COMP101 LAB8

Requirements

Make a Java program that calculates and displays information about penalties for late submission for a piece of coursework as described below.

The piece of coursework is given a mark that is an integer between 0 and 100.

The mark for the piece of coursework to pass is 40%. Each piece of coursework may be subject to a late penalty if it is submitted after the deadline. There are two ways of calculating late penalties.

Scheme 1

The work loses 5 marks every day it is late. If the mark drops below 20, no further late deductions are made and the mark stays as 20. If the original mark is initially less than or equal to 20, then the mark stays as its original value.

Scheme 2

The mark for the work is reduced by 10% of the current mark every day it is late. If the mark drops below 25, no further late deductions are made and the mark stays as 25. If the original mark is initially less than or equal to 25, the mark stays as its original value.

It should also output the number of days until the work no longer passes

Analysis and Design

There will be 2 classes within the solution, a markCalculator class and a LatePenaltiesUser class, there is also a LatePenaltiesUserExt class for the extended requirements, the MarkCalculator Class will contain all the calculations and methods within 2 subclasses.

PseudoCode

Mark Calculator class

INT mark

INT days

INT passMark = 40

FUNCTION setDays

INPUT INT (X)

OUTPUT VOID

     days = X

     END

FUNCTION setMark

INPUT INT (X)

OUTPUT VOID

     mark = X

END

FUNCTION setPassMark

INPUT INT (X)

OUTPUT VOID

passMark = X

END

FUNCTION inputBetween

INPUT INT (min) INT (max)

OUTPUT INT

INT value = min-1

WHILE value < min OR value > max

value = INT INPUT

IF value value < min OR value > max

OUTPUT The mark must be between min and max, enter a new value:

ELSE

BREAK

END LOOP

RETURN value

CLASS schemeOne

INT lowerLimit = 20

INT marksLostPerDay = 5

FUNCTION setLowerLimit

INPUT INT (X)

OUTPUT VOID

lowerLimit = X

END

FUNCTION setMarksLostPerDay

INPUT INT (X)

OUTPUT VOID

```
                marksLostPerDay = X
                END


        FUNCTION getMarks
        INPUT VOID
        OUTPUT INT ARRAY
                INT currentMark = mark
                INT ARRAY markList
                FOR day = 0; day <= days; day++
                        markList[day] = currentMark;
                        currentMark -= marksLostPerDay
                        IF currentMark < lowerLimit AND mark>lowerLimit
                                currentMark = lowerLimit
                        ELSE IF mark < lowerLimit
                                currentMark = mark
                RETURN markList


        FUNCTION getDays
        INPUT VOID
        OUTPUT INT
                RETURN (mark-passMark)/marksLostPerDay


        FUNCTION printMarks
        INPUT INT ARRAY (markList)
        OUTPUT VOID
                OUTPUT "day | mark"
                FOR day = 0; day <= markList.length-1; day++
                        OUTPUT day | markList[day]


CLASS schemeOne
        INT lowerLimit = 25
        INT percentageLostPerDay = 10


        FUNCTION setLowerLimit
```

```
INPUT INT (X)

OUTPUT VOID

        lowerLimit = X

        END


FUNCTION setPercentageLostPerDay

INPUT INT (X)

OUTPUT VOID

        percentageLostPerDay = X

        END


FUNCTION getMarks

INPUT VOID

OUTPUT DOUBLE ARRAY

        DOUBLE currentMark = mark

        DOUBLE ARRAY markList

        FOR day = 0; day <= days; day++

                markList[day] = currentMark;

                currentMark = currentMark*(100-percentageLostPerDay)/100

                IF currentMark < lowerLimit AND mark>lowerLimit

                        currentMark = lowerLimit

                ELSE IF mark < lowerLimit

                        currentMark = mark

        RETURN markList


FUNCTION getDays

INPUT VOID

OUTPUT INT

        DOUBLE marksRemaining = mark

        INT day = -1

        WHILE marksRemaining > passMark

                marksRemaining = marksRemaining*(100-percentageLostPerDay)/10

                day ++

                END loop
```

