

# Problem Solving

## COUPLING DIAGRAM & DATA DICTIONARY

by

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# Chapter Description



- **Aims**

- Students able to draw coupling diagram correctly based on given algorithm
- Students can write down all the variable in the given problem

- **Expected Outcomes**

- Students understand and can relate the interactivity chart to coupling diagram and data dictionary

- **References**

- Sprankle, M., and Hubbard, J., (2012). Problem Solving and Programming Concepts : 9th Edition. Prentice Hall, 2012. ISBN : 0132492644

# Coupling Diagram

- **Coupling diagram:** shows which variables are passed from one module to another (Sprankle and Hubbard, 2012)
- Coupling diagram relate with interactivity chart and the way of sending data (send value OR send address) from one module to another
- Coupling diagram can be draw based on algorithm

# Example: Coupling Diagram based on an Algorithm

**Draw Coupling Diagram based on algorithm given**



ControlRinggitConverter

Process Read(\*Money, \*Rate, \*Tax)

Process CalcTotalMoney(Money, Rate, \*TotalMoney)

Process CalcTotalTax(Tax, TotalMoney, \*TotalTax)

Process Print(TotalMoney, TotalTax)

End

Read(\*My, \*Rate, \*Tax)

Enter My, Rate, Tax

Exit

CalcTotalMoney(Money, Rate, \*TotalMoney)

TotalMoney=Money\*Rate

Exit

CalcTotalTax(Tax, TotalMoney, \*TotalTax)

TotalRax=Tax\*TotalMoney

Exit

Print(TotalMoney, TotalTax)

Print TotalMoney, TotalTax

Exit

# Example: Coupling Diagram based on an Algorithm



The first step is draw the interactivity chart. Analysis how many modules you need to draw

**ControlRinggitConverter**

**Read**

**CalcTotalMoney**

**CalcTotalTax**

**Print**

# Example: Coupling Diagram based on an Algorithm



To link between 2 modules, you need a line. There are two types of lines either single headed or double headed

Single-headed:  
indicate these  
parameters are  
**call-by-value**

Double-headed:  
indicate these  
parameters are  
**call-by-reference**

# Example: Coupling Diagram based on an Algorithm

## ControlRinggitConverter

ControlRinggitConverter

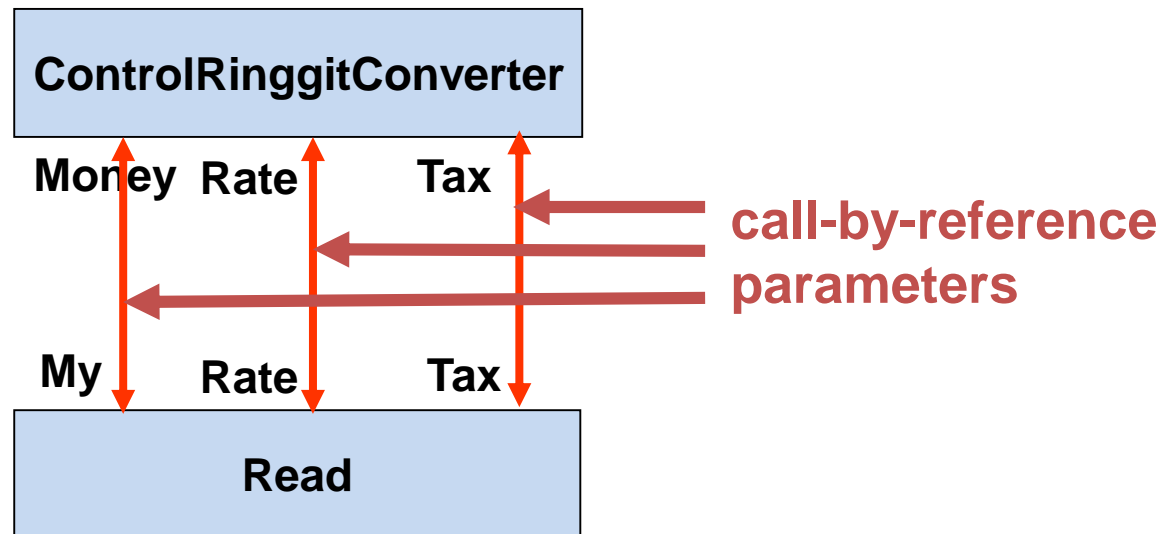
Process Read(\*Money, \*Rate, \*Tax)

