

Deborah Barndt

ITMD 513 Open Source Programming

Professor Dr. Sam

Midterm

3-14-19

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1  '''
2  Deborah Barndt
3  3-14-19
4  LoanAmortization.py
5  midterm: Financial Application: Loan Amortization Schedule
6
7  This program will let the user enter the loan amount, the number of years, and
8  the interest rate. Then it will display the amortization schedule for the loan.
9
10 The monthly payment for a given loan pays the principal and the interest. The
11 monthly interest is computed by multiplying the monthly interest rate and the
12 balance (the remaining principal). The principal paid for the month is therefore
13 the monthly payment minus the monthly interest.
14
15 Written by Deborah Barndt.
16 '''
17
18 # Function to get the input from the user, and print the loan amortization schedule.
19 def main():
20     # Ask the user for the loan amount and check if it is valid.
21     while True:
22         try:
23             loanAmount = float(input('Enter the total loan amount: '))
```

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24
25     except ValueError:
26         print('The loan amount you entered is not valid.')
27         continue
28
29     if(loanAmount <= 0):
30         print('The loan amount is not valid and must be a positive number.')
31         continue
32
33     break
34
35     # Ask the user for the number of years and check if it is valid.
36     while True:
37         try:
38             numYears = int(input('Enter the number of years: '))
39
40         except ValueError:
41             print('The number of years is not valid.')
42             continue
43
44         if(numYears <= 0):
45             print('The number of years is not valid and must be greater than 0.')
46             continue
47
48         break
49
50     # Ask the user for the annual interest rate and check if it is valid.
51     while True:
52         try:
```

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53     annualInterestRate = float(input('Enter the annual interest rate: '))
54
55     except ValueError:
56         print('The interest rate is not valid.')
57         continue
58
59     if(annualInterestRate <= 0):
60         print('The interest rate is not valid and must be a positive number.')
61         continue
62
63     break
64
65     # Calculate the monthly interest rate.
66     monthlyInterestRate = annualInterestRate / 1200
67
68     # Calculate the monthly payments.
69     monthlyPayment = loanAmount * monthlyInterestRate / (1 - (pow(1 / (1 + monthlyInterestRate),
70 numYears * 12)))
71
72     # Calculate the total payments.
73     totalPayment = int(monthlyPayment * 12 * numYears * 100) / 100.00
74
75     # Convert the principal to the balance.
76     balance = loanAmount
77
78     # Print the input from the user.
79     print('\nLoan Amount: ', format(loanAmount, '.2f'))
80     print('Number of Years: ', numYears)
81     print('Annual Interest Rate: ', format(annualInterestRate, '.2f') + '\n')
```

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82
83     # Print the monthly and total payments.
84     print('Monthly Payment: ' + format(int(monthlyPayment * 100) / 100.0, '.2f'))
85     print('Total Payment: ', format(totalPayment, '.2f') + '\n')
86
87     # Print the headers for the table.
88     print('Payment#\t Interest\t Principal\t Balance')
89
90     # For loop to create the data for the table.
91     for i in range(1, numYears * 12 + 1):
92         interest = int(monthlyInterestRate * balance * 100) / 100.00
93         principal = int((monthlyPayment - interest) * 100) / 100.00
94         balance = int((balance - principal) * 100) / 100.00
95         print(i, '\t\t', format(interest, '.2f') + '\t\t', format(principal, '.2f') + '\t\t', format(balance, '.2f') +
96               '\t\t')
97
98
99     # Call the main function to run the program.
100     main()
101
102
103     Output Result:
```

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Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
>>>
RESTART: G:\ITMD 513 Open Source Programming Python\midterm\LoanAmortization.py

Enter the total loan amount: abcd
The loan amount you entered is not valid.
Enter the total loan amount: -10
The loan amount is not valid and must be a positive number.
Enter the total loan amount: 10000
Enter the number of years: one
The number of years is not valid.
Enter the number of years: -1
The number of years is not valid and must be greater than 0.
Enter the number of years: 1
Enter the annual interest rate: seven
The interest rate is not valid.
Enter the annual interest rate: -7
The interest rate is not valid and must be a positive number.
Enter the annual interest rate: 7

