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CSCS-1 #0105

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Assignment 2: IOAA Document

**Data Input**

|  |  |  |
| --- | --- | --- |
| Variable name | C++ Data Type | Remarks/Comments |
| Deposit | double | Initial deposit or principal |
| Rate | double | Annual interest rate in decimalized fraction  (not in percent, e.g., 7.5% -> 7.5). |
| Compound | int | Number of times the compounding is done per year |
| Left | int | Number of years “Deposit” is left in deposit |

**Data Output**

|  |  |  |
| --- | --- | --- |
| Variable name | C++ Data Type | Remarks/Comments |
| Accumulation | double | Total accumulation after “Left” years |
| Dollars | int | Whole dollars part of accumulation |
| Cents | int | Whole cents part of accumulation |
| Deposit | double | Initial deposit or principal |
| Rate | double | Annual interest rate in decimalized fraction  (in percent, e.g., 7.5%) |
| Compound | int | Number of times the compounding is done per year |
| Left | int | Number of years “Deposit” is left in deposit |

**Computational Aid and Other Variables**

|  |  |  |
| --- | --- | --- |
| Variable name | C++ Data Type | Remarks/Comments |
| Accumulation | double | Total accumulation after “Left” years |
| TotalPennies | double | “Accumulation” in pennies |
| RoundedPennies | int | Derived from “TotalPennis” |

**Global Constants**

None

**Analysis**

Math Form of Total accumulation after “Left” years:

Accumulation = Deposit\*(1 + Rate/Compound)Left\*Compound

C++ Form of Total accumulation after “Left” years:

Accumulation = Deposit\*pow(1 + Rate/Compound,Left\*Compound)

Algorithm to round Accumulation to nearest penny

TotalPennies = Accumulation\*100

RoundedPennies = int(TotalPennies + 0.5)

Dollars = RoundedPennies / 100

Cents = RoundedPennies % 100

**Algorithm**

1.1 Declare Deposit as double

1.2 Declare Rate as double

1.3 Declare Compound as int

1.4 Declare Left as int

2.1 Declare Accumulation as double

2.2 Declare Dollars as int

2.3 Declare Cents as int

3.1 Declare TotalPennies as double

3.2 Declare RoundedPennies as int

4. Print, “Enter your Initial deposit or principal in decimalized fraction without $ ex) 1000.00”

5. Accept and store into Deposit variable

6. Print, “Enter your Annual interest rate in decimalized fraction without % ex) 7.5”

7.1 Accept and store into Rate

7.2 Rate = Rate / 100

8. Print, “Enter your Number of times the compounding is done per year”

9. Accept and store into Compound

10. Print, “Enter your Number of years ”, Deposit, “ is left in deposit.”

11. Accept and store into Left

12. Accumulation = Deposit\*pow(1 + Rate/Compound,double(Left\*Compound))

13.1 TotalPennies = Accumulation\*100

13.2 RoundedPennies = int(TotalPennies + 0.5)

13.3 Dollars = RoundedPennies / 100

13.4 Cents = RoundedPennies % 100

14.1 Print, “Initial deposit or principal = “, Deposit, “ $”, EOL

14.2 Print, “Annual interest rate = “, Rate\*100, “ %”, EOL

14.3 Print, “Number of times the compounding is done per year = “, Compound, EOL

14.4 Print, “Number of years ”, Deposit, “ is left in deposit = ”, Left, EOL

14.5 Print, “Total accumulation after “, Left, “ years = ”, Accumulation, “ $”, EOL

14.6 Print, “Your accumulation is: “, Dollars, “ dollars and ”, Cents, “ cents.”, EOL

15. End