class constructor method. Create object based off of list of inputs developed from json string. Class variables are provided in the following table. The STS document contains more information

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Var Name** | **Var Type** | **Format/Values** | **Req** |
| Analysis Type | analysisType | String | {LCCA, BCA, Cost-Loss, Profit Maximization, Other} | **X** |
| Project Type | projType | String | {Buildings, Infrastructure, Resilience, Manufacturing Process,Other} |  |
| ObjectsToReport | objToReport | List of Strings | {FlowSummary, MeasureSummary, SensitvitySummary, UncertaintySummary,IRRSummary} | X |
| Study Period | studyPeriod | Int | whole digits | X |
| Base Date | baseDate | Date | Year, Month, Day | X |
| Service Date | serviceDate | Date | Year, Month, Day |  |
| TimestepValue | timestepVal | String | Year, Quarter, Month, Day | X |
| TimestepCompound | timestepComp | Int | Interval of Timestep to compound interest | X |
| Output in Nominal or Real Dollars | outputRealBool | Boolean | {Nominal, Real} or {0,1} | X |
| Interest Rate (Nominal) | interestRate | Float | in decimals |  |
| Discount Rate (Real or Nominal) | dRateReal | Float | in decimals | X |
|  | dRateNom | Float |  |  |
| Inflation Rate | inflationRate | Float | in decimals |  |
| MARR (Real or Nominal) | Marr | Float | in decimals | X |
| Reinvestment Return Rate (Real or Nominal) | reinvestRate | Float | in decimals | X |
| Income Tax Rate | incomeRateFed | Float | Federal |  |
|  | incomeRateOther | Float | State/Local |  |
| Location | location | List of Strings | Country, Region, Division, State, County, City, ZIP, address |  |

End init

Define validateAnalysisObject(objectList)

Verify that all inputs are of the required type and in valid ranges, if not

Return error: Invalid input for analysis object

Based on chosen analysis type, check that all required inputs are included, if not

Return error: Invalid input for Analysis object using <analysisType> type

Else

Return: self **OR** call without assignment and return nothing

End validateAnalysisObject

validateDiscountRate(self)

Find all variables associated with discounting (dRateReal, dRateNom, inflationRate, outputRealBool)

If (outputRealBool is true and dRateReal given and inflationRate exists and dRateNom not given) or (outputRealBool is False and dRateNom given and inflationRate exists and dRateReal not given)

Pass

Else if (outputRealBool is true and dRateReal given and inflationRate exists and dRateNom given) or (outputRealBool is False and dRateNom given and inflationRate exists and dRateReal given)

Call Discounting Library

inflRateCalc = inflationRateCalc(dRateNom,dRateReal)

if inflRateCalc is not within tolerance (start at 1% and we can adjust as needed) of given discount rate

return “Inflation rate calculated from nominal and real rate does not match the provided inflation rate. Calculation the provided rate used in calculation may not be correct.”

Else

pass

Else if dRateNom and dRateReal exist and outputRealBool is true

Use dRateReal

If inflationRate does not exist

Call Discounting library

inflationRateCalc(dRateNom,dRateReal)

update inputObjectList with calculated inflationRate

Return updated inputObjectsList with warning (see next line)

Return warning: “Both the Real and Nominal discount rate were provided based on User input only the Real rate will be used in calculations”

Else if dRateNom and dRateReal exists and outputRealBool is false

Use dRateNom

If inflationRate does not exist

Call Discounting library

inflationRateCalc(dRateNom,dRateReal)

update inputObjectList with calculated inflationRate

Return updated inputObjectsList with warning (see next line)

Return warning: “Both the Real and Nominal discount rate were provided based on User input only the Nominal rate will be used in calculations”

Else if outputRealBool is true and dRateNom given and inflationRate exists:

Call Discounting Library

dRateRealCalc(dRateNom,inflationRate)

update inputObjectsList with realrate

return updated inputObjectsList

return warning: “Output defined as Real but Nominal rate provided, Real rate has been calculated from available inputs and will be used in subsequent calculations”

Else if outputRealBool is false and dRateReal exists and inflationRate exists:

Call Discounting Library

dRateNomCalc(dRateReal,inflationRate)

update inputObjectsList with nominal rate

return updated inputObjectsList

return warning: “Output defined as Nominal but Real rate provided, Nominal rate has been calculated from available inputs and will be used in subsequent calculations”

Else If outputRealBool is true and dRateReal given and dRateNom does not exist and inflationRate does not exist or (outputRealBool is false and dRateNom given and dRateReal does not exist and inflationRate does not exist)

Return “Inflation rate not calculable from given values, calculations will proceed unaffected however no inflation rate will be reported with output”

Else

Return “Error: improper information given for discount rate. Calculation cannot proceed.”

Halt all calculations

dRateNomCalc(dRateReal,inflationRate)

update inputObjectsList with nominal rate

return updated inputObjectsList

End validateDiscountRate

Valid input ranges

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Var Name** | **Var Type** | **Range** |
| Analysis Type | analysisType | String | N/A |
| Project Type | projType | String | N/A |
| ObjectsToReport | objToReport | List of Strings | N/A |
| Study Period | studyPeriod | Int | Positive integer |
| Base Date | baseDate | Date | Year, Month, Day |
| Service Date | serviceDate | Date | Year, Month, Day (must be later than Base Date) |
| TimestepValue | timestepVal | String | Year, Quarter, Month, Day (when divided into Study period the answer must be a whole number |
| TimestepCompound | timestepComp | Int | Positive and less than study period |
| Output in Nominal or Real Dollars | outputRealBool | Boolean | N/A |
| Interest Rate (Nominal) | interestRate | Float | in decimals |
| Discount Rate (Real or Nominal) | dRateReal | Float | in decimals |
|  | dRateNom | Float |  |
| Inflation Rate | inflationRate | Float | in decimals |
| MARR (Real or Nominal) | Marr | Float | in decimals |
| Reinvestment Return Rate (Real or Nominal) | reinvestRate | Float | in decimals |
| Income Tax Rate | incomeRateFed | Float | N/A |
|  | incomeRateOther | Float | N/A |
| Number of Alternatives | noAlt | Int | whole digits >= 1 |
| Baseline Alternative Number | baseAlt | Int | whole digits |
| Location | location | List of Strings | N/A |