CH2120

Class 8

# Replace mainProgram with Subroutines

Move code from mainProgram to a new subroutine mainArithmeticFunctions.

## mainProgram.f08

**program** mainProgram

**implicit** **none**

**call** mainArithmeticFunctions()

**end** **program** mainProgram

## mainArithmeticFunctions.f08

**subroutine** mainArithmeticFunctions()

**implicit** **none**

**real** sumOf, diffBetween, prodOf, quotOf

**real** number1, number2

**real** sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers

**write**(\*,\*) "Arithmetic Operations"

**write**(\*,\*) "Enter the first number: "

**read**(\*,\*) number1

**write**(\*,\*) "Enter the second number: "

**read**(\*,\*) number2

sumOfNumbers = sumOf(number1, number2)

diffBetweenNumbers = diffBetween(number1, number2)

prodOfNumbers = prodOf(number1, number2)

quotOfNumbers = quotOf(number1, number2)

**call** printArithmetic(number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers)

**end** **subroutine** mainArithmeticFunctions

# Subroutines: Arithmetic Operations

## mainProgram.f08

**program** mainProgram

**implicit** **none**

**call** mainArithmeticSubroutines()

**end** **program** mainProgram

## mainArithmeticSubroutines.f08

**subroutine** mainArithmeticSubroutines()

**implicit** **none**

**real** number1, number2

**real** sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers

**write**(\*,\*) "Enter the first number: "

**read**(\*,\*) number1

**write**(\*,\*) "Enter the second number: "

**read**(\*,\*) number2

**call** arithmeticSub(number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers)

**call** printArithmetic(number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers)

**end** **subroutine** mainArithmeticSubroutines

## arithmeticSub.f08

**subroutine** arithmeticSub(number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers)

**implicit** **none**

**real**, **intent**(in) :: number1, number2

**real**, **intent**(out) :: sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers

sumOfNumbers = number1 + number2

diffBetweenNumbers = number1 - number2

prodOfNumbers = number1 \* number2

quotOfNumbers = number1 / number2

**end** **subroutine** arithmeticSub

## printArithmetic.f08

**subroutine** printArithmetic(number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers)

**implicit** **none**

**real**, **intent**(in) :: number1, number2, sumOfNumbers, diffBetweenNumbers, prodOfNumbers, quotOfNumbers

**write**(\*,\*) "Arithmetic Operations"

**write**(\*,\*) "The input--"

**write**(\*,10) "Number 1 = ", number1

**write**(\*,10) "Number 2 = ", number2

**write**(\*,\*)

**write**(\*,\*) "The output--"

**write**(\*,20) "The sum of ", number1, " and ", number2, " is ", sumOfNumbers

**write**(\*,20) "The difference of ", number1, " and ", number2, " is ", diffBetweenNumbers

**write**(\*,20) "The product of ", number1, " and ", number2, " is ", prodOfNumbers

**write**(\*,20) "The quotient of ", number1, " and ", number2, " is ", quotOfNumbers

10 **format**(a12, f8.2)

20 **format**(a18, f8.2, a5, f8.2, a4, f8.2)

**end** **subroutine** printArithmetic

# Budget: Variable Type—Character

## Code

### mainProgram.f08

**program** mainProgram

**implicit** **none**

**call** mainBudget()

**end** **program** mainProgram

### mainBudget.f08

**subroutine** mainBudget()

**implicit** **none**

**character**(*len* = 10) :: category1, category2, category3

**real** amount1, amount2, amount3

**write**(\*,\*) "Enter the first category."

**read**(\*,\*) category1

**write**(\*,\*) "Enter amount"

**read**(\*,\*) amount1

**write**(\*,\*) "Enter the second category."

**read**(\*,\*) category2

**write**(\*,\*) "Enter amount"

**read**(\*,\*) amount2

**write**(\*,\*) "Enter the third category."

**read**(\*,\*) category3

**write**(\*,\*) "Enter amount"

**read**(\*,\*) amount3

**write**(\*,\*)

**write**(\*,\*) "My Budget"

**write**(\*,\*) "-------------------------"

**write**(\*,20) category1, ": ", amount1

**write**(\*,20) category2, ": ", amount2

**write**(\*,20) category3, ": ", amount3

**write**(\*,\*) "-------------------------"

20 **format**(a10, a2, f7.2)

**end** **subroutine** mainBudget

## Output

Enter the first category.

Groceries

Enter amount

5000

Enter the second category.

Eating Out

Enter amount

2000

Enter the third category.

Books

Enter amount

1500

My Budget

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Groceries : 5000.00

Eating : 2000.00

Books : 1500.00

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# Budget: Fixed-sized Arrays, the do-loop

## Code

### mainProgram.f08

**program** mainProgram

**implicit** **none**

**call** mainBudget()

**end** **program** mainProgram

### mainBudget.f08

**subroutine** mainBudget()

**implicit** **none**

**character**(*len* = 10), **dimension**(4) :: categories

**real**, **dimension**(4) :: amounts

**integer** categoryCounter

**do** categoryCounter = 1, 4

**write**(\*,\*) "Enter category #", categoryCounter

**read**(\*,\*) categories(categoryCounter)

**write**(\*,\*) "Enter amount"

**read**(\*,\*) amounts(categoryCounter)

**end** **do**

**write**(\*,\*)

**write**(\*,\*) "My Budget"

**write**(\*,\*) "-------------------------"

**do** categoryCounter = 1, 4

**write**(\*,20) categories(categoryCounter), ": ", amounts(categoryCounter)

**end** **do**

**write**(\*,\*) "-------------------------"

20 **format**(a10, a2, f7.2)

**end** **subroutine** mainBudget

## Output

Enter category # 1

Groceries

Enter amount

5000

Enter category # 2

Eating Out

Enter amount

2000

Enter category # 3

Books

Enter amount

1500

Enter category # 4

Stationery

Enter amount

1000

My Budget

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Groceries : 5000.00

Eating : 2000.00

Books : 1500.00

Stationery: 1000.00

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