### Read

Read(\*My, \*Rate, \*Tax)

Enter My, Rate, Tax

Exit



# Example: Coupling Diagram based on an Algorithm

## ControlRinggitConverter

ControlRinggitConverter

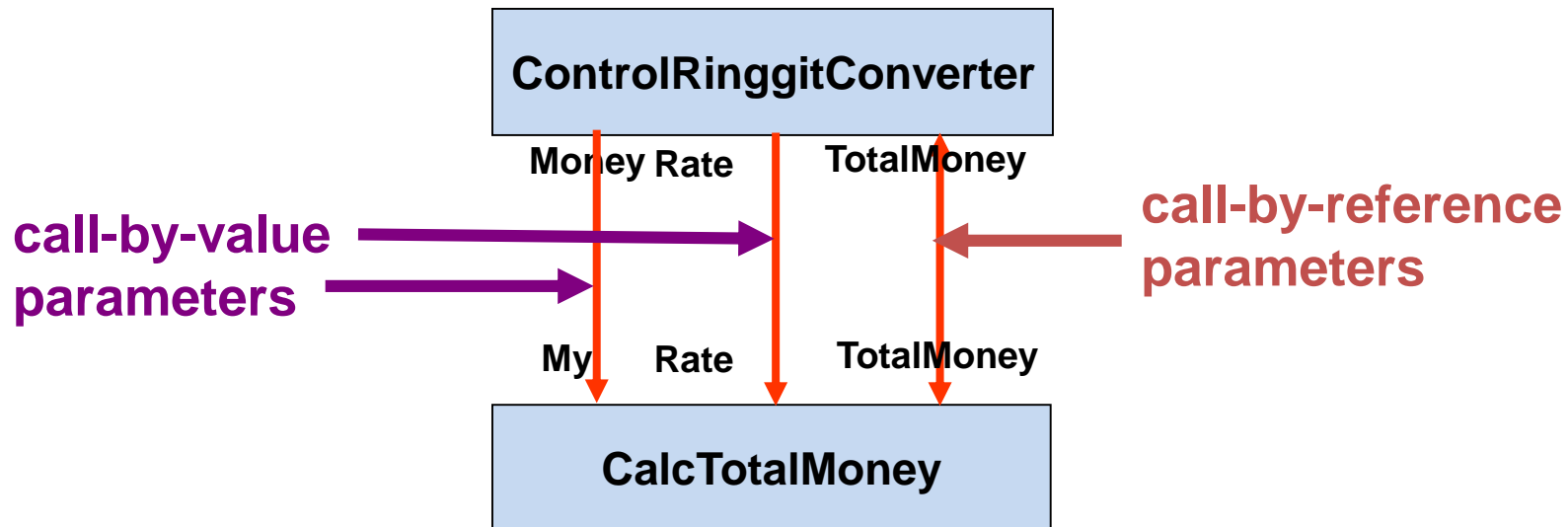
Process CalcTotalMoney(Money, Rate, \*TotalMoney)

## CalcTotalMoney

CalcTotalMoney(Money, Rate, \*TotalMoney)

