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 |  | MarkCalculator |
|  | mark : int  days : int  passMark: int = 40 |
| Main()  printDays(int): |
|  | 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