RETURN day

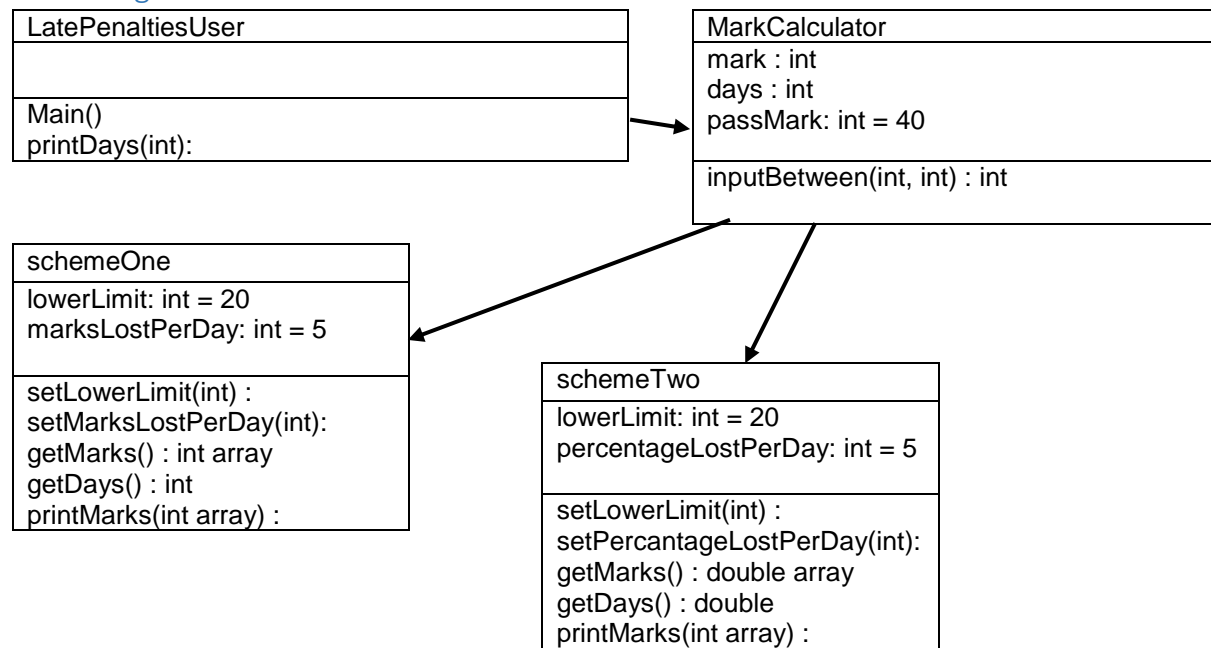FUNCTION printMarks

INPUT DOUBLE ARRAY (markList)

OUTPUT VOID

OUTPUT "day | mark"

FOR day = 0; day <= markList.length-1; day++

OUTPUT day | markList[day]

END

Class Diagram

LatePenaltiesUser
Main() printDays(int):

MarkCalculator
mark : int days : int passMark: int = 40
inputBetween(int, int) : int

schemeOne
lowerLimit: int = 20 marksLostPerDay: int = 5
setLowerLimit(int) : setMarksLostPerDay(int): getMarks() : int array getDays() : int printMarks(int array) :

schemeTwo
lowerLimit: int = 20 percentageLostPerDay: int = 5
setLowerLimit(int) : setPercantageLostPerDay(int): getMarks() : double array getDays() : double printMarks(int array) :

Testing

Mark	Days	As expected
100	10	yes
50	15	yes
40	0	yes
30	5	yes
25	10	yes
20	20	yes

Evidence

C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser

Please Enter the mark: 100

Please Enter the number of days: 10

```
 SCHEME ONE


Day | Mark

  0 | 100

  1 | 95

  2 | 90

  3 | 85

  4 | 80

  5 | 75

  6 | 70

  7 | 65

  8 | 60

  9 | 55

 10 | 50
```