TotalMoney=Money\*Rate

Exit





# Example: Coupling Diagram based on an Algorithm

## ControlRinggitConverter

ControlRinggitConverter

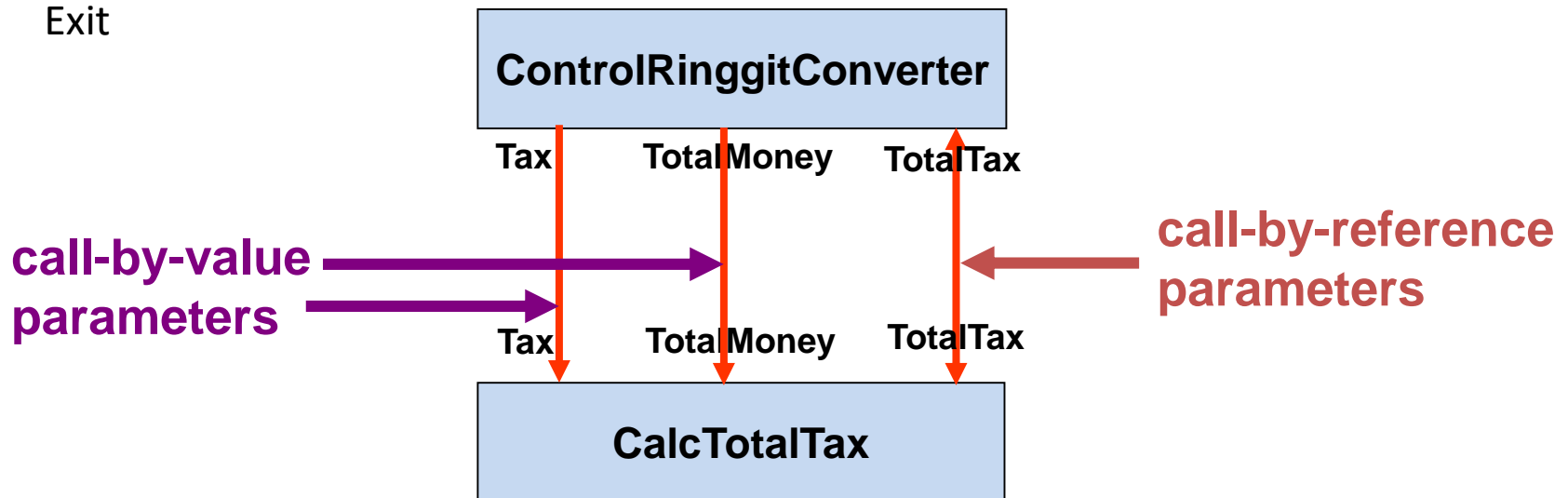
Process CalcTotalTax(Tax, TotalMoney, \*TotalTax)

## CalcTotalTax

CalcTotalTax(Tax, TotalMoney, \*TotalTax)

TotalRax=Tax\*TotalMoney

Exit



# Example: Coupling Diagram based on an Algorithm

## ControlRinggitConverter

ControlRinggitConverter

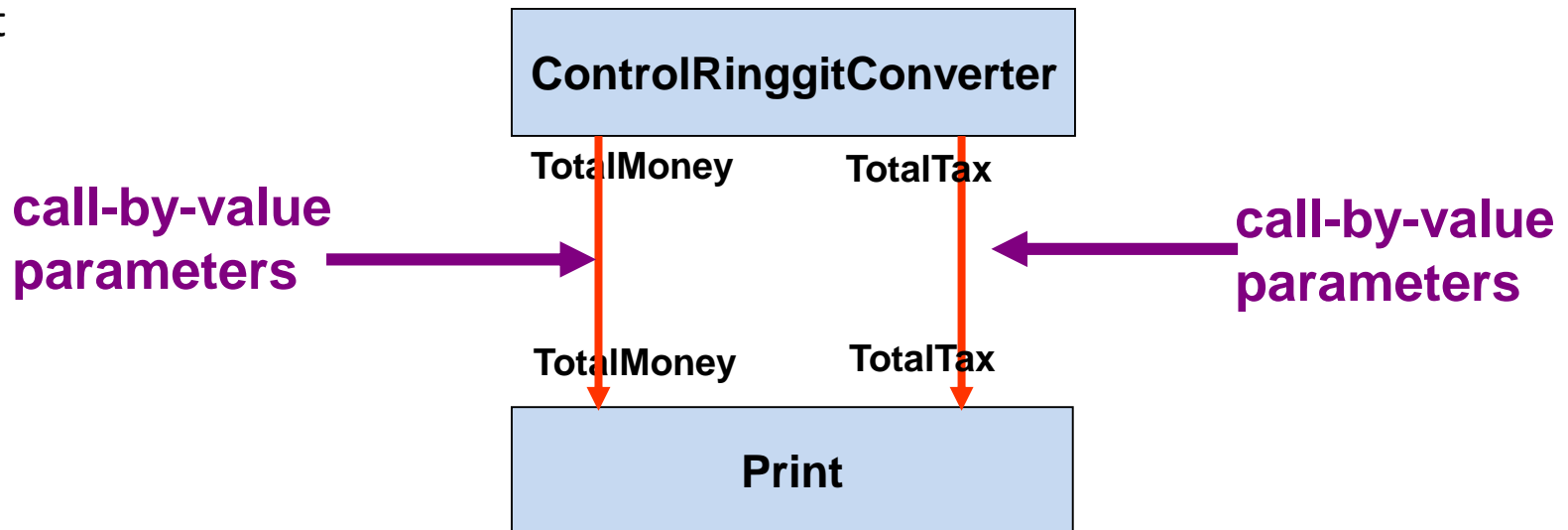
Process Print(TotalMoney,TotalTax)