Loan Amount: 10000.00
Number of Years: 1
Annual Interest Rate: 7.00

Monthly Payment: 865.26
Total Payment: 10383.20

Payment#      Interest      Principal      Balance
1             58.33         806.93         9193.07
2             53.62         811.64         8381.43
3             48.89         816.37         7565.06
4             44.12         821.14         6743.92
5             39.33         825.93         5917.99
6             34.52         830.74         5087.25
7             29.67         835.59         4251.66
8             24.80         840.46         3411.20
9             19.89         845.37         2565.83
10            14.96         850.30         1715.53
11            10.00         855.26         860.27
12             5.01         860.25         0.01
>>> |
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Ln: 41 Col: 4

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Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
>>>
RESTART: G:\ITMD 513 Open Source Programming Python\midterm\LoanAmortization.py

Enter the total loan amount: 15000
Enter the number of years: 2
Enter the annual interest rate: 5.05

Loan Amount: 15000.00
Number of Years: 2
Annual Interest Rate: 5.05

Monthly Payment: 658.40
Total Payment: 15801.76

Payment#      Interest      Principal      Balance
1             63.12         595.28         14404.72
2             60.61         597.79         13806.93
3             58.10         600.30         13206.63
4             55.57         602.83         12603.80
5             53.04         605.36         11998.43
6             50.49         607.91         11390.52
7             47.93         610.47         10780.05
8             45.36         613.04         10167.00
9             42.78         615.62         9551.37
10            40.19         618.21         8933.16
11            37.59         620.81         8312.35
12            34.98         623.42         7688.93
13            32.35         626.05         7062.88
14            29.72         628.68         6434.20
15            27.07         631.33         5802.87
16            24.42         633.98         5168.88
17            21.75         636.65         4532.23
18            19.07         639.33         3892.89
19            16.38         642.02         3250.87
20            13.68         644.72         2606.14
21            10.96         647.44         1958.69
22             8.24         650.16         1308.53
23             5.50         652.90         655.63
24             2.75         655.65         -0.01
>>> |
```

Ln: 41 Col: 4

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```
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.1916 64 bit
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: G:\ITMD 513 Open Source Programming Python\midterm\LoanAmortization.py

Enter the total loan amount: 10000
Enter the number of years: 1
Enter the annual interest rate: 7

Loan Amount: 10000.00
Number of Years: 1
Annual Interest Rate: 7.00

Monthly Payment: 865.26
Total Payment: 10383.20

Payment#      Interest      Principal      Balance
1             58.33         806.93         9193.07
2             53.62         811.64         8381.43
3             48.89         816.37         7565.06
4             44.12         821.14         6743.92
5             39.33         825.93         5917.99
6             34.52         830.74         5087.25
7             29.67         835.59         4251.66
8             24.80         840.46         3411.20
9             19.89         845.37         2565.83
10            14.96         850.30         1715.53
11            10.00         855.26         860.27
12            5.01         860.25         0.01
>>> |
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```
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Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: G:\ITMD 513 Open Source Programming Python\midterm\LoanAmortization.py

Enter the total loan amount: 11000
Enter the number of years: 1
Enter the annual interest rate: 7

Loan Amount: 11000.00
Number of Years: 1
Annual Interest Rate: 7.00

Monthly Payment: 951.79
Total Payment: 11421.53

Payment#      Interest      Principal      Balance
1             64.16         887.63         10112.37
2             58.98         892.81         9219.56
3             53.78         898.01         8321.54
4             48.54         903.25         7418.29
5             43.27         908.52         6509.77
6             37.97         913.82         5595.95
7             32.64         919.15         4676.80
8             27.28         924.51         3752.29
9             21.88         929.91         2822.38
10            16.46         935.33         1887.05
11            11.00         940.79         946.26
12            5.51         946.28         -0.01
>>> |
```

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