This work can be up to 12 days late before failing

```
 SCHEME TWO


Day | Mark
```

```
 0 | 100.00

 1 | 90.00

 2 | 81.00

 3 | 72.90

 4 | 65.61

 5 | 59.05

 6 | 53.14

 7 | 47.83

 8 | 43.05

 9 | 38.74

10 | 34.87
```

```
This work can be up to 8 days late before failing
C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>goto a


C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser
Please Enter the mark: 509
The mark must be between 0 and 100, enter a new value: 50
Please Enter the number of days: 15
```

```
 SCHEME ONE


Day | Mark
  0 | 50

  1 | 45

  2 | 40

  3 | 35

  4 | 30

  5 | 25

  6 | 20

  7 | 20

  8 | 20

  9 | 20

 10 | 20
```

```
11 | 20
12 | 20
13 | 20
14 | 20
15 | 20


This work can be up to 2 days late before failing


 SCHEME TWO


Day | Mark
  0 | 50.00
  1 | 45.00
  2 | 40.50
  3 | 36.45
  4 | 32.81
  5 | 29.52
  6 | 26.57
  7 | 25.00
  8 | 25.00
  9 | 25.00
 10 | 25.00
 11 | 25.00
 12 | 25.00
 13 | 25.00
 14 | 25.00
 15 | 25.00


This work can be up to 2 days late before failing
C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>goto a


C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser
Please Enter the mark: 40
Please Enter the number of days: 0
```

```
  SCHEME ONE


 Day | Mark
   0 | 40


This work can be up to 0 days late before failing


  SCHEME TWO


 Day | Mark
   0 | 40.00


This work can be up to 0 days late before failing
C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>goto a


C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser
Please Enter the mark: 30
Please Enter the number of days: 5



  SCHEME ONE


 Day | Mark
   0 | 30
   1 | 25
   2 | 20
   3 | 20
   4 | 20
   5 | 20


This work has failed before submission


  SCHEME TWO
```

```
Day | Mark
  0 | 30.00
  1 | 27.00
  2 | 25.00
  3 | 25.00
  4 | 25.00
  5 | 25.00
```

This work has failed before submission

C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>goto a

C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser

Please Enter the mark: 25

Please Enter the number of days: 10


```
 SCHEME ONE


Day | Mark
  0 | 25
  1 | 20
  2 | 20
  3 | 20
  4 | 20
  5 | 20
  6 | 20
  7 | 20
  8 | 20
  9 | 20
 10 | 20
```

This work has failed before submission

```
 SCHEME TWO
```

```
Day | Mark
  0 | 25.00
  1 | 22.50
  2 | 20.25
  3 | 18.23
  4 | 16.40
  5 | 14.76
  6 | 13.29
  7 | 11.96
  8 | 10.76
  9 | 9.69
 10 | 8.72
```

```
This work has failed before submission
C:\Users\BenHa\OneDrive\Documents\JAVA\Lab 8>java LatePenaltiesUser
Please Enter the mark: 20
Please Enter the number of days: 20
```

```
 SCHEME ONE

Day | Mark
  0 | 20
  1 | 20
  2 | 20
  3 | 20
  4 | 20
  5 | 20
  6 | 20
  7 | 20
  8 | 20
  9 | 20
 10 | 20
 11 | 20
 12 | 20
```

```
13 | 20
14 | 20
15 | 20
16 | 20
17 | 20
18 | 20
19 | 20
20 | 20
```

This work has failed before submission

 SCHEME TWO

```
Day | Mark
  0 | 20.00
  1 | 20.00
  2 | 20.00
  3 | 20.00
  4 | 20.00
  5 | 20.00
  6 | 20.00
  7 | 20.00
  8 | 20.00
  9 | 20.00
 10 | 20.00
 11 | 20.00
 12 | 20.00
 13 | 20.00
 14 | 20.00
 15 | 20.00
 16 | 20.00
 17 | 20.00
 18 | 20.00
 19 | 20.00
 20 | 20.00
```

This work has failed before submission