## Print

Print(TotalMoney,TotalTax)

Print TotalMoney,TotalTax

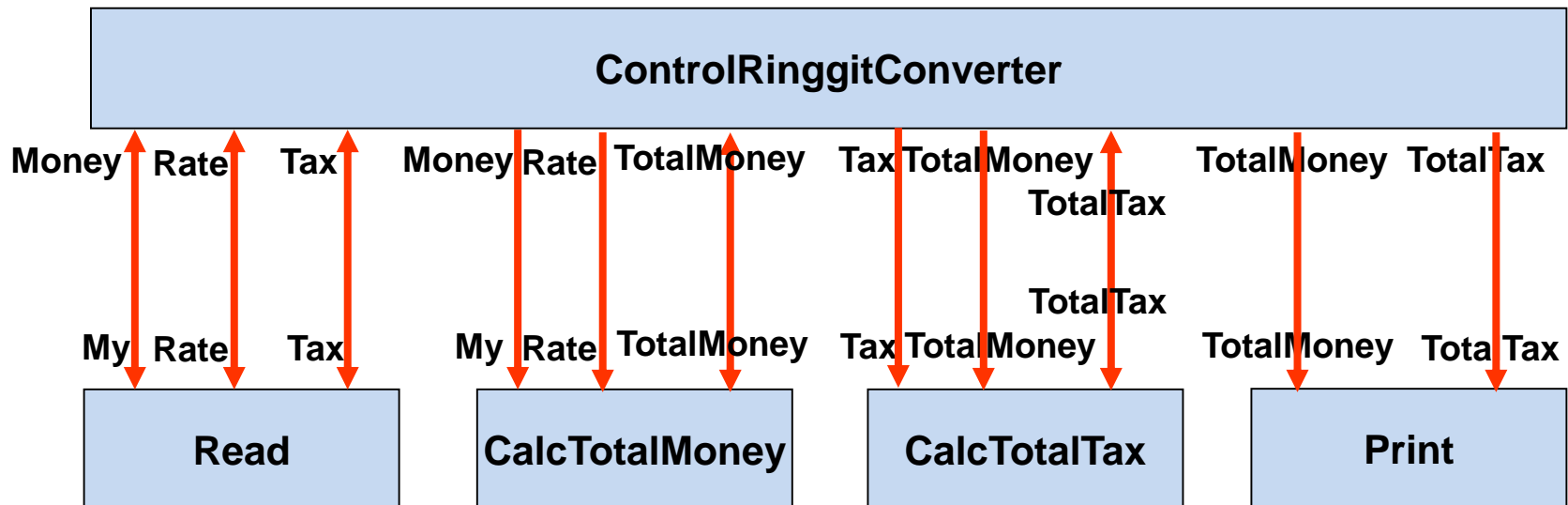
Exit



# Example: Coupling Diagram based on an Algorithm



Combine all modules. Now! this is your **COUPLING DIAGRAM**



# Data Dictionary



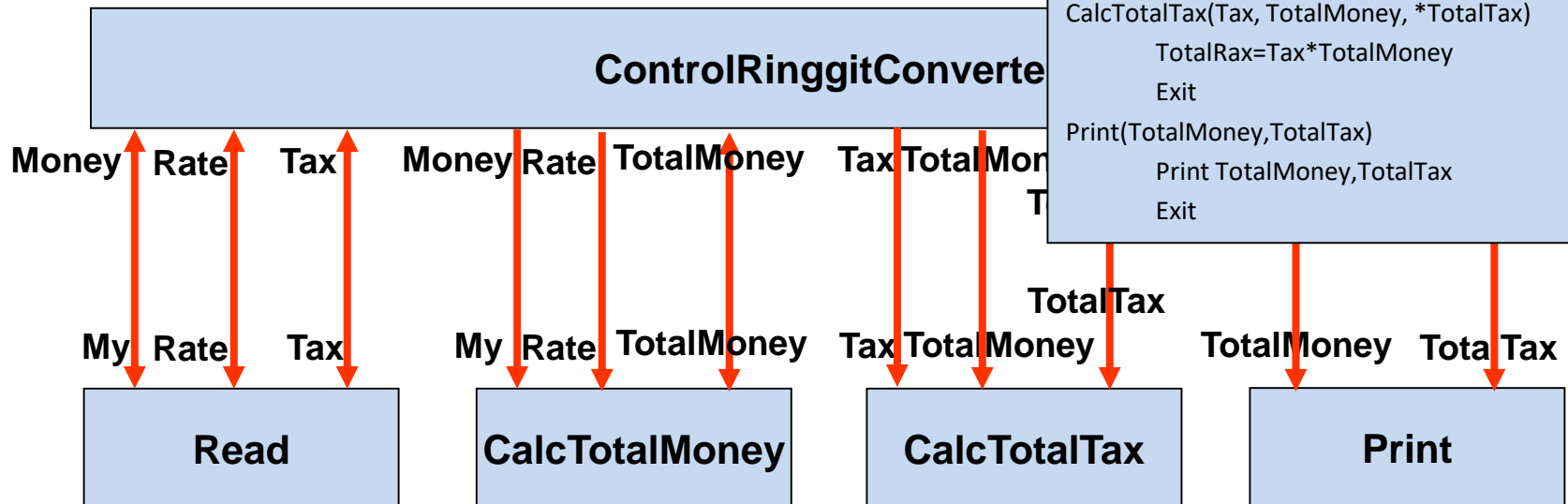
**DATA DICTIONARY** use to help to keep track of the variable usage in program. Data dictionary contain a list of all items, variable names and data types and the module that the variables are used

# Example: Data dictionary based on Coupling Diagram



```

ControlRinggitConverter
    Process Read(*Money, *Rate, *Tax)
    Process CalcTotalMoney(Money, Rate,
*TotalMoney)
    Process CalcTotalTax(Tax, TotalMoney,
*TotalTax)
    Process Print(TotalMoney, TotalTax)
    End
Read(*My, *Rate, *Tax)
    Enter My, Rate, Tax
    Exit
CalcTotalMoney(Money, Rate, *TotalMoney)
    TotalMoney=Money*Rate
    Exit
CalcTotalTax(Tax, TotalMoney, *TotalTax)
    TotalRax=Tax*TotalMoney
    Exit
Print(TotalMoney, TotalTax)
    Print TotalMoney, TotalTax
    Exit
    
```



# Data Dictionary

Data item	Variable Name	Data Type	Module
Money	Money	Numeric: Real	ControlRinggitConverter / CalcTotalMoney
Money	My	Numeric: Real	READ
Rate	Rate	Numeric: Real	ControlRinggitConverter / READ / CalcTotalMoney
Tax	Tax	Numeric: Real	ControlRinggitConverter / READ / CalcTotalTax
TotalTax	TotalTax	Numeric: Real	ControlRinggitConverter / CalcTotalTax / PRINT
TotalMoney	TotalMoney	Numeric: Real	ControlRinggitConverter / CalcTotalMoney / CalcTotalTax/ PRINT

# Conclusion / What we have learn today?



How to draw coupling diagram



How to convert coupling diagram to data dictionary

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